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Welcome to your BTEC First delivery guide

This delivery guide is a companion to your BTEC First specifications. It contains a wealth of ideas for practical activities, realistic scenarios and independent learning, helping to bring the content of the units to life. The aim of this guide is to show how the content of the specifications might work in practice and to inspire you to start thinking about different ways to deliver your course. The guidance has been put together by teachers who understand the challenges of finding new and engaging ways to deliver a BTEC programme, which means you can be sure the guidance is relevant and achievable.

Unit-by-unit guidance is given and includes suggestions on how to approach the learning aims and unit content, as well as providing ideas for interesting and varied activities. You will also find a list of carefully selected resources for each unit, including suggestions for books, websites and videos that you can either direct your learners to use or that you can use as a way to complement your delivery.

Guidance about the new features of the BTEC Firsts is also included, providing an explanation of how these work and what you will need to consider as you plan the course. You will also find comprehensive coverage of assessment, including useful advice about external assessment, as well as extensive guidance about how to plan, design and deliver your assignments. Information about the Quality Assurance process will help you understand the different roles and responsibilities of individuals within your centre, and how you can work closely with Pearson to enable the successful running of your programme.

This delivery guide is intended to be read in conjunction with the qualification specifications.

- The specifications tell you what must be taught and give guidance about how it should be assessed.
- This delivery guide gives suggestions about how the content could be delivered.

The suggestions given in this delivery guide link with the suggested assignment outlines in the specifications but they are not compulsory; they are designed to get you started and to spark your imagination.

Remember that all assignments must go through internal verification before being delivered to learners.

When combining units for a BTEC First qualification, it is the centre’s responsibility to ensure that the qualification structure(s) in the specification are adhered to.
1 BTEC First Qualifications

BTEC Firsts are vocationally-related qualifications designed to develop learners’ knowledge and understanding through the application of learning and skills in a work-related context. BTEC Firsts are designed to allow learners to progress to other level 2 qualifications or apprenticeships, to junior roles in the industry they are learning about or level 3 qualifications.

Around 100 BTEC First qualifications are available for level 2 learners, each linked to an industry sector. Learners may take BTEC Firsts alongside core GCSEs subjects such as English, maths and science, giving them the balanced curriculum recommended by the majority of schools.

There are four sizes of qualification available in the BTEC First suite:

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Size – Guided Learning Hours</th>
<th>Equivalent in size to</th>
<th>Age group</th>
<th>Delivered predominantly in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Award</td>
<td>120</td>
<td>1 GCSEs</td>
<td>14-19</td>
<td>School</td>
</tr>
<tr>
<td>Certificate</td>
<td>240</td>
<td>2 GCSEs</td>
<td>14-19</td>
<td>School</td>
</tr>
<tr>
<td>Extended Certificate</td>
<td>360</td>
<td>3 GCSEs</td>
<td>14-19</td>
<td>School/FE College</td>
</tr>
<tr>
<td>Diploma</td>
<td>480</td>
<td>4 GCSEs</td>
<td>14-19</td>
<td>FE College</td>
</tr>
</tbody>
</table>
INTRODUCTION

2 Introducing the new BTEC Firsts in Information and Creative Technology

The BTEC Firsts in Information and Creative Technology have been developed to inspire and enthuse learners to become technology savvy – to become producers of technology – and computer-based products and systems, rather than just consumers of them. This involves learners creating technology-based products or systems. The new title of the qualifications (from ‘information technology’) reflects the emphasis on the creativity required by learners to create/develop products or systems. It also acknowledges the convergence of creative arts-based disciplines and IT/computing, in areas such as digital animation and computer games.

The BTEC philosophy of learning through doing remains at the heart of the qualification. Learners will be given opportunity to gain knowledge of and a broad understanding of the skills required in the information technology (IT) sector and some aspects of the creative industries, e.g. computer games development.

Developing the qualifications in response to change

The new suite of BTEC Firsts is now available on the National Qualifications Framework (NQF). The NQF fully supports both academic and vocationally related progression pathways.

The BTEC Firsts have been designed to reflect recommendations as set out in independent reviews, consultations and government guidance on vocational education. As part of the development of all of the new BTEC Firsts, we have also taken into account many consultations with schools, further education, higher education institutions and employers.

The Wolf Review

Professor Alison Wolf’s Review of Vocational Education was published in March 2011. The Government has since accepted her proposals in full and the Department for Education (DfE) has produced a list of seven characteristics that all high-value vocational qualifications for learners aged 14+ should demonstrate. Specifically, they should:

1. be at least as big as a GCSE in terms of guided learning hours (GLH), i.e. 120 GLH
2. contain an element of external assessment, e.g. an externally set and marked test taken under specific conditions
3. contain some synoptic assessment so that learners appreciate the breadth of their course and the links between its different elements, rather than just taking units in isolation from each other
4. be graded, e.g. Pass, Merit, Distinction and Distinction*
5. contain content appropriate for learners aged 14+
6. enable progression to further study in the same subject at the next level, and also support progression to broader study at the next level
7. have a proven track record, measured by an uptake of at least 100 learners in five centres.
The Extended Certificate and Diploma within Study Programmes for 16–19 year olds

The BTEC Level 1/ Level 2 First Extended Certificate and Diploma in Information and Creative Technology have been designed to meet the requirements of the government’s Study Programmes for 16–19 year olds. The Department for Education, as part of its Study Programmes for 16–19 year olds requires learners aged 16+ to be offered a high quality study programme giving them the best opportunity to progress to higher education or to secure skilled employment.

As part of this requirement learners should be able to study a qualification of substantial size which provides them with the opportunity to progress to the next stage of learning. The BTEC Level 1/2 First Extended Certificate and Diploma in I&CT have been designed to meet this requirement and provide learners who wish to progress their learning and development in I&CT with the opportunity to study topics and aspects of the I&CT sector appropriate for post-16 learners.

The qualification meets the requirements of the Study Programmes for 16–19 year olds by:

1. Providing learning appropriate for learners aged 16+ who have chosen to focus their learning in the sector.
2. Providing learners with an opportunity to extend learning from pre-16 to post-16.
3. Encouraging learners to explore relevant specialisation in their learning, through new optional units designed specifically for learners aged 16+
4. Supporting learners who may also be working towards achieving level 2 English and/or mathematics qualifications in a post-16 setting and wish to complement their study programme with a qualification that supports preparation for work or progression.
5. Supporting work experience requirements through a specific optional unit, Unit 25: IT Work Experience.
3 Pathways in the BTEC Level 1/Level 2 First Diploma in Information and Creative Technology

The following three pathways are available:

1. Non-endorsed
2. Computer science
3. Systems development and support

Core and Mandatory Units

There are four core and two mandatory units that are common across all the pathways in the Diploma.

The four core units of the qualification provide learners with the foundation that the rest of the units build on.

- **Unit 1: The Online World** provides an introduction to how the internet/web works.
- **Unit 2: Technology Systems** introduces how systems work, as well as covering programming concepts.
- **Unit 3: A Digital Portfolio** provides learners with an opportunity to showcase their work developed throughout the course to prospective educational institutions and employers, by creating a digital portfolio.
- **Unit 19: Computing in the Workplace** provides an insight into the career opportunities in the sector, the skills valued by employers in the workplace and the social media/communications skills that are needed in order to successfully deliver projects.

The following two exciting new mandatory units will give learners a deeper and broader skills and knowledge base that will help them to progress:

- **Unit 17: Multimedia Products Development** is a practical unit providing an introduction to the digital information age, where multimedia plays an ever-expanding and increasingly important role in daily life.
- **Unit 18: Computational Thinking** provides a formal introduction to relevant thinking concepts, such as algorithmic and logical thinking, and mathematical methods, such as Boolean operations and functions, that underpin the topic. Computational thinking skills are required extensively in any IT/computing career and are very much valued by employers.

These six units are to be taken by learners undertaking any pathway.

Non-Endorsed Pathway

The non-endorsed pathway is designed for learners with an interest in a range of information technology and creative computing areas and includes units that will allow them to develop skills across these sectors in a range of contexts.

The optional specialist units provide learners with the opportunity to develop skills in any areas in which they are interested, and the most appropriate outcomes from all of these units must be incorporated into the learner's portfolio (**Unit 3: A Digital Portfolio**).

In providing guidance to learners who are thinking of selecting this pathway it is important that you stress that this is a more wide-ranging programme than the...
endorsed titles and that learners will need to be prepared to work across different areas of information technology and creative computing. This programme is particularly suitable for learners who are undecided about which areas of information technology or creative computing to specialise within, or who wish to explore a wide range of potential options.

This pathway provides progression opportunities onto BTEC Nationals in Information Technology, Creative Media Production and Engineering as well as AS/A2 qualifications such as the GCE in Applied Information Communication Technology. Unit 3: A Digital Portfolio and Unit 19: Computing in the Workplace will be particularly useful to learners who intend to gain employment, as it prepares them with the personal characteristics valued by employers and will allow them to prepare an application for an IT/computing job role. This is complemented with a digital portfolio showcasing their work that they can present during an interview.

Sample curriculum model for the non-endorsed pathway

<table>
<thead>
<tr>
<th>Term</th>
<th>Unit(s)</th>
</tr>
</thead>
</table>
| 1    | Unit 1: The Online World – Externally Assessed (30 GLH)  
Unit 2: Technology Systems – Externally Assessed (30 GLH)  
Unit 3: A Digital Portfolio (part – 10 GLH)  
Unit 6: Creating Digital Graphics (30 GLH)  
Unit 12: Software Development (part – 30 GLH)  
Unit 13: Website Development (part – 20 GLH)  
Unit 19: Computing in the Workplace (part – 20 GLH) |
| 2    | Unit 4: Creating Digital Animation (30 GLH)  
Unit 8: Mobile Apps Development (30 GLH)  
Unit 12: Software Development (part – 30 GLH)  
Unit 13: Website Development (part – 20 GLH)  
Unit 18: Computational Thinking (30 GLH)  
Unit 19: Computing in the Workplace (part – 20 GLH) |
| 3    | Unit 3: A Digital Portfolio (part – 20 GLH)  
Unit 7: Creating Digital Video (30 GLH)  
Unit 13: Website Development (part – 20 GLH)  
Unit 17: Multimedia Products Development (60 GLH)  
Unit 19: Computing in the Workplace (part – 20 GLH) |

- **Unit 1: The Online World, Unit 2: Technology System, Unit 3: A Digital Portfolio** and **Unit 19: Computing in the Workplace** are core units within the qualification, and should be delivered in term 1 as they all provide the underpinning knowledge required for learners, that will support them with other units. Delivering these units first will allow for additional time throughout the programme to prepare learners for the external assessments.

- **Unit 3: A Digital Portfolio** is started at the beginning of the programme as it covers the concept of the project lifecycle which is used in almost all the optional units and so that learners can start planning their digital portfolio. They should also set up a folder structure in which to store relevant information so that when they create their digital portfolio this information can easily be adapted and used.

- It is suggested that **Unit 12: Software Development** is delivered from term 1 onwards as the programming skills and knowledge gained can be effectively used for other units, such as **Unit 8: Mobile Apps Development** and **Unit 18:**
**Computational Thinking.** It also maximises the time learners can spend learning how to design and develop software programs.

- **Unit 6: Creating Digital Graphics** is a fun creative unit, which will engage learners right from the beginning and throughout the programme. This unit links very well to **Unit 13: Website Development**, **Unit 8: Mobile Apps Development**, and **Unit 17: Multimedia Products Development**.

**Computer Science Pathway**

The computer science pathway is designed for learners who are mainly interested in software development, and are enthusiastic about developing mobile apps, creating computer games or even building a robot. This pathway will take learners on a journey into the world of computer science where they will be able to create software systems.

In addition to the **four** core and **two** mandatory units that are common across all pathways, learners will complete **two** further mandatory units. These units develop further work-related and programming skills, and learners will gain a deeper understanding of how to design and develop software programs and software systems alike, using a range of different technologies to solve problems (**Unit 12: Software Development** and **Unit 24: Software Systems Development**).

The optional specialist units provide learners with the opportunity to develop skills in any areas in which they are interested, and the most appropriate outcomes from all these units must be incorporated into the learner’s portfolio (**Unit 3: A Digital Portfolio**).

**In providing guidance to learners who are thinking of selecting this pathway it is important that you stress that this will produce an endorsed qualification which is recognised by employers, further and higher education institutions, and that it will enable learners to take their studies or employment further in the computer science field.**

This pathway provides progression opportunities onto BTEC Nationals in Information Technology, Creative Media Production and Engineering, as well as **AS/A2** qualifications such as the Applied GCE in Information Communication Technology. **Unit 3: A Digital Portfolio** and **Unit 19: Computing in the Workplace** will be particularly useful to learners who intend to apply for places in employment as it prepares them with the personal characteristics valued by employers, and will allow them to prepare an application for an IT/computing job role. This is complemented with a digital portfolio showcasing their work, that they can present during an interview.

Learners will gain the skills and experiences that will prepare them for job roles such as a software developer, website developer and software tester, all of which are highly sought-after roles in this field of information technology and computing.
Sample curriculum model for the Computer science pathway

<table>
<thead>
<tr>
<th>Term</th>
<th>Unit(s)</th>
</tr>
</thead>
</table>
| 1    | Unit 1: The Online World – Externally Assessed (30 GLH)  
      Unit 2: Technology Systems – Externally Assessed (30 GLH)  
      Unit 3: A Digital Portfolio (part – 10 GLH)  
      Unit 6: Creating Digital Graphics (30 GLH)  
      Unit 12: Software Development (part – 30 GLH)  
      Unit 18: Computational Thinking (part – 15 GLH)  
      Unit 19: Computing in the Workplace (part – 20 GLH) |
| 2    | Unit 8: Mobile Apps Development (30 GLH)  
      Unit 12: Software Development (part – 30 GLH)  
      Unit 16: Automated Computer Systems (part – 30 GLH)  
      Unit 17: Multimedia Products Development (part – 30 GLH)  
      Unit 18: Computational Thinking (part – 15 GLH)  
      Unit 19: Computing in the Workplace (part – 20 GLH) |
| 3    | Unit 3: A Digital Portfolio (part – 20 GLH)  
      Unit 16: Automated Computer Systems (part – 30 GLH)  
      Unit 17: Multimedia Products Development (part – 30 GLH)  
      Unit 19: Computing in the Workplace (part – 20 GLH)  
      Unit 24: Software Systems Development (60 GLH) |

- It is recommended that some aspects of Unit 3: A Digital Portfolio should be delivered in the first term, as it will give learners the opportunity to acquire the skills needed to design a digital portfolio. These skills will be valuable throughout the programme as learners will be required to create a digital portfolio demonstrating the outcomes from all other units. It also covers the concept of the project lifecycle, which is used in almost all the optional units.

- Unit 18: Computational Thinking should be delivered in the first term for this pathway, as it is important for learners to understand some of the mathematical methods that underpin the computational thinking skills used to solve problems. Learners will be required to solve problems throughout the programme and will use a range of computational thinking skills, particularly those connected to Unit 12: Software Development, Unit 8: Mobile Apps Development, Unit 16: Automated Computer Systems and Unit 24: Software Systems Development.

- Unit 24: Software Systems Development should be one of the last units to be delivered in this programme, as it requires learners to have gained sufficient skills and knowledge of software development, and to be working with different technology systems. Learners will be required to create a software system which uses two or more different types of technology system.

Systems Development and Support Pathway

The systems development and support pathway is designed for learners who are mainly interested in the technical hardware side of computing, and are enthusiastic about building, configuring, securing and supporting systems. This pathway is very practical and will give learners the opportunity to understand how computer systems work by 'lifting the lid' on them.
In addition to the four core and two mandatory units that are common across all pathways, learners will complete two further mandatory units. These units develop further work-related skills through working with computer hardware devices and software to make/maintain a system (Unit 11: Computer Networks and Unit 23: Computer Security in Practice). The optional specialist units provide learners with the opportunity to develop skills in any areas in which they are interested, and the most appropriate outcomes from all these units must be incorporated into the learner’s portfolio (Unit 3: A Digital Portfolio).

In providing guidance to learners who are thinking of selecting this pathway it is important that you stress that this will produce an endorsed qualification which is recognised by employers, further and higher education institutions, and that it will enable learners to take their studies or employment further in the systems development and support field.

This pathway provides progression opportunities onto BTEC Nationals in Information Technology and Engineering as well as AS/A2 qualifications such as an Applied GCE in Information Communication Technology. Unit 3: A Digital Portfolio and Unit 19: Computing in the Workplace will be particularly useful to learners who intend to apply for places in employment as it prepares them with the personal characteristics valued by employers, and will allow them to prepare an application for an IT/computing job role. This is complemented with a digital portfolio showcasing their work, that they can present during an interview.

Learners will gain the skills and experiences that will prepare them for job roles, such as a computer/network technician, technical/network support engineer, service team leader, helpdesk engineer, IT fraud and forensic consultant, all of which are roles that are highly sought after in this field of information technology and computing.

**Sample curriculum model for the Systems Development and Support pathway**

<table>
<thead>
<tr>
<th>Term</th>
<th>Unit(s)</th>
</tr>
</thead>
</table>
| 1    | Unit 1: The Online World – Externally Assessed (30 GLH)  
Unit 2: Technology Systems – Externally Assessed (30 GLH)  
Unit 3: A Digital Portfolio (part – 10 GLH)  
Unit 14: Installing and Maintaining Computer Hardware (60 GLH)  
Unit 18: Computational Thinking (part – 15 GLH)  
Unit 19: Computing in the Workplace (part – 10 GLH) |
| 2    | Unit 11: Computer Networks (part – 30 GLH)  
Unit 17: Multimedia Products Development (part – 30 GLH)  
Unit 18: Computational Thinking (part – 15 GLH)  
Unit 19: Computing in the Workplace (part – 20 GLH)  
Unit 22: Computer Security in Practice (60 GLH) |
| 3    | Unit 3: A Digital Portfolio (20 GLH)  
Unit 11: Computer Networks (part – 30 GLH)  
Unit 17: Multimedia Products Development (part – 30 GLH)  
Unit 19: Computing in the Workplace (part – 30 GLH)  
Unit 23: Computer Systems Support in Practice (60 GLH) |
• It is recommended that **Unit 14: Installing and Maintaining Computer Hardware** should be delivered in the first term as it allows learners to take their knowledge of technology systems further by installing and maintaining hardware. This unit goes well alongside **Unit 20: Building a Personal Computer** and **Unit 15: Installing and Maintaining Computer Software**. If there is scope to add extra units to the curriculum model, these units would be a perfect addition.

• **Unit 3: A Digital Portfolio** is started at the beginning of the programme as it covers the concept of the project lifecycle which is used in almost all the optional units. It also means that learners can start planning their digital portfolio. Learners should set up a folder structure in which to store relevant information so that when they create their digital portfolio this information can be easily adapted and used.

• **Unit 11: Computer Networks** is a mandatory unit and should be delivered from term 2 onwards, as learners at this stage of the programme should have an appreciation of what technology systems are, how they are used and what makes them work. Learners will be expected to create computer networks using technology systems.

• **Unit 17: Multimedia Products Development** is a mandatory unit and should be delivered from term 2 onwards. It maximises the time learners can spend understanding how to design and develop multimedia products.
4 Key features of the BTEC Firsts explained

We are always working to ensure our qualifications are relevant, and that they support opportunities and progression for young people. We have updated the current BTECs to meet the needs of today’s learners, teachers, educators, employers and universities, and also to reflect the policy decisions being introduced following The Wolf Report (March 2011) on vocational education. Our new BTECs contain a number of new features and it is important that you understand these and how they relate to your delivery of the course.

Employability skills within BTEC

Helping learners to progress into employment has always been a cornerstone of BTEC qualifications. Equipping learners with the skills they will use in the workplace is at the very heart of BTEC and remains an important driver in determining the content of each qualification. When developing our qualifications we work closely with employers to understand the skills they are looking for in new entrants to their industries. The vast majority of employers not only require learners to have certain technical skills, knowledge and understanding to work in a particular sector, but they are also looking for what is termed employability skills. These are the skills which underpin the different tasks and duties that a person can be expected to undertake in their role and which are applicable across sectors.

Unlike technical skills, which may become outdated over time, employability skills enable learners to adapt to the ever-changing roles needed to survive in the global economy.

The CBI definition of employability skills is based on a positive attitude (readiness to take part, openness to new ideas and activities, desire to achieve) which underpins seven characteristics.

1. **Self-management**: readiness to accept responsibility, flexibility, time management, readiness to improve own performance.
2. **Teamworking**: respecting others, co-operating, negotiating/persuading, contributing to discussions.
3. **Business and customer awareness**: basic understanding of the key drivers for business success and the need to provide customer satisfaction.
4. **Problem solving**: analysing facts and circumstances and applying creative thinking to develop appropriate solutions.
5. **Communication and literacy**: application of literacy, ability to produce clear, structured written work, and oral literacy (including listening and questioning).
6. **Application of numeracy**: manipulation of numbers, general mathematical awareness and its application in practical contexts.
7. **Application of information technology**: basic IT skills including familiarity with word-processing, spreadsheets, file management and use of internet search engines.

In a recent CBI/Pearson education and skills survey, Learning to grow: What employers need from education and skills 2012, it was noted that employers (71 per cent) believe schools and colleges should prioritise developing employability skills. They also want to see more done to develop literacy (50 per cent), numeracy (45 per cent) and technology skills (30 per cent).
KEY FEATURES

How employability skills are promoted and developed in BTEC courses

All internally assessed units in BTEC are based on set assignments that require learners to produce evidence of learning applied to a work-related scenario. Within the scenario, learners will typically be put into a junior role in the sector, asked to do some research or preparation, and then asked to provide evidence in the form of a presentation, information leaflet, performance or artefact, depending on the assignment. Suggestions for high-quality assignments are provided in the specification and in the authorised assignment briefs. For example, in *Unit 9: Lifestyle and Well-being* the following scenario is given:

Assignment – Physical Activity: Are You Doing Enough?

You are working as a trainee in a health promotion team. You have been asked to produce a series of articles for a lifestyle magazine.

In your first article you need to look at how much physical activity individuals need to carry out in order to gain health benefits and how they can increase their activity levels.

As assessment evidence, learners are asked to design documentation and prototypes.

Many of the assignments are group assignments and so involve teamwork. Problem solving is developed through the research and/or practice part of the assignment. All assignments require self-management in that it is the responsibility of the learners to complete the assignments and ensure they are submitted by the set deadline.

BTECs are vocational qualifications. This means that learners are preparing to work in a particular sector and so must have good business and customer awareness: an understanding of how the sector works, what makes it ‘tick’ and the business and/or customer drivers for the sector. This will vary depending on the sector. For example, in Business or I&CT the ‘customer’ is the person or organisation that buys or uses the products or services, so in order to make good products the learner has to understand customer needs, primarily by doing research or surveys. In a sector like Health and Social Care, the customer is the client or a parent; again, the learner will need to learn by doing practical work and undertaking assignments that help develop their understanding and respect of clients’ needs and wishes.

In most BTEC specifications there is a unit that introduces the industry to learners. In Sport, this is *Unit 12: The Sport and Active Leisure Industry*. Through this unit, if selected, learners will gain an understanding of the organisations and occupations within the sector, current trends in participation, and the impact of key issues on information and creative technology.

Knowledge and skills signposting for English and mathematics

The mastery of the essential skills of communication and numeracy are at the heart of a young person’s ability to progress, as identified in the *Wolf Report*. In BTECs these skills are woven throughout and tackled in two specific ways.

1. **Embedded mathematics and English throughout the units, mapped to GCSE and functional skills.** Opportunities to practise these essential skills in naturally occurring and meaningful contexts are provided throughout units, where appropriate to the sector. In the specifications, *Annexes B and C* show where an assessment criterion in a BTEC First unit can provide an opportunity to practise a subject content area from the GCSE English or mathematics subject criteria.
2. **Sector-specific mathematics and English units, where appropriate.** For some sectors, there are units specifically devoted to developing mathematical and communication skills in context, for example, *Mathematics for Engineering* and *Effective Communication in Health and Social Care*.

Throughout the course, learners are encouraged to **apply information and creative technology** by producing their assignment work to the highest standard, with forward-looking use of IT at the heart of their work, whether it be using the internet to do research, producing spreadsheets of evidence, or using sophisticated packages to record results aurally or visually. The assessment guidance for every unit provides suggestions for how evidence can be presented, and use of electronic portfolios is highly recommended.

In addition, the new external assessments have looked at innovative use of IT, for example through the introduction of onscreen testing.

**Personal, learning and thinking skills**

In addition to those qualities outlined by the CBI/Pearson, the qualifications were also developed with **personal, learning and thinking skills (PLTS)** in mind. The PLTS map closely to the CBI definition of employability skills in that they develop:

- independent enquirers
- creative thinkers
- reflective learners
- teamworkers
- self-managers
- effective participants.

A mapping grid showing coverage of these skills in each unit appears in *Annexe A* of the specifications.

**Contextualised English and mathematics**

The new BTEC First qualifications provide opportunities for learners to develop and apply their knowledge, understanding and skills within vocational contexts. This provides opportunities for them to develop their essential skills in English and mathematics related to GCSE study.

You are encouraged to deliver these BTEC First qualifications in vocational contexts as these will allow learners to develop and apply their skills in English and mathematics. Within units we have identified opportunities for linking assessment to GCSE study in English and mathematics. These GCSEs are relevant to all learners at ages 14-16 and many learners post-16 who will be continuing to work towards attaining a GCSE at grade C or above in one or both of these subjects. We have also provided a more general mapping of how Learning Aims in units can be related to Functional Skills for relevant post-16 learners in the Diploma specification.

It is recognised that good literacy and numeracy skills are highly valued by employers and by wider society and that achievement of English and mathematics at GCSE level is key to progression through the education system and into employment. The current Government has refocused attention on this need with a number of education policy announcements, and development of English and mathematics was a key recommendation in *The Wolf Report*.

Research has shown that for many learners the most effective way of developing their mathematical skills and of improving their functional skills in English is to learn them within the context of a specific area of vocational interest. Therefore, in the
new suite of BTEC Firsts we have provided opportunities for contextualised maths and English so that learners can practise these essential skills in a meaningful way within naturally occurring contexts.

GCSEs in mathematics and English are the current benchmark of achievement, so we have signposted the assessment criteria of the BTEC Firsts to content from these GCSE qualifications, specifically to the more functional parts of their content. This signposting, which is indicated by a * sign for maths and a # sign for English, shows where learners should be able to practise and develop their skills. These instances occur naturally within the BTEC Firsts, for example when communicating or compiling reports, but can be emphasised and drawn out during teaching and learning. More detail on how this can be done is given on a unit-by-unit basis in the qualification specification.

Where signposting does occur in the unit specification, it indicates that English and mathematics knowledge and skills are a constituent part of the assessment requirements of the units. This does not mean that the BTEC assessment criteria cover the whole of the GCSE or Key Stage 4 requirements but that learners can practise specific areas of English and mathematics. You may want to highlight this opportunity to learners during delivery.

Annexes B and C in the specification show the exact relationship between the BTEC assessment criteria and the GCSE subject content. The mathematics content listed is a consolidation of the full requirements in GCSE Mathematics. Note that GCSE English and GCSE Mathematics already cover functional skills.

The following example demonstrates when learners will be able to develop their English skills within the context of a specific vocational area.

- **Unit 3: Digital Portfolio** – 1B.3, 2B.P3, 2B.M2, 2B.M3, 2B.D2 – where learners are gathering and saving portfolio content, they will have the opportunity to develop skills in choosing content and adapting form from a wide range of styles and genres (English 2, 5, 15, 16).

**Delivery tips: examples of good practice**

There are a number of different ways that centres can effectively manage the delivery of units to strengthen the provision of English and mathematics. Here are two examples.

**Collaboration between the vocational teacher and mathematics/English teachers**

- In this example, the actual mathematics and English concepts are taught by subject teachers but they use contextualised examples from the vocational sector to make the learning meaningful. The learners are in timetabled slots where they attend mathematics and English lessons.
- This approach works well in larger centres where there are many learners taking the same vocational route. It works less well when there is a range of vocational sectors in the same mathematics/English class, although it can still be effective if the respective teachers work closely together to plan the learning programme.

**Mathematics and English are taught in specific lessons by the vocational teacher**

- In this example, the learners have timetabled slots, as part of their vocational contact time, in which their vocational teachers focus on presenting and practising mathematics and English concepts. This model is particularly motivating for learners because they see the direct link between skills and application, but it relies on the vocational teachers being comfortable with teaching mathematics and English concepts and theories.
Whichever model is chosen, we recommend that timetables include specific slots to focus on the teaching of mathematics and English in the context of the vocational course.

**Supporting learners who are unable to achieve their level 2 qualification**

The new suite of BTEC Firsts is for learners aiming to achieve a level 2 qualification. Most will achieve this, but some will not. These learners may have struggled to provide sufficient evidence in their assignments or they may have failed their external assessment.

The new BTEC First qualifications give you the opportunity to assess your learners at level 1 if they are not able to reach level 2 standards, recognising their learning and achievements.

All the assessments you create must be written against the level 2 criteria and be reliable and fit for purpose. You should not create a separate level 1 assignment. If a learner does not provide sufficient evidence to meet the level 2 criteria, only then should you assess their work against the level 1 criteria. The grade given will be Unclassified if the learner does not meet the level 1 criteria.

You should expect that learners will be able to achieve a Level 2 Pass or above in at least some of their units. Units where learners have achieved a Level 2 pass will be shown in their certification even if the qualification overall is achieved at Level 1.

If a learner is identified as having difficulty achieving at Level 2 then you may want to consider switching the learner to a smaller size of qualification, such as an Award or Certificate, so that they can focus on achieving in a smaller range of units.

**An example of a learner being assessed against a level 1 criterion**

On the next page is an example of an assessment grid, taken from *Unit 3: A Digital Portfolio*. Each assessment grid includes level 1 assessment criteria.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2 Pass</th>
<th>Level 2 Merit</th>
<th>Level 2 Distinction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning aim A: Design a digital portfolio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A.2 Produce designs for a digital portfolio, with guidance, including:</td>
<td>2A.P2 Produce designs for a digital portfolio, including:</td>
<td>2A.M1 Produce detailed designs for a digital portfolio, including:</td>
<td>2A.D1 Justify the final design decisions, explaining how the digital portfolio will:</td>
</tr>
<tr>
<td>● outline storyboards of the layout and content</td>
<td>● a timeline for the project</td>
<td>● alternative solutions</td>
<td>● fulfil the stated purpose</td>
</tr>
<tr>
<td>● a list of ready-made assets to be used.</td>
<td>● a storyboard of the layout and content of pages</td>
<td>● detailed storyboard of the layout and content of pages</td>
<td>● meet the needs of the audience.</td>
</tr>
<tr>
<td></td>
<td>● a structure chart indicating navigation routes</td>
<td>● a detailed structure chart with complete navigation routes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● a list of ready-made assets to be used, including sources.</td>
<td>● fully referenced sources for the readymade assets.</td>
<td></td>
</tr>
</tbody>
</table>

In the scenario below learners are given the following assignment:

**Assignment title:** Design a Portfolio
**Scenario**: You are applying for a job with an IT company. As part of the application process, the company wants to see examples of the products you have made and the projects you have completed.

Design a digital portfolio to go alongside your application, which includes at least two products or projects you have worked on. The content of your portfolio should show a range of your IT skills and experience, and be related to the work of the IT company you are applying to.

In your portfolio, specify the audience and purpose. Include a timeline, structure chart, storyboards and details of assets required.

Justify the choice of assets and the design of the portfolio in relation to the audience and purpose.

**Assessment evidence**: Design documentation

The learner’s portfolio must include work from every unit in their BTEC First I&CT course.

In the scenario below, the learner has been given the same assignment as everyone else in the group; however, they are clearly not working at a level 2 standard.

Harry cannot decide on a design for his e-portfolio. His teacher has spent a lot of time with him helping him to get started. [This indicates that Harry is not working independently; he needs a lot of support.]

After a lot of discussion, Harry starts to work on his storyboard to illustrate the layout and content of his portfolio. He produces a storyboard with five screens (panels) and the screens are missing navigation buttons. Also, Harry is not sure what type of ready-made assets to include. His teacher suggests that he looks on the internet for some suitable copyright-free photographs and selects some suitable bevelled buttons from Dreamweaver for Harry to use. [His teacher has had to give Harry some of the sources for his assets.]

Harry does find some suitable photographs and improves his storyboard, which now includes six screens with navigation buttons, and he completes a list of ready-made assets, but he has struggled and it took him a long time. The teacher recognises that Harry will not be able to complete the storyboard and he has not produced a timeline. [Harry has provided sufficient evidence for 1A.2 but not for 2A.P2.]

Learners who achieve at level 1 can consider the following progression routes.

- Use the skills, knowledge and experience they have gained to retake their level 2 qualification.
- Choose to study a different subject at level 2.
- Work towards an Apprenticeship at level 2.
Key Features

Learners moving on to a larger qualification: Recruitment with integrity

After completing a next generation BTEC a learner may wish to continue their studies on a BTEC First in order to top up to a larger qualification, for example from an Award to a Diploma. This could be at the same centre or at a new one.

It is often appropriate to recruit learners onto further study at level 2 following a BTEC First certification. In these cases you should ascertain that the learner is demonstrating that they are still engaged and challenged at Level 2, rather than demonstrating that they are capable of progressing to study at Level 3. This can usually be judged from a learner’s BTEC, GCSE and other grades and the quality of their application. It is also important that further qualification at Level 2 will benefit the learner by furthering their progression into their chosen career.

Remember: Your groups may contain a mix of learners studying the qualification for the first time as well as learners who are topping up. Care should be taken to ensure that all members of these groups are equally engaged and challenged, for example by ensuring all team members in group activities have an opportunity to perform the leadership roles.

Learners moving on to a larger qualification: Top-up registration

After you have made a top up registration for your learner, the achievement of the certificated units will be imported into your records on Edexcel Online. There is no opportunity to retake the assessments in the internally assessed units via a top-up registration so the imported grades are final. It is possible for a learner to retake externally assessed units.

Learners moving on to a larger qualification: Re-registration

If your learner did not realise their full potential in an NQF BTEC that they have been certificated for, and wishes to study a larger size BTEC at a new centre, then an entirely new registration may be more appropriate than a top-up registration to enable a fresh start. In this case the learner must produce entirely new evidence for assessment generated by your centre’s assignment briefs.
5 Assessment guidance

Assessment for the new BTEC Firsts

BTEC assessment has always been about:

● ensuring that learners are assessed for their skills as well as their knowledge
● ensuring that learners are given the chance to show what they have learned in vocational and applied contexts
● allowing learners to be assessed when they are ready and when a centre is able to fully support them.

While updating the BTEC Firsts, we have not changed these fundamentals – BTEC assessment will remain a positive statement of achievement.

The introduction of external assessment will reinforce learner engagement, giving them clear goals and targets in a way that helps them to understand the challenges of working life.

Experienced BTEC teachers should think about whether or not they need to change their delivery pattern to make sure they can provide access to external assessment at the best time. At the same time, there are some important developments in internal assessment that you should also be aware of as you plan your assessment for the year.

External assessment

After careful discussion with centres and other stakeholders, we have tailored the type of external assessment to meet the needs of the sector. All the assessments will be distinctively vocational, enabling learners to apply their learning in vocational or applied contexts.

For your sector you need to check:

● which unit(s) are to be externally tested
● the assessment method
● the availability of assessment for the first time
● the availability of retake opportunities (allowing for results)
● the delivery pattern we are recommending for these units and for other units as given in the specifications.

Remember that you have plenty of time to prepare for assessments because you will be delivering over a one- or two-year period. For some sectors, completion of the externally assessed unit at or very near the end of the programme will be the recommended pattern. In others, it may be suggested that learners take the assessment earlier in the programme, but you should always make sure that learners are fully prepared.

The externally assessed unit will often be one that provides a core of knowledge that will be enhanced, developed and applied through other units. Learners’ depth of understanding of the content of externally assessed units is likely to be enhanced by applying knowledge through other units. Therefore, when you are planning and delivering your units, think about how you can bring out examples that would be useful illustrations of issues covered in the external unit(s).

Each specification has details about when assessment is available. To gain access to the assessments, learners have to be registered for a programme – the
arrangements for this will be the same as for all BTECs. Please refer to the
*Information Manual* on the website.

We will do everything we can to make external assessments relevant, engaging and
suited to learner needs so that they support the overall development of the learner
rather than being a hurdle or distraction. You should not enter learners for external
assessment to check how they are doing or to give them practice – we provide
sample materials for use in preparation.

The table below shows the type of external assessment and assessment availability
for this qualification.

This assessment forms part of the core knowledge of the programme and is likely to
be delivered towards the start of the programme but may be complemented by study
in the other core unit(s). The learner’s overall readiness to undertake external
assessment should be considered before entering for the assessment.

<table>
<thead>
<tr>
<th>Unit 1: The Online World</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of external assessment</strong></td>
</tr>
<tr>
<td><strong>Length of assessment</strong></td>
</tr>
<tr>
<td><strong>No. of marks</strong></td>
</tr>
<tr>
<td><strong>Assessment availability</strong></td>
</tr>
<tr>
<td><strong>First assessment availability</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit 2: Technology Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of external assessment</strong></td>
</tr>
<tr>
<td><strong>Length of assessment</strong></td>
</tr>
<tr>
<td><strong>No. of marks</strong></td>
</tr>
<tr>
<td><strong>Assessment availability</strong></td>
</tr>
<tr>
<td><strong>First assessment availability</strong></td>
</tr>
</tbody>
</table>
Assessment and grading for internally assessed units

Internal assessment remains the main assessment method for BTEC qualifications because we believe that assignments set and marked within the centre provide the most relevant vocational learning experience for your learners.

You should guide both the teaching and the learning to then ensure that learners are assessed validly and reliably in a way that is relevant for a vocational qualification. Your teaching of the knowledge, skills and vocational applications will underpin a learner being able to demonstrate achievement through assessed assignments. Learners should be given formative feedback on their learning and skills development during the teaching and learning phase. You should consider carefully when your learners are ready to undertake an assessment. An assessed assignment must have a clear structure and timescale, and encourage the learner to work independently to show relevant evidence. You should make sure that the assessment is a clear, discrete activity. You can then make a qualitative judgement on the evidence using the assessment criteria.

For those who are used to teaching BTEC not much has changed, but we are putting more emphasis on some requirements and helping to build good practice.

- You should make sure that the assessment is a clear, discrete activity. Evidence from the guided learning phase is not admissible because evidence for assessment must be produced independently.
- You should use the new presentation of units, where learning aims are placed with associated assessment criteria, to provide building blocks for assessment – these are clear and simple to use and we recommend that you work through them with your learners.
- Your assessment plan for each unit and for the programme must be clear at the outset of the programme and signed off by the Lead Internal Verifier.
- Your Lead Internal Verifier must authorise your assignments. If you don’t have a Lead Internal Verifier who has been through standardisation, you should use support from us to ensure that your assignments are fully fit for purpose. You can use the endorsed assignments or you can access the assignment checking service through our website.
- You need to be explicit about the timescales and the evidence for assignments – there is nothing new about this but we will be expecting centres to follow best practice and to be very clear for their learners.
- You need to set out expectations through tasks and evidence – remember that the criteria are used to judge evidence and are not tasks in their own right.
- Summative assessment takes place after the final submission date. A learner may be given one opportunity to resubmit a completed assessment after a grade has been given, where this has been correctly authorised.
- You should ensure that all work has been produced authentically and that you have checks in place to ensure that learners are submitting their own work.

How assignments are used

Assignments are used to assess learner achievement. You should work with the other people in your programme team to design a plan of activity for the year, or the programme as a whole so that assignments have a clear schedule for the start, the finish and for internal verification.

A key question to ask is, ‘How many assignments do I need?’ Your assessed assignments should cover a minimum of one complete learning aim. You may choose
to set an assignment for a whole unit or even bring units together for assessment. Remember that this means your assessed assignments – of course you may set activities before assessed assignments to provide opportunities for learning from formative feedback and through skills building. These preparatory activities may often use group work and research as a preparation for undertaking the assessment itself but cannot contribute evidence towards an assessment.

In making a decision about how many assignments to use, you can think about what resources you have in your centre, what is available in the locality, how you could use links with local employers, and what opportunities there are for relating assessment to realistic vocational themes.

**Top tips**
- If a unit builds up – for example by ‘plan’ and then ‘do’ and then ‘review’ – then one large assignment may work best.
- If a unit requires several forms of evidence then several assignments may be best.
- It is good to emphasise the links between units but it is harder to manage assessment across units – if you feel this is a good approach then be clear on how you will reach one decision for a unit.

You need to think about how the evidence that the learner will produce can be verified and about how you will know that what each learner has done is authentic. You can only accept for assessment learner work that you know has been produced in a way that demonstrates the learner’s own achievement.

**Assignment ‘warm-up’ – active teaching and learning**

Your learners will do their best if they are motivated through engaging and realistic activities. All units involve ‘teaching the basics’ but learners need to get involved in order to understand where what they are learning fits in.

You can use your resources and your imagination to really bring learning alive. You can encourage learners to try things out in groups, role plays, presentations and practical demonstrations. You can use visits and talks for research – remember you will need to structure what you do so that learners get the information they need by providing a question sheet for them to use during a talk or visit, for example.

You can encourage learners to ‘get their hands dirty’ by trying something out. You can build up their skills so that they will be able to show them off confidently in the assessed assignment.

You can use this ‘warm-up’ time to emphasise practical links between units, so that when learners are carrying out tasks they appreciate that they are often simultaneously drawing on skills/understanding from different units. It is important that learners appreciate the holistic way that their learning prepares them for further study or employment.

**Introducing the assignment**

Your teaching and learning phase is going to lead directly into the assessed assignment. You may be setting this up in a very specific way – such as everyone completing a practical activity in a timed slot – or this may be independent work spread over a number of weeks.

It is important to remind learners preparing work for assessment that they have to produce it themselves and that they have to meet the deadlines you give them. Once
learners begin work on an assignment, no specific assessment feedback can be given.

Remember that you should be sure that the learners understand all the requirements for an assessed assignment before the assessment begins. Look at each unit carefully for how the evidence generated will be judged using the assessment criteria.

**Evidence for assignments**

You can use different types of evidence for assignments. A description does not have to be written and a presentation could be given in a number of styles – for example PowerPoint®, verbal or a digital/video recording. You need to think about what is fit for purpose. So, if learners need to explain a plan, why not have them present it to an audience with a question and answer session?

You should check that the type of evidence you are planning is feasible – for example, if you ask learners to ‘write a memo’, the coverage of one or two sides of A4 in a mainly written format must be capable of generating sufficient evidence. Likewise a poster may not be a suitable evidence format for a detailed evaluation. Remember that whatever evidence your learners produce must be capable of being verified as well as assessed. So, if they are actually producing a model, a performance, a meal, a coaching session, a demonstration, etc., you need to think about how it will be observed or recorded so that it can be checked during verification. Remember: No activity can be evidenced solely by an assessor’s observation log or by a witness testimony. All observed evidence must be able to be authenticated to the learner. This means that observation logs must always be supported by learner-generated evidence such as preparation notes or reflective logs, or by photographic or video evidence in which the learner can be identified. The totality of this evidence must be available to the assessor at the point of the assessment decision, which must follow hand-in of an assignment. An assessor should not award criteria during an activity, e.g. at the point of completing an observation log.

**Learning aims and assessment criteria**

A learning aim sets out what you should be covering in order to prepare the learners for assessment. It may define knowledge, understanding, skills and contexts, and the wording of the aim will suggest appropriate learning experiences. You may set an assessed assignment on more than one learning aim but you should not normally split a learning aim over assignments. The evidence evidence the learner produces in response to the assignment brief is judged using the assessment criteria, so you must make sure that what you have stated in the task fully covers those criteria.

**What about the final grade for a unit?**

The final grade for a unit is at Level 2 (Distinction, Merit or Pass), Level 1 or Unclassified. The assessment criteria are detailed in each unit so that you can clearly see what is required. You need to be aware that a unit grade can only be given once all the activities and assignments for that unit are complete. In giving assessment decisions to learners, you need to be clear about when you are giving a formal decision and how this relates to the assessment for the unit as a whole.

If you choose to include a learning aim in more than one assignment, you should be very clear with learners how a judgement will be reached through looking at the evidence across the assignments. For example, the learner may be being asked to show the same skills in two different contexts. If so, they need to know if their
performance in either is sufficient for assessment, or if they must perform to the same standard in both.

**Keeping clear assessment records**

You can only use assignments as assessment instruments effectively if you work closely with other members of the assessment team and keep accurate records of what you are doing. Your records help you and the team to plan, review, monitor and support learners and ensure that assessment is authentic and accurate.

The Lead Internal Verifier has a very important role in ensuring that each teacher, assessor and internal verifier on the programme understands the standards and the processes for keeping assessment documents.

Your records are there to help you get it right for your learners. The main documents that you use, which can be used electronically, are:

- an assessment and verification plan for the programme, showing when each assignment starts and finishes, when it is verified, and which unit(s) or learning aims it covers
- an assignment brief template, ensuring that all the key requirements of an assignment are covered
- a record of internal verification for the assignment brief
- a record that the learner completes when submitting an assignment, which should include the date and a declaration of authenticity
- a record of internal verification for an individual sample of learner work
- a record of progress for each learner, showing the assignments that have been completed and the assessment decisions given.

**Giving grades**

At the end of an assignment you will need to reach a decision on assessment. If an assignment covers a whole unit then this will be a final grade; if it covers part of a unit then it will be a component of a final grade. In either case, it counts as an assessment decision and should be subject to internal verification and then finalised.

Your decisions must be checked according to the internal verification plan signed off by the Lead Internal Verifier. For each assignment, a sample of learner work must be reassessed fully by the Lead Internal Verifier or another person acting as an Internal Verifier who has been directed by the Lead Internal Verifier. Once your decisions have been checked you can give these to the learners as ‘final’. Remember: You will then be able to accept only one further attempt from the learner to provide further or better evidence for the learning aim(s) covered in that assignment.

The assessment decision must be given to the learner on an appropriate assessment record document which contains the assessment decision, the assessor’s declaration of authentication of the learner work, space for the Lead Internal Verifier to authorise a resubmission and specify the conditions where applicable, and the assessment feedback comments. Feedback to the learner for each learning aim must be constructive and criterion-based. The learner should be clear on why they have been awarded each criterion, and why they have not been awarded any others. It is also helpful to annotate the learner work to show exactly where evidence for each criteria can be found. The assessment feedback must NOT offer any further guidance to the learner. Further guidance means guidance that is beyond that available to them at the start of the assignment; they must not be told individually or specifically what they can do to be awarded further criteria. Care must be taken to maintain the independence of the learner to enable a resubmission opportunity to be authorised.
You can only award higher grades if a learner has demonstrated the requirements of lower grades. This does not mean that the criteria represent different tasks or stages – you should be able to apply the criteria to the same evidence if the assignment is structured carefully.
A summative unit grade is awarded after all opportunities for achievement are given. A learner must achieve all the assessment criteria for that grade. Therefore:

- to achieve a Level 2 Distinction a learner must have satisfied all the Distinction criteria in a way that encompasses the Level 2 Pass, Merit and Distinction criteria, providing evidence of performance of outstanding depth, quality or application
- to achieve a Level 2 Merit a learner must have satisfied all the Merit criteria in a way that encompasses all the Level 2 Pass and Merit criteria, providing performance of enhanced depth or quality
- to achieve a Level 2 Pass a learner must have satisfied all the Level 2 Pass criteria, showing breadth of coverage of the required unit content and having relevant knowledge, understanding and skills
- a learner can be awarded a Level 1 if the level 1 criteria are fully met. The award of Level 1 is not achieved through a failure to meet the Level 2 Pass criteria.

A learner who does not achieve all the assessment criteria at Level 1 has not passed the unit and should be given a grade of U (Unclassified).

A learner must achieve all the defined learning aims to pass the internally assessed units. There is no compensation within the unit

**Enabling Higher Achievement**

Your assignments should provide opportunities for learners to achieve at the highest level and should promote stretch and challenge. Not all learners will finally achieve a Distinction or a Merit, but it is important that they are provided with the opportunity to do so.

You must look to structure assignments so that learners produce evidence that can be used across the grade levels – Learners should not have to ‘get pass out of the way first’. To ‘aim high’ learners must be well prepared before they start the assignment and be encouraged to attempt to reach the highest standards All assessed activities must ask the learner to produce evidence that can be assessed against the full range of grades available.

**Assignment design**

Your assignments are a tool for encouraging learners to provide evidence for you to make assessment judgements. Good assignments are interesting and motivate learners well.

The components of an assignment are:

- **scope** – outlines which unit(s) or learning aims are being covered and which criteria are being addressed
- **a scenario** – provides a setting and rationale for the assessment
- **tasks** – set out what a learner needs to do to provide the evidence
- **evidence requirements** – set out exactly what the learner is expected to produce and how the assessment will take place.
- **a timescale** – sets out start and hand-in dates.
Assignment briefs

Your assignments must be given to a learner formally as an assignment brief so that the learner knows they are being assessed and what is required of them.

The assignment brief includes:

- the qualification
- the title and number of the unit(s)
- an assignment title and number (if more than one per unit)
- the learning aims
- the assessment criteria
- the evidence requirements
- the start date
- the hand-in deadline.

You should include a record that it has been given to the learner, normally by inserting the learner’s name into a copy of the assignment brief, but this could be recorded electronically.

Your learners should be provided with a form or other record for declaring that their work is their own and for confirming the date of submission.

Using an authorised assignment brief

We are preparing a bank of authorised assignments briefs that you will be able to access at www.btec.co.uk/authorisedassignments. It will include at least one authorised assignment brief for every internally assessed unit. For mandatory units, there will be enough authorised assignment briefs to cover all assessment criteria.

We ask you to verify every assignment every year, regardless of whether it is your own or one sourced from elsewhere. Once your assignment is verified, you can put it in your timetable and check that you have planned delivery of the appropriate unit content. This can be as simple as making sure you have planned an event, visit or performance as suggested.

- The Lead Internal Verifier should fit these assignments into the overall plan and know when they will be assessed.
- You may want to adjust the assignment to make it fit your learners’ needs and your centre’s resources.
- You should think about exactly how the evidence is going to be produced and whether or not your learners need guiding to relevant activities that they have already completed.
- You may need to plan for practical activities to be carried out and recorded.

It is important that you are as familiar with the authorised assignment brief as you would be if you had created the assignment yourself. Understanding the assignment will ensure that you plan activities that properly reflect the scenario given in the assignment and that you are prepared for the evidence learners submit.
The scenario

The assignment should be set in a vocational context that helps your learners to show what they have learned in a relevant way. This can often be achieved by asking learners to imagine they are in an appropriate job setting with a job role and job tasks. It could involve providing them with a brief of an activity that would be of value to a local employer, or without using a job context directly. It could draw on a real case study in order to allow application and analysis. You can draw on understanding of your sector to develop appropriate assessment contexts.

Evidence

You can choose suitable forms of evidence – and it is possible to use a wide range; from reports to presentations, from performances to diaries, from record sheets to digital/video recordings.

Of course you should match the evidence type(s) selected to the requirements of the unit(s) or learning aims(s). For example, if a learning aim requires a practical demonstration then you should think about how that is going to be set up and recorded.

Be careful not to suggest a type of evidence that may be too short – for example, a ‘leaflet for new buyers’ may be a realistic form of assessment for business learners to produce but may not provide for sufficient breadth in itself, depending on the assessment requirements.

For some evidence, the period for its production must be time-constrained and in some cases you may want to ensure authenticity by having some evidence produced in supervised conditions.

The tasks

The tasks should be a clear statement of what a learner needs to do to produce the evidence. You may explain the tasks to learners in more detail during delivery, but the assignment itself should be clear. You should remember to relate tasks to the scenario and to the evidence. If learners have been carrying out preparatory work – such as visits, rehearsals or skills exercises – then you may want to refer to this in the tasks.

Your tasks must:

● specify the nature and extent of the evidence
● be clear and include any specific materials or steps with times or dates when necessary
● refer to the assessment criteria that the evidence will be judged against
● encourage the generation of evidence that can be judged against the criteria
● be presented in a way the learner can understand – remember that the criteria are not in themselves tasks
● fit together to cover the learning aim sensibly, allowing learners to achieve to the best of their ability.

You must make sure that the tasks can generate evidence which cover the criteria. When you create tasks you should not use the exact wording of the criteria, but you should pay close attention to it and the associated assessment guidance.

You should always list the criteria covered by each assignment – and also normally each task. When you quote the assessment criteria, please don’t change their wording. You can, of course, use a glossary of the wording of tasks to highlight what certain words mean. Many words will be repeated across criteria for different grades and your learners may find it useful if you highlight the changes.
ASSESSMENT GUIDANCE

Scope
You can choose the scope of an assignment provided that it fits well into the overall assignment plan for the unit(s) and the programme. For some qualifications it is normal practice to bring several units together for large-scale projects, while for others initial coverage of a topic in one unit may then be picked up in later, more specialist units.

When planning a unit-by-unit approach to assessment, you should make sure that learners understand through their learning how the units relate to each other, and that the requirements for synopticity are addressed.

Assignments that span several units should be carefully controlled, and you need to decide whether it is only the learning or both learning and assessment that is considered together.

Learner responsibility
You should make sure that learners know they must meet their deadlines and provide work that is genuinely their own, otherwise their grades will be affected. To support learners, you should explain how to reference the work of others and how to work in such a way that ensures they can declare that their work is their own.

We recommend that learners are given a guide to their assessment at induction to the programme. You can reinforce the expectations when assessed assignments are handed out.

Quality assurance

What is quality assurance?
Quality assurance is at the heart of vocational qualifications. For many BTEC units, assessment is completed by your centre and your centre is responsible for the grading and standard of assessments.

- You use quality assurance to ensure that your managers, internal verifiers and assessors are standardised and supported.
- We use quality assurance to check that all centres are working to national standards. This is done by sampling your marked assignments.

What is the purpose of quality assurance?
In your centre, quality assurance allows you to monitor and support your BTEC staff and to ensure that they understand, and are working to, national standards. It gives us the opportunity to identify and provide support where it is needed in order to safeguard certification. It also allows us to recognise and support good practice.

How does it work?
First of all, you need approval to deliver BTEC qualifications. By signing the approval declaration you confirm that you have in place all necessary resources, appropriately experienced staff, and quality-assurance policies and procedures. You should have standardised systems and procedures for registering and certificating learners, tracking learner achievement and monitoring assessment and internal verification.

During the delivery of a programme, internal verification is the quality-assurance system that you use to monitor assessment practice and decisions, ensuring that:

- assessment is consistent across the programme
- assessment tools are fit for purpose
• assessment decisions judge learner work accurately using assessment criteria
• standardisation of assessors takes place.

Internal verification is a recorded discussion between two or more professionals to ensure accuracy, fairness, consistency and quality of assessment. Internal verification procedures must:
• check all the assignment briefs or assessment tools used in every internally assessed unit
• check a sample of assessment decisions made for every internally assessed unit
• check a sample of assessment decisions from every assessor
• ensure that within the sample:
  o the range of assessment decisions made is covered
  o the experience of the assessor is taken into account when setting the sample size
  o the sample size is sufficient to assure the accuracy of the assessment decisions for the whole group
• plan and document the process.

Our external quality-assurance processes include:
• annual visits to each centre to look at quality-assurance systems and procedures (Quality Review and Development)
• standards verification by a subject specialist to sample assessment and internal verification of learner work
• standardisation activities to support assessors, internal verifiers and lead internal verifiers.

Every year we publish an updated BTEC Quality Assurance Handbook to explain our external quality-assurance process for the next academic year. Along with the programme specification, the handbook should provide your programme team with everything they need to run vocational programmes successfully.

Centre roles and responsibilities

• Senior managers
  The Head of Centre is formally responsible for ensuring that your centre acts in accordance with our terms and conditions of approval. These include ensuring the provision of appropriate resources, recruiting learners with integrity, providing full and fair access to assessment, maintaining full and accurate records of assessment, complying with all quality-assurance processes, and ensuring that all certification claims are secure and accurate. Day-to-day responsibility is normally delegated to the centre’s BTEC Quality Nominee.

• BTEC Quality Nominee
  Each centre is asked to identify a member of staff as its Quality Nominee for BTEC provision. This person is the main point of contact for information relating to quality assurance. Quality Nominees will receive regular information from us about all aspects of BTECs, which they should share with the relevant staff in their centre. Therefore, it is very important that Quality Nominee details are kept up to date on Edexcel Online. We recommend that your Quality Nominee is someone with responsibility for the BTEC curriculum because they will be involved in monitoring and supporting staff in your centre. The Quality Nominee should ensure that BTEC programmes are managed effectively and actively encourage and promote good practice in your centre.
• **Examinations Officer**
  The Examinations Officer is the person designated by the centre to take responsibility for the correct administration of learners. This person normally acts as the administrator for Edexcel Online – our system for providing direct access to learner administration, external reports and standardisation materials.

• **BTEC Programme Leader**
  The Programme Leader (or Programme Manager) is the person designated by your centre to take overall responsibility for the effective delivery and assessment of a BTEC programme. The Programme Leader may also act as the Lead Internal Verifier.

• **Lead Internal Verifier**
  The Lead Internal Verifier is the person designated by your centre to act as the sign-off point for the assessment and internal verification of programmes within a principal subject area (for example, BTEC Firsts and Nationals in Business, or BTEC Firsts and Level 1 in Engineering). We provide Lead Internal Verifiers with access to standardisation materials. The Lead Internal Verifier should be someone with the authority to oversee assessment outcomes. Ideally this would be the Programme Leader, because this would normally be a key part of their role. They should be directly involved in the assessment and delivery of programmes and able to coordinate across assessors and other internal verifiers for a principal subject area.

• **Assessors and internal verifiers**
  The programme team consists of the teachers who are responsible for the delivery, assessment and internal verification of the BTEC qualification. An assessor is anyone responsible for the assessment of learners. An Internal Verifier can be anyone involved in the delivery and assessment of the programme. Please note that if a teacher writes an assignment brief they cannot internally verify it. Someone else should perform this function. Where there is a team of assessors, it is good practice for all to be involved in internally verifying each other. If there is only one main person responsible for delivery and assessment then arrangements must be made for their assignments and assessment decisions to be internally verified by someone appropriately experienced.

**Tips for successful BTEC quality assurance**

• Recruit with integrity. Ensure that the learners you register on the programme are able to achieve at level 2 and have a specific interest in the vocational sector.

• Ensure that you have sufficiently qualified and vocationally experienced staff involved in delivery and assessment. BTECs are vocational qualifications, designed to be delivered by staff with expertise in their subject.

• Provide induction, training and ongoing development opportunities for your staff. Best practice comes from having staff that understand the BTEC ethos and assessment methodology and have up-to-date knowledge of their vocational sector.

• Use the free resources available. There is a wealth of guidance in the specifications and delivery guides that will help you with delivery and assessment.

• Make quality assurance part of everyone’s role. Quality assurance is a fundamental aspect of every role, from assessor to senior manager. Recognising this and providing time and resources to support quality assurance is the key to success.

• Plan ahead. You should begin a programme with a clear schedule for handing out assignments, assessment deadlines and internal verification, so that you are well prepared to ensure ongoing quality and able to address any issues quickly.
● Ensure good communication. Assessors, Internal Verifiers, Lead Internal Verifiers and managers should all be clear on their roles and how they interact. The Lead Internal Verifier must have a clear overview of the plan of assessment and how it is being put into practice.

● Provide clear, consistent feedback to learners during the guided learning stage and clear and accurate assessment feedback based on the grading criteria after the final submission only. Remember care must be taken to maintain the independence of the learner during assessment activities. This allows learners to know exactly how they are achieving on the programme, identifies areas for development, and encourages them to take responsibility for their own learning.

● Undertake internal verification in a timely way. Assignment briefs must be internally verified before they are given to learners. A sample of assessment decisions should be internally verified as soon after assessment as possible to ensure that learners receive accurate and supportive feedback on their achievement.

● Track assessment and internal verification accurately as you go along. Assessment records should be kept at the level of the learning aim and assessment criterion/criteria. This gives a clear confirmation of individual achievement and identifies areas for improvement.

● Using standardised templates for all quality-assurance documents helps to ensure a consistent approach. We provide templates via our website that you can use for:
  o internal verification of assignment briefs
  o internal verification of assessment decisions
  o observation records and witness statements.

● These templates are not mandatory and you are free to design your own, but using them will help to ensure that you are meeting requirements.

● Ensure that learner work is kept securely, but is accessible during the programme. You will be required to provide learner work for external quality assurance while learners are on the programme.
Units
Unit 1: The Online World

Delivery guidance

Approaching the unit

This unit provides an introduction to the underpinning knowledge and understanding of how the internet and the web work and how to use them. It also provides an introduction to networking. The unit will help learners prepare for the next phase of the internet revolution – the ‘internet of objects’. It has been estimated that, by 2020, 50 billion devices will be interconnected over the web. By studying this unit, your learners will be in a position to capitalise on this predicted revolution.

The technological focus of this unit is on communicating online, computer networks and websites.

Ideally, this unit would be delivered before moving on to Unit 11: Computer Networks and/or Unit 13: Website Development.

This unit is externally assessed by an online test, which should be taken after the underpinning knowledge has been delivered. This assessment is available on-demand, but will take some weeks to be marked. You can ‘semesterise’ this unit with online assessment close to the end of semester 1, and plan for a revision session halfway through semester 2 followed by a re-sit for any learners who fail the first assessment.

Delivering the learning aims

Firstly, learners could consider their own online life and how they use online services and communications. They could explore selected examples of the services identified in the specification and, through collaborative work, investigate online facilities for advertising, storage, backup, archiving and file sharing. During this work, learners could take advantage of communication methods such as video calls, VoIP, web meeting and instant messaging and experience real-time communication over the internet. Their investigation could lead to a presentation about the internet of objects as the next major revolution of the online world.

You could introduce the technologies that underpin these online services and communications with reference to the internet, its infrastructures, associated protocols and service providers. The emphasis should be on an overview of these technologies at a depth appropriate for level 2 learners, and the scope should cover the worldwide web, as the collection of information available via the internet, and email as a system for sending messages through the internet. This work on internet technologies should be based around the fundamental topic of data exchange to cover transmission modes and the main characteristics of alternative transmission methods.

Learners should be familiar with packet switching as the data transmission process that enables the exchange of data across the internet. In addition, they should investigate the components required to create wireless- and server-based networks and gain an understanding of client-side and server-side processes. A client is a computer application such as a web browser that runs on the user’s local computer and connects to a remote server to access internet content. Learners must be aware of back-office processes and develop their knowledge of databases and their role in the storage and manipulation of data to provide the information required for online transactions such as storing customer details when you shop online.
UNIT 1: THE ONLINE WORLD

During their investigations into online services, communications and the exchange of data, learners must be aware of possible threats to the data and how to manage their own e-reputation. Threats to the data include both accidental and malicious damage and this section of work should cover measures for protection, backup and recovery.

Learners will need to investigate the inherent dangers in the widespread use of social networking websites and security associated with the use of email. They should also consider how current legislation attempts to protect personal data.
Getting started

This provides you with a starting place for one way of delivering the unit. Activities are provided in preparation for the external assessment.

<table>
<thead>
<tr>
<th>Unit 1: The Online World</th>
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</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Give a presentation to learners introducing the content of the unit. Stress that they should make good use of information technology when working on this unit, and that they will need to carry out research and present their findings using online collaborative software such as wikis, VLEs or shared documents. Remind them that they will need to consider their own online experiences and discuss the importance of maintaining good e-reputations and the potential issues associated with the use of Web 2.0 technologies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning aim A: Investigate online services and online communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Begin by asking learners to reflect upon and describe their own use of online services and online communications.</td>
</tr>
<tr>
<td>● Learners should then explore additional services provided online and identify advantages and disadvantages of the use of these services.</td>
</tr>
<tr>
<td>● Ask learners to produce an online resource that presents their conclusions about the benefits, risks and difficulties of life in the online world.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning aim B: Investigate components of the internet and how digital devices exchange and store information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learners should collaborate with others online and produce:</td>
</tr>
<tr>
<td>● a guide to the internet, the worldwide web and email with sections on methods of data exchange and data storage</td>
</tr>
<tr>
<td>● a description of the collaboration including methods used for communication, file sharing, version control and data security.</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Learning aim C: Investigate issues with operating online</th>
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</thead>
<tbody>
<tr>
<td>● Present to your class the possible threats to data.</td>
</tr>
<tr>
<td>● Ask learners to research/discuss measures taken to protect data.</td>
</tr>
<tr>
<td>● Then introduce current legislation and personal data.</td>
</tr>
<tr>
<td>● Ask learners to research and discuss e-reputations, social networking, online monitoring of individuals and identity theft.</td>
</tr>
<tr>
<td>● Learners can then summarise their findings in a report or as a presentation to peers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External online test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review the test with a class discussion on any issues or misunderstandings from set questions.</td>
</tr>
<tr>
<td>Learners who fail their first online assessment will need to take part in a revision session before they re-sit.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External online test re-sit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review the test with a re-sit group discussion on any issues or misunderstandings from the questions.</td>
</tr>
</tbody>
</table>
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 4: Creating Digital Animation**
- **Unit 5: Creating Digital Audio**
- **Unit 6: Creating Digital Graphics**
- **Unit 7: Creating Digital Video**
- **Unit 8: Mobile Apps Development**
- **Unit 9: Spreadsheet Development**
- **Unit 10: Database Development**
- **Unit 11: Computer Networks**
- **Unit 13: Website Development.**

Resources

**Textbooks**

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


**Websites**

- [www.readwriteweb.com/](http://www.readwriteweb.com/) - A blog that keeps up to date with new technologies.
Unit 2: Technology Systems

Delivery guidance

Approaching the unit

This unit provides an introduction to the underpinning knowledge and understanding of how technology systems work. These systems tend to be smaller closed systems, from an individual computer to an automated car-manufacturing cell.

The technological focus is on the types of hardware devices which combine to create a technology system. Examples include the internal components of a computer, the types of software that bring the hardware to life, and the basic programming concepts – such as flow charts, selection and iteration – used to create software. A brief overview of networking is required, to explain how hardware devices communicate, but this topic is covered in much greater detail in Unit 1: The Online World.

Ideally, this unit should be delivered before moving on to Unit 8: Mobile Apps Development and/or Unit 12: Software Development.

This unit is externally assessed by an online test, which should be taken after the underpinning knowledge has been delivered. This assessment is on-demand, but will take some weeks to be marked. You can ‘semesterise’ this unit with online assessment close to the end of semester 1, and plan for a revision session halfway through semester 2 followed by a re-sit for any learners who fail the first assessment.

Delivering the learning aims

For learning aim A, learners should already have some experience or be aware of many technology systems, and the devices that combine to create them. You can build upon this existing knowledge in the classroom. In addition, a brief overview of networking is required to explain how hardware devices communicate.

Learning aim B examines the internal components of computer systems and other mobile devices such as the iPhone. These device internals will be interesting to many learners, especially how they affect performance and battery life. The class can be divided into groups, each with a similar model mobile phone. The groups can then discuss and present back to the class how their devices perform on battery life, signal strength, features and desirability.

You should introduce binary numbers in the context that every digital device works using two states, ‘on’ and ‘off’, and how these states are represented as 1s or 0s (called bits). You should cover the conversion of binary numbers (up to 8 bits) to whole numbers (base 10), and how bits are grouped into bytes and larger units, such as megabytes and terabytes.

Learning aim C considers the planning and creation of software as well as its uses. The role of the operating system and range of apps should be easy for learners to understand, but the planning and creation of software will be more difficult.

For planning, you should introduce flow chart symbols with simple examples which the learners can relate to, such as the inputs and/or outputs from simple processes as listed in the unit specification, and then build on them to the point where they can create simple flow charts of their own to represent given processes.
UNIT 2: TECHNOLOGY SYSTEMS

The programming concepts in this unit can be reinforced with some simple programming exercises for learners to complement Units 8 and 12 (if delivered). Learners will easily relate to the different styles of graphical user interface (GUI) currently available on computers and mobile devices as well as appreciating issues relating to installing or upgrading software. There should be a lot of computer gaming experience in the group with examples of problems encountered and the need to match hardware to software specifications before installation.
Getting started

This provides you with a starting place for one way of delivering the unit. Activities are provided in preparation for the external assessment.

Unit 2: Technology Systems

Introduction
Introduce the unit to your learners, providing a brief outline of the scope of the unit and how it links with other units, followed by a group discussion.

Learning aim A: Understand how the components of technology systems work together
- Begin by asking learners to create a poster of how technology systems are used in different sectors, for example: construction, finance, health, manufacturing and retail.
- Putting learners in pairs, ask them to complete a worksheet within 30 minutes identifying as many potential issues as possible involved in the use of IT systems. Results can be written on a whiteboard starting with the pair with the fewest issues found.
- In small groups, ask learners to give presentations on the importance to organisations of developing their IT systems.
- Learners could then create a guide to hardware devices covering uses, input, output and storage.
- In small groups, each with a given IT system, learners research input, processing and output, reporting their findings back to the class.
- Ask learners to work in pairs, and to complete a worksheet on the purposes and uses of different types of network.
- You could then ask learners to synchronise PAN (personal area network) data to a Bluetooth® phone.
- They could then create a poster showing cabled and wireless methods of data transfer.
- You could then ask learners to use this poster as the basis of comparing the benefits and drawbacks of cabled methods of data transfer.
- In preparation for the external assessment, provide a practice test on the topics covered in learning aim A.

Learning aim B: Understand how data flows between internal components of a computer and is processed to provide information
- Begin by asking learners to produce a diagram showing data flows between system unit components.
- In pairs, ask learners to complete a worksheet to find a processor, fan and heat sink, motherboard, memory, graphics card, SSD and optical drive, identifying the parts of specifications showing compatibility.
- In small groups, learners could produce a wall display of the inside of a system. They could then give a presentation to the rest of the class explaining how features of the CPU and GPU affect performance.
- Ask learners to produce an advert for a mobile device with technical details and features.
- Learners to complete worksheets on converting between whole numbers and binary. The worksheet could have sets of four boxes to represent binary bytes with the column headings of 8, 4, 2 and 1 pre-printed to assist learner conversions.
- Learners create a poster to show how 8 bits make up a byte with the accurate and approximate size of a kilobyte, megabyte, gigabyte, terabyte and petabyte.
- Learners complete a practice test on the topics covered in learning aim B.
## Unit 2: Technology Systems

### Learning aim C: Understand different types of software

- Give learners a worksheet to complete which prompts them to describe and compare custom-made and off-the-shelf software.
- You could then ask learners to produce a diagram showing the structures of software and hardware.
- Learners then produce mind maps of high- and low-level programming languages.
- Learners should then produce a guide to flow chart symbols.
- In pairs, ask learners to produce a flow chart for a business process, which could be: currency conversion, converting marks to grades or calculating wages with overtime.
- Learners can produce an idiot’s guide to the terms used in computer programming.
- Learners can then produce programs, compiling instruction sheets to accompany this.
- Learners can produce a mind map of roles, features and benefits of operating systems.
- Ask learners to find as many software products as possible within 30 minutes. The results can be written on a whiteboard and categorised, e.g. into utility or productivity applications.
- In pairs, ask learners to research the factors to consider when installing or upgrading software.
- Learners complete a practice test on the topics covered in learning aim C.

### External online test

Review the test with a class discussion on any issues or misunderstandings from set questions.

Learners who fail their first online assessment should take part in a revision session before they re-sit.

### External online test re-sit

Review the test with a re-sit group discussion on any issues or misunderstandings from the questions.
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 8: Mobile Apps Development**
- **Unit 9: Spreadsheet Development**
- **Unit 10: Database Development**
- **Unit 11: Computer Networks**
- **Unit 12: Software Development**
- **Unit 13: Website development.**

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites

www.youtube.com/watch?v=IEUivBek930&feature=related

This video explains the basics of cabled and wireless networks.
Unit 3: A Digital Portfolio

Delivery guidance

Approaching the unit

This unit forms part of the synoptic assessment within the qualification. Therefore, it must contain learner's work from all their completed BTEC I&CT units, and may also contain other project work.

This unit is unusual in that some of the content for the portfolio will not become available until the learner has almost completed the qualification. However, it would be unwise to leave this unit until the very end of the course. Learners will need to be aware of the requirements to collect content for their portfolio and they should also be encouraged to collect content from other sources. Learners will also need to plan and develop their portfolio so that it is a completed framework into which they can slot their work from other units as it becomes available.

As this unit gives learners an opportunity to showcase their talents, you may want to encourage some healthy competition between learners and may even want to offer a prize for the best portfolio. Completed portfolios can be used to promote the centre and the course, and you may want to display a selection of portfolios at parents' evenings, open days, etc. Showing your current learners the best portfolios from previous years will also encourage them to aim high.

Delivering the learning aims

The learning aims for this unit follow a logical sequence and it is especially important that the sequence is followed and the design is created first rather than as an afterthought once the portfolio is complete. You should encourage learners to spend time on the design of the portfolio and consider alternatives, as a poorly designed portfolio will fail to show their materials in the best light. Time may be usefully spent looking at a range of websites to establish the difference between an amateurish or visually unappealing site and a site that looks really good.

Work on learning aim B can begin even though the content may not be ready. Learners can create and test the structure, add the commentary text and use dummy content to bring the portfolio close to completion. They may also be able to construct and test those parts of the portfolio that do not rely on material from units they have not yet completed.

Learning aim C can only be tackled once the portfolios are complete, which is likely to be at the very end of the course. One possibility would be to set aside the last week of the course for learners to complete and test their portfolios and then present them in an end-of-course showcase to which external visitors (parents, senior staff, employers, etc.) could be invited. This would create an exciting finale to the whole course. Feedback and comments could be collected from the event to inform the learners' reviews of their portfolios.
# Unit 3: A Digital Portfolio

## Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

### Unit 3: A Digital Portfolio

#### Introduction

Introduce the unit to your learners, covering the scope and aims. Look at the unit content and assessment criteria to give learners an idea of what the unit involves.

#### Learning aim A: Design a digital portfolio

- Begin by getting learners to look at the previous years’ portfolios if available. Discuss good and bad points. What makes the best ones stand out?
- Lead a class discussion on what assets should be included in a digital portfolio. This should draw on what they have noticed about the work of previous learners.
- Ask learners to research and discuss what makes a visually appealing web page. Look at some web page examples showing good and bad design.
- You should then introduce the product life cycle, e.g. how to create a storyboard, timeline and structure chart.
- As part of a class discussion, ask learners what they think makes content appropriate for different audiences.
- Introduce and then lead a discussion on how to make web pages accessible.

#### Assignment 1: Design a Portfolio

#### Learning aim B: Create and test a digital portfolio

- Demonstrate to your learners how to create linked pages in the chosen application software (or ask them to investigate how to do it).
- You can then show them how to prepare and save materials for inclusion in the portfolio.
- This can be followed with a demonstration on how to format pages in the chosen application software.
- Learners can investigate how to create tables, insert and format images, insert video and sound in the chosen application software.
- These demonstrations/investigations can then be followed with a class discussion covering: What do we need to test? And how can we test it?
- You should then outline how to create a test plan by showing them examples. You could provide them with a template for creating their test plan.

#### Assignment 2: Content of the Portfolio

#### Assignment 3: Make the Portfolio

#### Assignment 4: Test the Portfolio

#### Learning aim C: Review the digital portfolio

- Give an outline to the class of how to evaluate their portfolio.
- Encourage learners to go back and look at their original design and consider where and why their final product differs.
- This can be followed with a discussion sharing ideas on how to collect opinions on your portfolio.
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

The unit has links to all the other BTEC First in Information and Creative Technology units that the learners are studying, as these units will provide the content for the portfolio.

Resources

Textbooks
In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites
www.coolhomepages.com
This website has an inspiration gallery with lots of examples of page designs.

www.webpagesthatsuck.com
This website gives lots of examples of poor web page design plus some examples of good designs.
Unit 4: Creating Digital Animation

Delivery guidance

Approaching the unit

This unit gives learners an excellent opportunity to demonstrate both technical and creative skills and to showcase their talents by including the completed products in their digital portfolio (Unit 3).

Delivering the learning aims

For learning aim A there is a wealth of material that learners can investigate, although you may want to limit the amount of time learners spend investigating different types of animation. This task might be better set as homework rather than have learners spending time in class watching animations.

Learners will need to understand some of the technical details of film and animation creation before they start creating their own designs and animations. They will also need practice with whatever animation software you choose to use. Creating computer animations is a lengthy process that requires patience and attention to detail, and learners must be aware of this. Therefore, it is probably wise to intersperse the theory about features of animation and design techniques with a considerable amount of practical time where learners can develop their skills in using the software and implementing the techniques. However, learners should complete their design for the final product (learning aim B) before moving on to create it (learning aim C).

When designing their animation product, learners should try to be creative and original; the use of some ready-made assets such as graphics of characters or backgrounds is acceptable. If learners are also taking Unit 5: Creating Digital Audio and/or Unit 6: Creating Digital Graphics, then creating the soundtrack and graphics for the animation in those units would allow learners more time to concentrate on the time-consuming task of creating the animation, and better results should then be possible.

Given the complexity and time-consuming nature of producing digital animation, you may need to discourage learners from taking on a project that is too ambitious. To give learners an idea of the expected quality of the outcome, you could direct them to the Manchester University Schools Computer Animation Competition website, where they can view examples of animation created by school children (see website list for the URL).

You can create a real buzz with this unit by arranging a screening of all the completed animations to which you can invite other learners, staff, parents, etc. This will foster a sense of competition and also give learners an opportunity to collect feedback from a wider range of people.
Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

### Unit 4: Creating Digital Animation

#### Introduction

Introduce the unit and initiate appropriate introductory activities. A discussion on what animation is, why it is used, how it is created, and different types of animation, etc. would be an appropriate starting point. Also, looking at the unit content and assessment criteria would help learners understand what is required.

#### Learning aim A: Understand the applications and features of digital animation products

- Begin by introducing the types and purposes of animation, and features of animation. Show examples of different types.
- Have a class discussion on the effects of animation on the target audience. Ask the learners what a target audience is and give some examples of target audiences. Then ask them to list the sort of effects an animation could have on one of the target audiences they have identified.
- Ask learners to investigate the features and purpose of animations. Ask them to find several animation examples from the internet and then identify the features in each.
- Learners end by doing a presentation (to the class, in poster form or similar) on the strengths and weaknesses of each animation.
- Learners should develop skills in using computer animation software, by practising creating simple prototype animations.

#### Assignment 1: Investigation

#### Learning aim B: Design a digital animation product

- Introduce design techniques and how to create a storyboard. Show learners some example storyboards to give them an idea of what is required.
- Then ask your learners to create designs and create prototypes. Stress that they should consider more than one approach and keep all rough workings, etc., before selecting one final design to implement.
- Prototype animations will help learners make sure the animation ideas they have are actually achievable and also help them develop skills in using the software.
- Get learners to produce a report or similar that articulates how their design meets the original brief and also explains why they have chosen that approach and rejected their other ideas.

#### Assignment 2: Smoking vs Health – Design

#### Learning aim C: Create, test and review a digital animation product

- Get learners to gather assets and produce their animation, while updating their design documents as appropriate.
- Introduce learners to the concept of testing animated products. Testing is best done with a pre-prepared test plan that identifies what tests will be done and the criteria for passing the test.
- Give front-of-class advice, maybe accompanied by a workshop, on ensuring that clips are produced to as high a quality as possible.
UNIT 4: CREATING DIGITAL ANIMATION

Unit 4: Creating Digital Animation

- Check that learners are updating their asset lists and design documents.
- Learners could then review their animations. They might do this in the form of a presentation, as if to a client, explaining how it meets the audience and purpose. Learners can obtain feedback by arranging a showing of their animation, either to an individual or to a group, and then asking the viewers to complete a questionnaire or alternatively interviewing the viewers.
- Learners should then assess how they might further improve the product. This might be in the format of an internal memo.

Assignment 3: Making the Animation
Assignment 4: Review

Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 1: The Online World
- Unit 5: Creating Digital Audio
- Unit 6: Creating Digital Graphics
- Unit 7: Creating Digital Video
- Unit 8: Mobile Apps Development
- Unit 13: Website Development.

BTEC First in IT (QCF):

- Unit 30: Animation Techniques.

Resources

The most commonly used animation software have related books and internet resources that explain how to use the various features.

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


This is a more detailed introduction to computer animation techniques, covering design storyboards, layout and timings, also at an appropriate reading level.


This book gives a practical introduction to all types of animation (not just digital animation) at an appropriate reading level.

Websites
www.cs.manchester.ac.uk/Animation11
Manchester University Schools Computer Animation Competition website.
Unit 5: Creating Digital Audio

Delivery guidance

Approaching the unit

Digital audio is often integrated with other media such as animations, games and mobile apps, so this unit is ideal for integrating with other units that learners may be completing.

To make this unit engaging for learners, you should help them choose interesting scenarios for their assignments. You should also encourage and challenge them to produce audio products that approach professional quality.

Delivering the learning aims

For learning aim A, it shouldn’t be difficult to find examples of digital audio that learners can investigate, including podcasts, radio adverts and interviews, music tracks and sound effects for games. By investigating a range of audio products, learners should be able to identify all the different features listed in the content.

Learning aims B and C follow the basic project life cycle so it is important that learners follow the steps in the logical order. They should create a detailed design before moving on to recording and editing their assignment audio clips.

There are many ready-made audio clips of music, sound effects, etc. available on the internet which learners can find to include in their product, but they must also record their own material. Depending on the availability of equipment, you may need to arrange a schedule to allow learners access to record their clips. Complex or expensive equipment is not required; audio recordings made using a mobile phone are quite adequate although care is needed to ensure a good quality recording with minimum background noise.

You should encourage learners to make test recordings and to re-record items as many times as needed to produce the best-quality outcome. Learners will probably need to go outside the classroom to make recordings, so ensure adequate health and safety measures are in place.

Learners will need access to suitable audio editing software to edit the recordings they have made and collected, and they will need support to develop the required skills. Practical sessions developing these skills can be mixed with theory sessions early in the programme, but learners should not start editing their final products before the design is fully complete. As with the recording process, learners should be encouraged to view it as an iterative process with an edit–test/evaluate–re-edit cycle until the best-quality result is achieved.

Finally, learners will review what they have done. They should refer back to the original design and explain why changes were made. They should consider the development process and what issues they had with editing and mixing the products. Learners should also consider the feedback they got from other people on the products.
Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

## Unit 5: Creating Digital Audio

### Introduction

Introduce the unit and initiate a class discussion. Look at unit content and grading criteria to give learners an idea of what is required.

### Learning aim A: Understand the applications and features of digital audio products

- Introduce the features and technical qualities of audio products to your learners by showing them some examples and asking them to research and give examples themselves.
- From the examples you have shown them or they have found, learners can then select the two products they wish to investigate.
- Hold a class discussion on audience appeal, highlighting the different types of audience that may use an audio product and how that product may have been developed to suit their needs and preferences.
- Ask learners to research the purposes, audience and features of their two chosen products. This could be done through internet research, as well as talking to users of the audio product to gain user feedback.
- You could then hold a class discussion on the impact products may have on the audience. Encourage discussion by asking them to identify when they have used an audio product and how useful they found it.
- Learners could follow this by creating a survey that asks users to score how useful the product they used was. They can then give this to users of the audio products they are investigating.
- Learners can finish by giving presentations to the class that summarise their findings.

### Assignment 1: Research

### Learning aim B: Design digital audio products

- Begin with a teacher-led discussion describing what a target audience is and how products are designed to include features that will appeal to them.
- You can then introduce design briefs; show an example and highlight how they are used to meet a purpose.
- Give learners their own design brief, which they can use to design two audio products.
- Introduce to learners audio product design techniques. Show examples of the required documents.
- To practise script-writing, ask learners to create their own simple script.
- Learners can then develop the script into a full timeline that reflects how they will develop their two audio products.
- Learners can then develop their audio editing skills, by recording and editing some sample audio clips.
- Learners should also research where they can acquire ready-made assets (such as sound effects). They should put together a list of assets for both products and practise mixing them with audio they have created themselves.
Learners can then present their audio product design to the class. Their presentation should focus on how the design has met the requirements of the brief.

**Assignment 2: Pre-production**

**Learning aim C: Create, test and review digital audio products**

- Introduce to the class the techniques for recording high-quality audio, including preparing for making the recording and sound checks. Include some practical sessions for them to practise these techniques. You could demonstrate this by recording a class discussion, demonstrating each process you would need to go through before, during and after recording.

- Ask learners to practise audio recording techniques and making sample recordings. You could ask them to record an activity their peers are taking part in, such as a musical rehearsal, or to accompany a video or animation they may be creating for another unit. In preparation, ask them to make a checklist of what they will need to do (e.g. setting up equipment, sound check, etc.).

- When learners have recorded their audio they can then practise editing these audio clips in the classroom and combining them with suitable found ready-made assets.

- Ask learners to create a bibliography of the sources of their assets. You can assist learners by showing them an example of a bibliography you have created for your own audio clip.

- Learners should then test their audio clips for functionality and evaluate their results.

- Have a class discussion on ways of gathering feedback and giving constructive feedback. You can ask learners what they think the best way to obtain feedback from another person would be. You can also ask (as they will probably be giving feedback to each other) what the difference is between unhelpful criticism (such as ‘this audio clip was rubbish’) and constructive criticism (such as ‘this audio clip was spoilt by excessive background noise’).

- The class can then discuss: reviewing work, identifying strengths and weaknesses, making possible improvements and responding to feedback.

- Learners complete their reviews. This could take the form of a report, blog, video diary, etc. In their review they can consider a number of aspects including how well the final product matches their target audience needs and achieves its purpose. They can also look at the initial designs they created and comment on how and why their final product differs. They could review the development process and any problems they had or how they would do things differently next time or if they had more time or equipment. They should also discuss the feedback they received from others.

**Assignment 3: Production and Post-production**

**Assignment 4: Editing and Testing**

**Assignment 5: Review**
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 1: The Online World**
- **Unit 4: Creating Digital Animation**
- **Unit 6: Creating Digital Graphics**
- **Unit 7: Creating Digital Video**
- **Unit 8: Mobile Apps Development**
- **Unit 13: Website Development.**

BTEC First in IT (QCF):

- **Unit 28: Multimedia Design**
- **Unit 31: Interactive Media Production.**

Resources

The most commonly used audio editing software have related books and internet resources that explain how to use the various features.

**Textbooks**

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


This book gives very comprehensive and detailed coverage of every aspect of digital audio, but the reading level is high and there is a lot of technical explanation.
Unit 6: Creating Digital Graphics

Delivery guidance

Approaching the unit

For this unit, you could guide your learners towards a variety of commercial graphic products that provide experience of different types of graphic and are intended for different purposes and targeted towards different audiences. The graphic products could range from simple line-drawn logos to complex imagery as featured in modern movies and computer games, and include examples of both technical drawing and computer art. Learners will have to review these products.

Delivering the learning aims

Learners could work in groups to analyse the selected examples, identifying good features and weaknesses, considering suggestions for improvement and finding further examples to support their views. They could further analyse their examples to identify the specific features within them that make them effective, purposeful and suitable for the intended audience.

Your delivery of software tools and techniques needs to be ongoing but could initially involve demonstrations and the use of online video tutorials to motivate and excite learners. You may decide to plan delivery so that it integrates understanding software tools and techniques with developing design confidence. Short activities that require learners to apply their new skills could be used.

Your initial demonstrations and tutorials could concentrate on basic photo-editing techniques for importing and combining images and vector drawing using lines, text, shapes, fills and effects. These activities could develop the learners’ understanding of scale and proportion and the need for accuracy. At this stage, you could encourage learners to return to their groups to consider the tools and techniques used in producing the commercial graphics reviewed earlier.

You could present learners with a series of briefs that give them opportunities to explore content and layout ideas for both vector- and bitmap-based images. At this stage, learners may decide to produce initial ideas by using freehand sketches or their new skills with graphics software. But it is important that they then experiment, moving beyond their first ideas to improve their graphics design.

Learners could then finalise their designs and present their graphic products. The final design outcome could be subjected to both peer and self-review and a summative assessment.

Work intended for assessment should be completed in response to a single summative assignment brief. The final assignment brief could be built around the learning aims of the unit to maximise the opportunities for achievement. It should provide for initial research and the recording of sources, and require the design and presentation of at least two products – a vector-based product and a product based on the use of photo-editing techniques. The final section of the assignment could require the production of a report that includes an evaluation of the final products, relating them to the client’s brief, commenting on the tools used to produce them and the effectiveness of their presentation. The evaluation could report on feedback gathered about the final products and include suggestions for further improvements.
Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

<table>
<thead>
<tr>
<th>Unit 6: Creating Digital Graphics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>You could introduce this unit with a group discussion on a range of digital graphics for different purposes, and how they target their audience. This could be followed by a brief outline of the scope of the unit and how it can be linked to other units.</td>
</tr>
<tr>
<td><strong>Learning aim A: Understand the applications and features of digital graphic products</strong></td>
</tr>
<tr>
<td>● The examples selected for review could be relevant, in terms of content, purpose and/or audience, to the graphic products required by part 2 of the assignment.</td>
</tr>
<tr>
<td>● Your learners could research and discuss a range of graphic products used in advertising, for example logos, posters, magazine adverts, packaging, web graphics, selected to cover the content of learning aim A.</td>
</tr>
<tr>
<td>● Learners might use examples found in their local area. The examples could be used to prompt research on the internet or using appropriate trade publications.</td>
</tr>
<tr>
<td>● Your learners should identify and describe the main features of the products, including graphic types, composition, layout, colour and texture, text, images, and so on. They should summarise how these are combined to achieve the intended effect on the audience and go on to suggest how they could be improved.</td>
</tr>
</tbody>
</table>

**Assignment – Part 1:** Research – Technology Products

<table>
<thead>
<tr>
<th>Learning aim B: Design digital graphic products</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Provide learners sample briefs. Advise learners about the best way to analyse the requirements as outlined in the briefs. Discuss the importance of identifying the intended audience, purpose and user requirements for products.</td>
</tr>
<tr>
<td>● Divide learners into small groups and ask them to produce initial design ideas/prototypes to illustrate content and appearance using either digital editing techniques or traditional methods such as hand-drawn sketches on paper.</td>
</tr>
<tr>
<td>● Discuss how to collect digital graphic assets (e.g. a company logo, character or object) that might be used in combination with original graphic assets to create the product. Reinforce the importance of keeping an up-to-date, fully-referenced asset list.</td>
</tr>
<tr>
<td>● In the form of a presentation each group should justify how their products will meet in the requirements of the sample brief.</td>
</tr>
</tbody>
</table>

**Assignment – Part 2:** A Promotional Campaign
Unit 6: Creating Digital Graphics

Learning aim C: Create, test and review digital graphic products

- Provide learners examples of high-quality assets for graphic products, discussing with learners how these assets show good awareness of audience and purpose. Remind learners of the constraints of copyright – examples of assets that may have copyright issues could be shown. In small groups have learners consider how the example assets could be re-purposed and used in combination to create prototypes of the graphic products required by a sample brief.

- Learners could then follow the project development cycle, gathering and responding to feedback on the quality of the example graphics from others. Each group should choose at least one example asset and refine it to create a high-quality product. Learners should utilise the software tools and techniques developed during the unit to create final graphic products that meet the needs of audience and the defined purpose.

- Learners then go on to review their products. They could do this via a word-processed report that considers the extent to which each of the final products meets the needs of audience and fulfils the required purpose, discusses feedback gathered from others and makes recommendations for further improvement.

- In their reviews learners could evaluate the initial designs and the final graphic products, justifying changes made and identifying main points in the development of the products. A consideration of any constraints, such as those identified in the unit specification, could also be included.

- They should also consider any improvements they might implement if designing these products again.

Assignment – Part 3: Create Graphics
Assignment – Part 4: Review
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 1: The Online World**
- **Unit 4: Creating Digital Animation**
- **Unit 7: Creating Digital Video**
- **Unit 8: Mobile Apps Development**
- **Unit 13: Website Development.**

**Resources**

**Textbooks**

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


**Websites**

For ideas, inspiration and advice:

- www.logodesignlove.com/logo-design-tips
- http://speckyboy.com/

For software-specific tutorials:

- http://inkscapetutorials.wordpress.com
- http://photoshoptutorials.ws/photoshop-tutorials
- www.seriftuts.com/
- http://tv.adobe.com/
Unit 7: Creating Digital Video

Delivery guidance

Approaching the unit

This unit should enthuse and motivate learners as they have probably spent a good part of their life watching TV and viewing videos on the internet. It is also very easy to find videos on the web to support their learning, so this unit can have many links to the real world.

Learners must be able to access the internet from the classroom as well as having access to design tools, video equipment and editing software. They must also have access to a collection of assets that they can use in the videos they produce.

This unit offers excellent opportunities for individual, paired and group activities, which can be based upon the many videos present on the web.

Many of the learners will be glad to gain and practise the skills needed to create videos – for some it will be the realisation of long-held dreams and ambitions.

Delivering the learning aims

Learning aim A should interest and motivate learners by looking at a selection of videos and examining them from a more professional stance to recognise their applications and features. A useful exercise here could be to use some videos which are well-known to the learners and then to discuss how these are used and the effects they have.

Learning aim B shows learners the importance of planning and how a video must meet the needs of the intended audience and the client’s requirements. Learners should be guided towards how the age, gender and interests of the expected audience can affect content, using selected videos. A case study can be used to explain the client’s requirements. There should be ample practice time here for learners to acquire skills such as storyboard outlining and script-writing so they are well prepared to actually create their videos.

You should encourage learners to work outside of the classroom to find their filming locations and to use these in the next learning aim. The choice of location needs to be able to meet the needs of video content and the practicalities of siting the lighting and cameras needed to shoot the video.

Recruiting the cast and crew is a great way of bringing role-play into the unit and to identify the most appropriate learners for these practical tasks.

Learning aim C allows learners to actually create and edit their videos using software available in the centre. YouTube tutorials can be used to help develop learner skills in video editing. The end products should be reasonably professional and meet both the intended audience’s needs and the client’s requirements.

Learners must test and review their videos. They can be reviewed by showing them to the whole class. Learners can post their comments on each video to a learning environment, such as Moodle, which can then be used by individuals in their final assessment to review their work.
UNIT 7: CREATING DIGITAL VIDEO

Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

### Unit 7: Creating Digital Video

#### Introduction

Introduce the unit and initiate appropriate introductory activities. This introduction should set out the broad terms of the assessment to be used and to outline the need for careful planning and how each learner will be allocated a role within their group to contribute towards making the video.

#### Learning aim A: Understand the applications and features of digital video products

- Begin by asking learners to select a digital video recording that they find interesting. They could show it to the rest of the class and then explain why the video interests them.
- The class can then discuss how videos are used and the effects they may have on the intended audience – for example, increasing charity donations, increased sales of a product. Record the learner suggestions on a whiteboard, so that they refer back to these for their assignment.
- You can then ask learners to produce a document with screenshots of videos that show examples of the following: informing the user, recording events, entertainment, education, raising awareness and advertising. Learners could give short explanations to accompany each.
- With learners working in pairs, ask them to identify what they think are the effects of video products on the intended audience. They should also consider the products’ strengths and how they could be improved.
- In groups, learners could then produce a brochure of video camera products and editing software, which they have identified have been used to create the video products/ clips. The brochure could include call-outs or text boxes to explain the features identified in this learning aim.

#### Assignment 1: Research

#### Learning aim B: Design a digital video product

- Give learners a design brief. Hold a class discussion identifying what they think the purpose of the video should be and who the target audience is.
- With learners working in small groups, ask them to create a storyboard and script for the video based on a brief written as if it’s from the producers.
- Ask learners to create a guide to the video assets available in the centre that they can use in their video productions.
- In small groups, learners can go on to create video test clips.
- Ask learners to examine two given examples of recording schedules with logsheets. They can then present these to the class who vote on which of these they would prefer to use. Selected learners can explain why.
- Learners can then create a poster showing the health and safety considerations needed when filming.
- With learners working in small groups, ask them to carry out a recce of the filming location(s), reporting back to the class with photos.
● Learners could then carry out a role-play activity in which a panel of learners interview/audition other learners for cast and crew job roles. The panel of learners should discuss and decide which learners are to be selected for each role.

Assignment 2: Pre-production

Learning aim C: Create, test and review a digital video product

● Learners should begin by taking part in exercises on using centre video recording equipment. This can be followed by exercises which cover how to use screen capture software.
● You could then use web-based tutorials in order to instruct learners on how to create video products.
● Learners could create a guidelines document explaining legal and ethical constraints of making videos, particularly health and safety considerations.
● Working in pairs, learners can then create the video clip/audio clips which they outlined in assignment 2.
● Moving on to the editing and testing phase, demonstrate to learners how to edit a video clip and assets into a suitable digital product. Learners, working in their pairs, should then apply this to their own clips.
● Ensure that learners are constantly referring to the original brief and not straying from it.
● Learners should test their product throughout the editing process, e.g. for volume levels, picture quality. They should make a note of any adjustments they have to make.
● They could also gain feedback from another pair during the editing process to confirm that they are fulfilling the original brief.

● You could use a theatre or other facility with a large screen that is available to the centre to hold a series of ‘private viewings’.
● Each pair could do a short ‘pitch’ before their video, explaining how they think it meets the audience and purpose. They could follow up the screening by submitting a brief report, written as if addressing the producers, that addresses any possible improvements, legal/ethical constraints and health and safety considerations.
● Viewer feedback needs to be gathered. The rest of the class could post up their comments on these videos to the centre’s online learning environment. Alternatively, one specific learner could be chosen to give feedback to each pair; or you could invite an industry expert to give feedback.

Assignment 3: Production and Post-production
Assignment 4: Editing and Testing
Assignment 5: Review
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 1: The Online World
- Unit 4: Creating Digital Animation
- Unit 5: Creating Digital Audio
- Unit 6: Creating Digital Graphics
- Unit 8: Mobile Apps Development
- Unit 13: Website Development.

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites

www.youtube.com

Learners should be guided to the manufacturer websites to find video tutorials on how to use the video equipment and authoring software available to learners in the centre.
Unit 8: Mobile Apps Development

Delivery guidance

Approaching the unit

This unit gives learners a good understanding not only of the theoretical elements of mobile application development, but also the practical implementation of these skills. Assessment should be built around solid practical examples with the assessment taken from the actual implementation of design and software development skills. You need to ensure that learners have a well thought-out context for the development of the application, and it would be particularly useful if learners are able to find actual clients who require applications.

For this unit to be delivered successfully, you should ensure learners are given a significant amount of practical time both to use mobile applications and to develop them.

Delivering the learning aims

When delivering learning aim A, you should encourage learners to explore a range of mobile applications to identify their purpose and uses. Allowing learners to use a variety of different applications to help them understand the different uses is an invaluable experience. You could invite learners to bring their own smartphones to the class and demonstrate some of the applications they use. This does not require the purchasing of expensive smartphones as Google provides a free smartphone emulator with its software development kit for learners who do not have access to their own smartphone.

For learning aim B, using existing design documentation created for various existing applications can be a helpful way for learners to see what is included in design documentation and how closely related it will be to a final application. It is helpful to allow learners to use case studies and role-play to gain requirements and develop design documentation to meet those requirements. This will ensure that they understand how to develop the documentation themselves; for example, a client may require an application for tracking appointments that are due and have been completed.

Learners will be able to use software that will allow for the creation of a mobile app using a drag and drop interface or re-using pre-existing code in learning aim C. However, learners must be able to understand the concepts of programming and edit the code generated themselves. Software such as Scratch is a useful tool that teaches the building of software programming code in a simple graphical interface. Learners will need a good understanding of programming code, so spending a significant amount of practical time developing code is important. Finally, learners will be expected to understand how to test a mobile application. Using complete applications, learners could develop test plans to successfully test the software to ensure it meets its requirements.

For learning aim D, allowing learners to review each other’s applications would be a good way to allow them to develop a more critical thought process when looking at their own applications. You could give learners the opportunity to produce written reviews or presentations that can then be shared with the class, articulating what they feel are the strengths and weaknesses of particular applications.
### Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

<table>
<thead>
<tr>
<th>UNIT 8: MOBILE APPS DEVELOPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Introduce the unit and initiate appropriate introductory activities such as getting learners to list all of the different apps they have on their mobile devices and why they use these apps.</td>
</tr>
<tr>
<td><strong>Learning aim A: Investigate the characteristics and uses of mobile apps</strong></td>
</tr>
<tr>
<td>● Begin by asking learners to discuss the purpose of mobile applications and their uses.</td>
</tr>
<tr>
<td>● You can then demonstrate a range of mobile applications to the class. Draw attention to their uses and ask learners to categorise a number of applications according to the different uses identified in the specification.</td>
</tr>
<tr>
<td>● Initiate a discussion on the features of mobile applications, asking learners to relate these features to a number of example applications.</td>
</tr>
<tr>
<td>● You can then demonstrate a range of programming languages used for mobile application development.</td>
</tr>
<tr>
<td>● Ask learners in groups to discuss the relevant benefits/drawbacks of the different programming languages.</td>
</tr>
<tr>
<td>● Learners should then go on to work on their own presentation.</td>
</tr>
<tr>
<td><strong>Assignment 1: Reviewing Apps</strong></td>
</tr>
<tr>
<td><strong>Learning aim B: Design a mobile app</strong></td>
</tr>
<tr>
<td>● Introduce design techniques and creating storyboards. Show learners some example storyboards to give them an idea of what is involved.</td>
</tr>
<tr>
<td>● Then ask your learners to create designs and create prototypes. Stress that they should consider more than one approach and keep all rough workings, etc., before selecting one final design to implement.</td>
</tr>
<tr>
<td>● Get learners to produce a report or similar that articulates how their design meets the original brief and also explains why they have chosen that approach and rejected their other ideas.</td>
</tr>
<tr>
<td><strong>Assignment 2: Design an Interactive Alphabet App</strong></td>
</tr>
<tr>
<td><strong>Learning aim C: Develop and test a mobile app</strong></td>
</tr>
<tr>
<td>● Begin by demonstrating to the class simple mobile app creation software.</td>
</tr>
<tr>
<td>● Learners can then research and discuss the different sources for reusable code.</td>
</tr>
<tr>
<td>● You should demonstrate the variety of commands used in programming languages using a simple tool such as Scratch.</td>
</tr>
<tr>
<td>● Ask learners to produce simple programs for selected case studies.</td>
</tr>
<tr>
<td>● You then demonstrate to learners examples of testing methodologies.</td>
</tr>
<tr>
<td>● Ask learners to create a test plan for a given mobile app using a standard testing methodology. Ask them to run their test plan and consider if anything was missed.</td>
</tr>
<tr>
<td><strong>Assignment 3: Developing and Testing</strong></td>
</tr>
</tbody>
</table>
Unit 8: Mobile Apps Development

Learning aim D – Review the finished mobile app

- Demonstrate the key points to consider in the review of mobile apps.
- Give learners example mobile apps to review and produce review documentation for.
- Give learners feedback from a client for the mobile app they have just reviewed, asking them to make changes.
- Ask learners to write a report explaining how they will meet these changes.
- Learners should then review their own app for suitability for audience, purpose and meeting original/user requirements. This could be in the form of a presentation or written report.

Assignment 4: Review the App
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:
- **Unit 1: The Online World**
- **Unit 2: Technology Systems**
- **Unit 4: Creating Digital Animation**
- **Unit 5: Creating Digital Audio**
- **Unit 6: Creating Digital Graphics**
- **Unit 12: Software Development.**

BTEC National in Information Technology:
- **Unit 6: Software Design and Development.**

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.

  A straightforward guide to using the Android SDK to make apps for Android devices.
  A clear guide designed to teach young people to program using the Scratch software.
  This book shows how to use the App Inventor for Android and is easy to understand.

Websites

- http://appinventoredu.mit.edu
  An extremely useful web application allowing the creation of mobile applications using a graphical user interface designer and a drag-and-drop code builder.
- www.youtube.com/playlist?p=PL2D27126F35E50A1B
  Video tutorials for using the app inventor to produce apps for Android phones.
- http://scratch.mit.edu/
  Excellent software to teach programming concepts using a drag-and-drop code builder.
Unit 9: Spreadsheet Development

Delivery guidance

Approaching the unit

This unit introduces learners to the power of spreadsheets to analyse and present data. Learners should explore the use of spreadsheets in context before developing their own spreadsheet to meet a given client brief.

Delivering the learning aims

Learners could explore some of the applications of spreadsheets that are identified in the specification, working together to investigate the role of spreadsheets in a range of contexts. You could introduce the first learning aim by getting learners to investigate spreadsheet solutions created by others. The internet is a good source of ready-made models for activities, such as carbon footprint calculators and food miles calculators that can form a good basis for discussion and also cover global sustainability and citizenship issues. They should consider the role of the spreadsheet tools and techniques in improving the usability, productivity, accuracy and presentation of output data. Their investigation could lead to a presentation about the value of using spreadsheets in a range of contexts.

To develop their own spreadsheet solution for this unit, learners need a good understanding of the function of the tools and techniques used to create a spreadsheet solution to a given client brief. To gain this, learners could investigate spreadsheet solutions created by others or use partially completed spreadsheet solutions to solve a given problem and produce a required output.

Assignment client briefs should be built around the learning aims to maximise opportunities for achievement. Learners should investigate and analyse the given problem to identify the intended purpose and user requirements and then produce appropriate design documentation. This design documentation should include information about the structure of the solution including:

- formulae
- functions
- input and output facilities
- format and layout
- any appropriate macros
- navigation features
- user guidance.

It is important that, as part of the design process, learners consider how they will test the spreadsheet solution. More able learners should also consider the design of the data required to carry out effective testing.

At milestones in the development work, and to improve their work using the feedback received, learners could benefit from working in pairs or small groups to carry out peer assessments.

Learners need to test their spreadsheet solutions for functionality and usability. Usability testing is another opportunity for peer assessment and feedback. This feedback could include how well the solution meets the client requirements and reflect on the user experience including usability, performance and adaptability.
UNIT 9: SPREADSHEET DEVELOPMENT

Learners must review their outcomes to see whether they have succeeded in producing a solution that matches the original requirements (as defined in the brief), is fit for purpose and provides a good user experience. The user experience could include the quality of features such as navigation and onscreen user instructions.
Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

<table>
<thead>
<tr>
<th>Unit 9: Spreadsheet Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Give an overview of the unit, followed by group discussion or other suitable introductory exercises.</td>
</tr>
<tr>
<td><strong>Learning aim A: Understand the uses of spreadsheets and the features available in spreadsheet software packages</strong></td>
</tr>
<tr>
<td>● Begin by asking learners to research and discuss examples of spreadsheet solutions created by others. These examples could come from subjects across the curriculum, such as the core subjects of Mathematics or Science, or Business Studies or Sports Science.</td>
</tr>
<tr>
<td>● Learners, working in small groups or pairs, can use the models and create a presentation to identify and describe the main tools and techniques used to create the spreadsheets.</td>
</tr>
<tr>
<td>● Learners can then use these tools and techniques to extend the models they are using or to create solutions to similar problems.</td>
</tr>
<tr>
<td>● Ask learners to draw conclusions on the benefits of developing spreadsheet solutions to real-world problems. Learners need to consider the benefits of using spreadsheets rather than carrying out their own handwritten calculations to solve problems. To be able to ensure that they can do this, it is important that they use suitably complex models that can be used to test hypotheses.</td>
</tr>
<tr>
<td><strong>Assignment 1: Application of Spreadsheets</strong></td>
</tr>
<tr>
<td><strong>Learning aim B: Design a spreadsheet</strong></td>
</tr>
<tr>
<td>● Ask learners to investigate partially completed spreadsheets created by others and use tools and techniques to complete the spreadsheet. As learners’ skills and knowledge of the tools and techniques available increase, they could work with partial solutions to more complex problems. They need to consider some features such as data entry forms, validation of data and the use of macros (for routines such as navigation between worksheets or the creation of graphs).</td>
</tr>
<tr>
<td>● They should consider how worksheets or workbooks can be formatted to make them easier to use. They should think about how to include instructions, menus and navigation, and/or features for inputting and outputting data that are suitable for audience and purpose.</td>
</tr>
<tr>
<td>● Present learners with given problems and ask them to use functions, formulae, formatting and presentation tools to create spreadsheets to solve this.</td>
</tr>
<tr>
<td><strong>Assignment 2: Designing a Spreadsheet Solution</strong></td>
</tr>
</tbody>
</table>
### Unit 9: Spreadsheet Development

**Learning aim C: Develop and test a spreadsheet**

- Begin by presenting groups of learners with a spreadsheet problem and ask them to create a solution.
- Ask learners to carry out their relevant research into the given problem. Learners need to consider the task to be carried out by their spreadsheet solution and identify the data to be entered into the model, the calculations to be carried out using formulae and functions, and the output required from the system.
- Learners then update their design documentation for their spreadsheet solutions covering the areas listed in the unit content for this section of work. They should aim to produce documentation that would allow a competent third party to implement their design.
- Ask learners to test the solution for fitness for purpose as a solution to the given problem. Learners should adapt their solution appropriately and record any changes made.

**Assignment 3:** Developing and Testing a Spreadsheet Solution

**Learning aim D: Review the finished spreadsheet**

- Learners should work review their work. They should describe, in technical terms, the good features of their work such as the use of efficient formulae or functions. They should also consider the layout of the spreadsheet and the facilities for data input.
- Learners should identify any changes they had to make to their original designs and explain why these changes were necessary.
- Learners should also consider some of the less successful elements of their work and make specific suggestions that would improve the product.

**Assignment 3:** Review
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 1: The Online World
- Unit 2: Technology Systems
- Unit 10: Database Development.

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites

www.exinfm.com/free_spreadsheets.html
This website provides access to a wide range of financial spreadsheets.

http://chandoo.org/wp/2011/02/03/spreadsheets-for-teachers/
A website that provides information, tips and examples of spreadsheets created in Excel.

This website provides spreadsheet theory notes, quizzes, lesson tasks, exam practice and lesson starters/plenaries.

www.pass-ict.com
A website developed by Kathryn Evans-Vince to support her pupils.

http://google.com/google-d-s/spreadsheets
Learners can work collaboratively using online spreadsheets such as those within Google Docs.
Unit 10: Database Development

Delivery guidance

Approaching the unit

This unit provides learners with an opportunity to develop both practical skills in using database software and some understanding of relational database design.

Delivering the learning aims

The learning aims are in a logical delivery sequence, and at least the last three can naturally become a series of connected tasks. It is therefore recommended that the assignment context of the last three learning aims should be seen as one project, divided into design, development and review stages.

Some learners will have encountered a database prior to taking this course, so you should take time to understand the extent of each learner’s prior experience through an initial assessment before planning the detail of the work scheme. However, working with multiple table relational databases rather than simple flat files is complex, and it is unlikely that level 1/level 2 learners will have met this aspect of databases before. There are also other aspects that learners are unlikely to have met before, such as the wider set of data types.

As learners’ prior experience will vary, it might be best initially to use workshops where learners can work and be supported through self-managed materials at their own pace, with some learners needing additional time and guidance to fill in knowledge and skill gaps. All learners should build up expertise and confidence with the database software so that they can design and create simple unrelated tables before they are introduced to the complexity of relational databases. Parallel practical workshops and theory sessions should continue throughout the delivery of the unit.

Software packages that work with relational databases are often complex and learners will be confronted by an interface that displays options and capability well beyond the level of this programme. This situation can introduce problems, but does, of course, offer opportunities for learners to build additional expertise that can motivate and extend them. In such situations, and with capable learners, it pays to let the higher-order grade requirements inform and focus their extension work – in particular, the distinction requirement for learning aim C has great potential for learners to use automated tools.

Learners at this level are best presented with pragmatic rather than theoretical justifications for relational databases, and a good approach that addresses their complexities would be working through the problems of a series of example flat files where significant data is duplicated. Learners will accept the need for multiple-related tables if they can see at first hand the difficulties (for example, in propagating updates of duplicated data within a single table), and they will also readily accept the waste of memory space involved. The break-up of a complex single flat file into two simpler tables is then seen as a natural and justifiable solution to known problems.

It is important, however, to manage the learner’s progress through a database development carefully. A badly designed database, if not corrected early, can cause almost insurmountable problems later. One technique that works well is to introduce the concept of ‘sign off’ where a teacher acting as client is expected to view and approve the progress at key stages.
Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

<table>
<thead>
<tr>
<th>Unit 10: Database Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Introduce the unit and initiate a class discussion.</td>
</tr>
<tr>
<td><strong>Learning aim A: Understand the uses of and tools/techniques used in databases</strong></td>
</tr>
<tr>
<td>• Begin with open but supported workshops in order to confirm learners’ basic skills in working with databases and the software. You should track learners as they work through the materials and give appropriate extension materials where required.</td>
</tr>
<tr>
<td>• In parallel, you can run classroom activities that include the study (in groups) of carefully chosen case studies. Although not explicitly included in the specification, understanding the problems encountered in the use of some databases might be useful preparation for the design work.</td>
</tr>
<tr>
<td>• Group work and open discussion can be useful to identify the specific purposes of particular examples, with summary formal lessons and notes to ensure all content has been covered.</td>
</tr>
<tr>
<td>• You could use formal presentations to cover the principles of relational databases, although care should be taken in the choice of examples to avoid the need to deal with complex normalisation, which is deliberately not covered in this specification. All examples should be relatively limited with well-defined single primary keys.</td>
</tr>
<tr>
<td>• Exercises in relational databases can be introduced as group work followed by individuals working with simple pairs of tables, formally assessed. Peer assessment could work well here too.</td>
</tr>
<tr>
<td><strong>Assignment 1: How and Why are Databases Used?</strong></td>
</tr>
<tr>
<td><strong>Learning aim B: Design a relational database</strong></td>
</tr>
<tr>
<td>• You can use formal lessons to give the structure of the design documentation that learners will be expected to use in their assignment and also to introduce some of the more complex concepts such as ERDs, validation/verification.</td>
</tr>
<tr>
<td>• Previously used or new case studies can be provided to enable individual learners to practise and build experience of the identification of aspects such as resources required, constraints, alternatives etc.</td>
</tr>
<tr>
<td>• You could follow this with formal teaching sessions and short exercises completed individually with formative assessment provided.</td>
</tr>
<tr>
<td><strong>Assignment 2: Designing a Database for a Doctor’s Surgery</strong></td>
</tr>
</tbody>
</table>
### Unit 10: Database Development

#### Learning aim C: Develop and test a relational database

- Further specialised practical workshops can be run with materials covering the software tools and techniques noted in the specification. In this situation, however, the workshops may need to be staffed by the subject specialist rather than provided in a generic learning resource centre. Extension material should be provided for some learners which is targeted at the merit and distinction criteria.
- Formally taught lessons and demonstrations will also be required to cover and reinforce some of the content and workshop activity. In each case, good sets of notes and examples will need to be provided for later reference. Short, individually completed exercises can be used at the end of sessions to confirm understanding and skill development.

#### Assignment 3: Developing Your Database

#### Learning aim D: Review the finished relational database

- Learners could complete peer reviews of their databases or could ask friends and family to review if appropriate. They should review their database against the given brief.
- Show learners examples of the types of improvements they may wish to make to their databases. From this discussions learners should consider their feedback and think of several improvements they could make to their database. These improvements could be shared in small group discussions.
- A final full-group session that revisits the key themes of the unit is useful at the end – this can also firm up connections with other units.

#### Assignment 4: Reviewing Your Database
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 2: Technology Systems (learning aim C)**
- **Unit 9: Spreadsheet Development**
- **Unit 12: Software Development.**

As the assessment activity can easily be based around one large design-and-build activity, it could be the basis for a significant project. This unit could therefore be linked to an external project unit or qualification.

Resources

The support materials needed for this unit fall into two distinct categories:

- Materials that assist in the development of the software skills and, at this level, need to be for the specific package and version being used. Teaching or self-teach resources may have already been generated for use within the centre, so it is sensible to check with staff in the learning resource centre or equivalent.

- Resources that deal with the theory of relational databases themselves. It is useful to have a number of general computing level 2 or level 3 textbooks in the library so that learners can browse different texts. Learners will also benefit from locally produced background notes to support each lesson, and should be encouraged to file and cross-reference them. It may also be useful to make the materials available through a local intranet.

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


  Many textbooks are available that cover the underpinning theory of relational databases and ones that focus on the basic principles will be useful even if they are not recently published. It is likely that most GCSE and A Level Computing, IT Diploma and ICT textbooks will have chapters on databases, which will prove useful support.

  Some textbooks are specifically designed for BTEC IT and, although specifications do change, they can give efficient background textbook support for a number of units. Here is one example: Fishpool, B. and Fishpool, M., *BTEC First in IT Level 2* (2nd edition), Hodder Education, 2011 (ISBN 978-1-4441-1050-0)
Websites

There are a number of semi-permanent websites that give support materials on a range of subjects. One example is the TES resources databank which has a number of useful secondary and post-secondary resources. There are materials that relate to the development of practical skills as well as theoretical principles. Useful search terms include database structure, database management, flat file and relational databases. Teachers will need to register before gaining access to the resources.

www.tes.co.uk/teaching-resources

It is also worth spending time on the internet searching for materials produced and shared by other teachers. As long as copyright is not infringed, they can give ideas, case study examples and stimuli for teachers.
Unit 11: Computer Networks

Delivery guidance

Approaching the unit

This unit will be outside many learners’ experience except from their perspective as users of the centre’s systems and WiFi.

Learners must be able to research the internet from the classroom as well as having full administrator access to peer-to-peer or client-server network hardware and software that is isolated from the centre’s systems for hands-on exercises and assessment.

The unit contains an excellent client’s brief case study which can be used to give vocational relevance to learners’ assessment and hands-on network builds.

The unit assessment would work well as four separate assignments, or you could choose to combine learning aim C (Develop and test a computer network) and learning aim D (Review the finished computer network) into the final assignment if you prefer.

Delivering the learning aims

Many learners will find learning aim A interesting as they investigate the features and uses of computer networking. The choice of wired or wireless connection methods will be easy, familiar territory that can be built upon to understand the rich variety of features needed for this unit and to appreciate the many uses of computer networks.

You should use current networking products such as a recent version of Windows Server or firewall to help learners investigate learning aim A. Their network design could be from a simulated case study or a real organisation and should provide enough depth to give learners the opportunities to design, develop and test their own system.

For learning aim B learners are asked to design a computer network. You should begin by introducing a client’s brief, an easy concept that does not require much depth. Learners must understand the hardware and software components used by networks; you could relate this back to the components they see at home and in your centre to ensure they can understand these as part of something they might use every day such as a home WiFi router.

To prepare learners for designing their computer network you could use design documentation showing how the centre network is set up to illustrate the tools they will need to use.

The network that learners produce will obviously have the number of workstations scaled down, but should still be a good and realistic representation of the learner design.

Learning aim C is very hands-on as learners gather the components needed to meet their network design for developing their computer network. Paired working is recommended here as there is unlikely to be enough kit for individual working and you will find that learners will benefit from the support they can give each other.

Learners must understand health and safety issues before starting their network builds. The test plan learners created in their design documentation must be implemented to confirm their network works as expected. Pairs of learners can test
UNIT 11: COMPUTER NETWORKS

each other’s systems to give client feedback which can then be used in assessment and to help suggest improvements to their network.

Delivery of learning aim D (Review the finished computer network) could be integrated into learning aim C or delivered after Assignment 3 has been completed. Learners should find it a useful exercise to confirm their network meets the original specification.

Give learners the opportunities to review other learners’ networks. Learners could be divided into groups of 5 or 6 with each learner in turn explaining to the others how their network met the specification. This should help the evaluations of their own networks and feed into their formal review assessment.
Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

### Unit 11: Computer Networks

#### Introduction

Introduce the unit to the learners, covering the aims and scope. An overview of the unit assessment can be given here, including strong links to the growth of modern networks with the workplace need for people who can set up and administer these systems.

#### Learning aim A: Understand the features and uses of computer networking

- You could put learners in groups and ask them to create a wall display about the scope of two wired or wireless computer networks. Learners can then produce a poster of the network topologies.
- Working in their groups, ask learners to put together a report on network security, utilities, services and types of users.
- Learners could then put together a dictionary that gives definitions for key terms covering protocols and data transfer methods.
- Ask learners to produce a table for a case study of your choice showing user, manager and administrator permissions for a network to meet the case study needs.
- Learners could then produce a diagram of an Ethernet packet with an explanation of its structure.
- With learners working in pairs, they could then produce a game that matches categories (e.g. communication) to the uses (e.g. blogs) of a computer network.
- Ask learners to find a real-life example from each type of network usage.
- In pairs, learners can report on how network features affect productivity and the user experience.

#### Assignment 1: Investigation

#### Learning aim B: Design a computer network

- Start by asking learners to create a client’s brief for a network that meets the needs of a case study.
- Working in pairs, ask them to produce network requirements and an initial design from the client’s brief.
- Learners could then create a magazine advert for a network device of their choice.
- In groups, learners could create a sales stand promoting network hardware and software components.
- In pairs, learners could produce an IP addressing scheme for a given network scenario.
- Again working in pairs, ask your learners to design a network set-up, configuration and testing within given constraints.

#### Assignment 2: Designing a Computer Network
## Unit 11: Computer Networks

**Learning aim C: Develop and test a computer network**

- Start by asking your learners to create a poster on health and safety issues that should be considered when developing a network.
- Working in pairs, ask learners to gather the hardware and software components they will need to develop a peer-to-peer network to meet a given design.
- In pairs, learners could gather the hardware and software components they will need to develop a client-server network to meet a given design.
- Ask the paired learners to test a network using a given test plan.
- Individual learners could then role-play providing clients with feedback on recommended improvements to a network.

**Assignment 3: Developing a Computer Network**
### Unit 11: Computer Networks

**Learning aim D: Review the finished computer network**

- With learners working in pairs, ask them to produce an informal review of the centre’s computer network.
- Learners can then put together a formal review of a computer network set up by another pair of learners.
- As a class, review the unit through a quiz covering all the learning aims, followed by a class discussion on the usefulness and applications of the unit.

**Assignment 4: Review the Finished Computer Network**
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 1: The Online World**
- **Unit 2: Technology Systems**
- **Unit 12: Software Development.**

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites

www.youtube.com
Search for video tutorials on how to set up and configure a network using the hardware and software available to learners in the centre.
Unit 12: Software Development

Delivery guidance

Approaching the unit
Software development is a complex subject that is intellectually challenging; learners will need to devote as much practical time to this unit as possible to enable them to grasp the concepts. Where possible, lessons in programming should be timetabled early in the day rather than after lunch when learners’ concentration can begin to wane. You should allow quite a lot of time before learners attempt the first assignment so that they can develop the necessary skills and understanding. It would be wise to mix the theory of program construction with simple practical examples.

Delivering the learning aims
Software such as Scratch can be used to introduce learners to programming concepts, but learners will then need to move on to a real programming language. Although learning aim A only requires them to modify an existing program, learners will need practice in writing their own simple programs; this is much more challenging and enjoyable than modifying existing ones and gives learners a better opportunity to grasp the basic concepts of programming. You should not introduce the various design techniques until learners have had some practise writing simple programs – without a basic understanding of how programs are written, the design techniques will be very difficult to understand.

For learning aim B, learners need to create a design for a program; this will be quite a challenge for learners who have little experience of software development. Make sure they have a detailed scenario and are very clear about exactly what the program should do, as this is a key requirement to producing a good design.

While working on creating their program for learning aim C, it would be useful for learners to create a diary (written, audio or video) in which they record their progress, successes and difficulties. This will prove useful when they come to review the software development process in learning aim D, and may also be suitable for inclusion in their digital portfolio (Unit 3: A Digital Portfolio). During this section of the delivery, lessons will be predominantly practical with learners working on their programs. However, you should be ready to give recap sessions on topics that are causing learners particular problems.

Learning aim D is an opportunity for learners to reflect on what they have done, the strengths of the solution they have developed and how it could be improved. You should encourage learners to look at each others’ programs and give constructive feedback. They should refer back to their original design and to the user requirements they were originally given to see if what they have produced matches these documents.
Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

Unit 12: Software Development

Introduction

Teacher to introduce the unit and initiate appropriate introductory activities. These may include looking at the content and assessment criteria for the unit, discussion about what is involved in software development.

Learning aim A: Understand the characteristics and uses of a software program

- The following content is largely covered/builds upon Unit 2: Technology Systems. You would not need to deliver this content again if it has already been delivered as part of that unit.
- Begin by asking learners to research why software is used; programming languages that are commonly used (Visual Basic, Java, C++, etc.).
- Introduce to the class programming constructs, techniques and quality issues.
- Learners can then investigate simple programs, demonstrating basic program constructs and modify them to help with their understanding.

Assignment 1: Reviewing Programmes

Learning aim B: Design a software program

- Introduce the software development life cycle, including user requirements and design techniques, to the class.
- Follow this with a teacher demonstration showing learners how to apply design techniques to simple programs.
- Learners should look at examples of design techniques (flowcharts, algorithms, screen designs, etc.) and practise creating their own designs.
- Introduce testing methods and documentation (test plans). Learners should create test plans for the program they have designed.

Assignment 2: Design a Password Program

Learning aim C: Develop and test a software program

- Learners need to develop the program they previously designed.
- Introduce the more complex aspects of program constructs, such as string handling, file handling, data structures, functions, procedures, etc.
- Learners should then practise using these techniques and develop example programs.
- Once learners have completed their programs they should test them using the previously created test plan and resolve any issues they come across.

Assignment 3: Develop and Test

Learning aim D: Review the finished software program

- Introduce to learners methods of reviewing a program: review criteria and quality issues, followed by a group discussion on software quality, usability and suitability for purpose.
- Ask learners to review others’ programs, giving feedback.

Assignment 4: Review the Program
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 2: Technology Systems
- Unit 8: Mobile Apps Development.

BTEC First in IT (QCF):

- Unit 18: Software Design
- Unit 20: Procedural Programming
- Unit 21: Event-driven Programming.

Resources

The availability of reading material and other resources will depend on the programming language selected. All popular programming languages have many books and online resources, but you will need to check that the level of any resource is suitable for your learners.

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


This is a basic introduction to programming concepts written for children, so reading level is appropriate. Programming examples use the Python language.


This is a more detailed introduction to programming concepts with a high reading level.
Unit 13: Website Development

Delivery guidance

Approaching the unit
This is a very accessible unit for learners as they will already be very familiar with a wide variety of websites. It is also easy to visit a large number of real websites to support their learning.

Learners need to be able to surf the internet from the classroom as well as having access to design tools, website authoring software and a collection of assets that can be used as content for the websites they will produce.

The unit content identifies a substantial list of reasons why individuals or organisations use websites. This gives excellent opportunities in the classroom to organise learners for individual, paired and group activities to research and understand these purposes, as well as the differences between static and dynamic web pages.

The rich experiences learners have of using websites can bring into classroom discussions the usability of known websites. This should give many suggestions on how the user experience of these websites can be improved.

Delivering the learning aims
Learning aim A should link to the real world, using a variety of current websites that the learners find interesting to investigate to identify their uses and features. The uses of these sites should be easy to identify. Learners will need to recognise the purpose of some of the tools and techniques used in these websites to deliver their functionality.

Learning aim B should familiarise learners with how a client brief can be used to specify the intended purpose and user requirements of a website, and how this can be used to produce design documentation. Learners can be shown the use of styles, templates and formats in websites. They can develop and practise their design skills by identifying the interactive features, creating site maps and storyboards using actual websites.

Learning aim C should enthuse learners as they learn the skills to produce their own websites and to view them in a browser. This unit does not require learner websites to actually be uploaded to an internet web host, although learners should be aware of the roles of a web server, domain name and web hosting services. Ideally their websites would be uploaded to the centre intranet, although viewing in a browser from locally stored HTML would suffice for the testing and reviews.

Learning aim D should instil valuable reviewing skills into learners as they compare their finished website against the original requirements. There is also a lot of opportunity for paired work with learners feeding back to each other on their final products and how well they met the client brief.
**Getting started**

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

<table>
<thead>
<tr>
<th>Unit 13: Website Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Introduce the unit to learners, providing an overview of scope and aims. The introduction should explain the teaching structure and assessment of this unit. Links can be made here to some of the websites the unit will use that learners already know for shopping or pleasure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Learning aim A: Understand the uses and features of websites</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>● Give learners a context with a purpose for the use of websites, e.g. advertising, and ask them to research in pairs or small groups. They can then report their findings back to the rest of the class. Ask learners to see how many examples of static websites they can find in 20 minutes.</td>
</tr>
<tr>
<td>● Ask learners to see how many dynamic websites examples they can find in 20 minutes.</td>
</tr>
<tr>
<td>● Working in pairs, ask learners to find two examples of websites where usability can be improved and two examples where it cannot.</td>
</tr>
<tr>
<td>● Put learners into small groups and ask them to provide suggestions on how the user experience of websites, identified by pairs in the group from the previous activity, can be improved.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Assignment 1: Investigating Websites</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning aim B: Design a website</strong></td>
</tr>
<tr>
<td>● In pairs, ask learners to write a client brief for a given real website, with class discussion on this work.</td>
</tr>
<tr>
<td>● Ask learners to create guides to website assets available for their use in the centre.</td>
</tr>
<tr>
<td>● Ask learners to create a storyboard for a website of each learner’s choice.</td>
</tr>
<tr>
<td>● In pairs, learners could create a site map for a given real website with class discussion on this work.</td>
</tr>
<tr>
<td>● Learners then practise using the styles, templates and formats using appropriate web-design software.</td>
</tr>
<tr>
<td>● Learners could create a poster showing hardware, software and resources required for a website.</td>
</tr>
<tr>
<td>● Learners could use a given client brief to create a storyboard and test plan for the website given in the scenario.</td>
</tr>
<tr>
<td>● Ask the pairs to report back to the class, giving an overview of their storyboard, explaining why they chose their design and relating it back to the brief.</td>
</tr>
</tbody>
</table>

| **Assignment 2: Designing the Website** |
### Unit 13: Website Development

#### Learning aim C: Develop and test a website

- Provide learners with exercises and web-based tutorials to complete, using suitable web-authoring software.
- Learners can then begin to build a website.
- Ask learners to create a review sheet (focusing on navigation, accessibility and performance) and use it to give feedback on the websites produced by the other learners.
- Learners can then use these reviews to improve their website.
- Learners can then create a test plan for their website and implement it.
- Learners could create documents suggesting improvements to accessibility for the website.

#### Assignment 3: Creating the Website

#### Learning aim D: Review the finished website

- In pairs, learners compare their finished website against the original requirements, including consideration of whether it was suitable for the client and met the intended purpose. There can be various combinations of learners feeding back to each other on their final products and how well they met the client brief.
- Ask the class to review the unit through a quiz covering all the learning aims, followed by a class discussion on the usefulness and applications of the unit.

#### Assignment 4: Reviewing the Website
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 1: The Online World
- Unit 2: Technology Systems
- Unit 4: Creating Digital Animation
- Unit 5: Creating Digital Audio
- Unit 6: Creating Digital Graphics
- Unit 7: Creating Digital Video
- Unit 12: Software Development.

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites

www.youtube.com
Search for video tutorials on how to create websites using suitable web-authoring software.
Unit 14: Installing and Maintaining Computer Hardware

Delivery guidance

Approaching the unit

We use technology systems all of the time, whether it is a mobile phone, a television or a games console. This unit is about 'lifting the lid' on technology systems, giving learners the opportunity to explore what's inside and understand how it all works. Your learners should enjoy the practical aspects of the unit, as it covers installing, maintaining or upgrading internal hardware components and external hardware devices. They will also identify and apply remedies to common faults found in technology systems.

Learners will need access to technology systems that can be dismantled, repaired and upgraded. As a minimum, learners will need access to a range of internal hardware components and external hardware devices from a computer system. The teacher assessment guidance in the specification gives some examples of internal hardware components and external hardware devices that would be acceptable in this unit.

Delivering the learning aims

It is strongly suggested that the unit is delivered in sequential order, from learning aim A to learning aim D.

Learning aim A concentrates on understanding the benefits and implications of installing and maintaining hardware in technology systems. It is important for learners to understand why technology systems need to be maintained, particularly for organisations that make heavy use of information technology. Technology systems need maintenance in the same way that a vehicle needs to be maintained, to make sure it remains in good condition and continues to perform well. Learners are likely to have encountered technical problems when using their own technology systems. Encourage them to discuss this within the group, including how they went about resolving them. Group discussions, including ones based on relevant case studies, are ideal for explaining the benefits and implications of maintaining hardware in technology systems.

Learning aim B focuses on planning the installation and maintenance of hardware with a given technology system. You will need to give learners a brief outlining the requirements of a ‘client’. Learners need to think about the purpose of the installation or maintenance, and how they are going to address the requirements of a ‘client’. The unit content and assessment guidance in the specification gives further information about what needs to be included in the brief.

Learning aim C is very much about practical application, where learners have an opportunity to configure a given technology system to meet the requirements of a ‘client’. Configuration in this context covers the installation, maintenance and troubleshooting/fault-finding of internal hardware components or external hardware devices. Content might include demonstrating a range of internal hardware components or external hardware devices, explaining how they are installed and maintained, and describing the common faults (and relevant remedies) associated with them.
In learning aim D, learners will review what they have done. They should refer back to the original requirements and explain the reasoning behind any changes they made. Learners should also consider feedback from others, including the ‘client’.

You should give learners appropriate tools, and health and safety equipment, to allow them to perform the practical activities. If resources are limited, it is recommended that learners work in small groups that will allow them to share the resources and still fulfil the learning aims.
Getting started
This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

<table>
<thead>
<tr>
<th>Unit 14: Installing and Maintaining Computer Hardware</th>
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<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Introduce the unit to your learners by giving a brief outline of the unit and how it links with other units in the qualification. Engage learners by giving them the tools to look inside a computer system and explain that by the end of this unit they will have covered the skills needed to install and maintain computer hardware, and troubleshoot faults with their own computer systems.</td>
</tr>
<tr>
<td>It is important that your learners understand why individuals and organisations use computer hardware (e.g. computers, printers, barcode scanners) and their internal components (e.g. network cards, memory, processor).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning aim A: Understand the benefits and implications of installing and maintaining hardware in a technology system</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Consider starting delivery with a discussion to establish what learners already know about technology systems in terms of what they are, how they are used and how they are built. Learners will most likely talk about their own technology systems and why they use them, for example a PC or laptop for accessing the internet, or the point of sale, for example a checkout technology system used by retailers.</td>
</tr>
<tr>
<td>● You could use physical examples (where available) to demonstrate a range of internal hardware components and external hardware devices. Use worksheets and group activities to get learners to identify different types of hardware components. If physical examples are not available, images (photographs or diagrams) would be a suitable alternative.</td>
</tr>
<tr>
<td>● Hold a group discussion about the reasons why people install and maintain hardware in technology systems. Use plenty of questions and answers to extract learners’ experiences of installing and maintaining hardware. Their previous experiences are most likely to relate to personal computers.</td>
</tr>
<tr>
<td>● Enable group activities where learners research the benefits of installing and maintaining hardware in technology systems. Learners could present their findings to the rest of the group and answer any questions (where appropriate).</td>
</tr>
<tr>
<td>● Consider delivering a presentation to your learners on the implications for organisations of maintaining hardware in technology systems. This presentation should be well supported with case studies of organisations that have maintained hardware with both successful and unsuccessful outcomes.</td>
</tr>
<tr>
<td>● Demonstrate a technology system to the group, explaining its individual internal hardware components and/or external hardware devices. Ask learners, in pairs, to think about the strengths and weaknesses of the hardware, and to present their findings to the rest of the group.</td>
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Assignment 1: Investigation

<table>
<thead>
<tr>
<th>Learning aim B: Plan installation and maintenance of hardware in a technology system</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Provide learners with a ‘client’ brief. The teacher guidance in the specification gives more information about what needs to be included in the brief. Discuss the brief, ensuring that all learners understand the requirements and what is expected of them.</td>
</tr>
<tr>
<td>It is important that you plan ahead and think about the technology system that you will</td>
</tr>
</tbody>
</table>
Unit 14: Installing and Maintaining Computer Hardware

give learners during their practical assessment, so that you can relate the brief to it.

- Explain at the outset that there is always more than one way of improving the performance of technology systems, and give examples. Ask learners to think about the different ways they could improve the performance of their own personal computer (if they have one).
- Demonstrate a range of fault-finding tools and techniques (e.g. antistatic equipment, computer toolkits, diagnosis software) that learners will use for the practical assessment.
- Ask learners to research suitable internal hardware components and external hardware devices that would meet the ‘client’ requirements.
- Deliver a presentation to your learners on testing hardware in technology systems, and explain (with examples) how test plans are produced. Ask learners to think about the range of tests they would carry out on a technology system.
- Provide short activities and formative assessments that cover each of the above points, so that learners have everything they need in order to prepare a plan that fulfils the assessment criteria. Learners could present their plans to the ‘client’, as hardware engineers would do in the working environment. This is a good opportunity for learners to demonstrate their presentation skills.

Assignment 2: Planning
### Unit 14: Installing and Maintaining Computer Hardware

#### Learning aim C: Install, maintain and test hardware in a technology system

- Deliver a series of ‘supervised’ practical workshops that will enable all learners (individually, in pairs or in small groups) to configure technology systems. It is at this stage that learners will need access to technology systems that can be dismantled, repaired and upgraded. Learners will also need access to tools that will enable them to install and maintain hardware, as well as to fault-finding/troubleshooting hardware components.

- You will need to provide technology systems with specific, known faults (loose connections, jumper settings, power support, power-on self-test (POST) errors) that are appropriate for your learners to be able to diagnose and correct.

- Demonstrate the processes involved with installing and maintaining a range of internal hardware components and external hardware devices in a technology system. Ask learners to observe and take notes. It is recommended to give breaks between demonstrations, giving learners the opportunity to digest what they have seen and practise it with their own technology system.

- Demonstrate how to use the correct tools and techniques to find faults with internal hardware components or external hardware devices, and the appropriate remedies to fix them.

- Remind learners of the importance of health and safety, and how to handle and use the equipment correctly and safely.

- Ask learners to refer back to their test plans. Demonstrate how they could complete their test plan while testing their given technology system. Give examples of where test plans have failed and the actions that have been taken to resolve them.

#### Assignment 3: Repair and Upgrade

#### Learning aim D: Review the modified technology system

- Learners could individually review their work. They should:
  - explain why their modified technology system is suitable for the intended purpose and the original requirements
  - refer to their original plan and check that they have completed the list of installation and maintenance activities
  - check that they have customised the modified technology system successfully
  - detail whether they experienced any problems and, if they had to change their plan to resolve them, justify the reasons why they had to change their original plan.

- You could ask learners to arrange an interview with the ‘client’ to discuss the modified technology in terms of whether or not the requirements have been fully met. Learners should record the feedback and include this as evidence towards partially satisfying the assessment criteria. Before the interview, get learners to prepare what they will discuss, giving them advice, if necessary.

- Learners should also give suggestions on how the modified technology system could be improved.

#### Assignment 4: Review
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 2: Technology Systems**
- **Unit 11: Computer Networks**
- **Unit 15: Installing and Maintaining Computer Software**
- **Unit 16: Automated Computer Systems.**

BTEC First in Information Technology (QCF):

- **Unit 3: Computer Systems**
- **Unit 7: Installing Computer Hardware**
- **Unit 13: IT Fault Diagnosis and Remedy.**

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Covers how to find common faults with computer systems and how to fix them, using appropriate tools and techniques.


Covers how computer systems work and covers every hardware component inside a computer system.

Journals

*Computer Weekly*

Keeps you up to date with the latest news regarding technology systems. It is useful for recognising the benefits and implications of installing and maintaining hardware in technology systems.

Websites

www.howstuffworks.com/pc

Gives an overview of how computer systems work and discusses the main hardware components in depth. It is useful for referencing the latest hardware components and understanding how they integrate with modern computer systems.
Unit 15: Installing and Maintaining Computer Software

Delivery guidance

Approaching the unit

Technology systems require software to bring them to life. This unit is about giving learners the opportunity to use software to control and communicate with technology systems. Your learners should enjoy the practical aspects of the unit, as it covers installing, maintaining and upgrading software. They will also be able to use their skills to customise software.

Learners will need access to technology systems that allow them to install, maintain/upgrade and customise software. As a minimum, learners will need access to operating-system installation software, at least two software applications, installation software, and software applications capable of customisation (e.g. office software, media software). The teacher assessment guidance in the specification gives some further information on resources that would be acceptable in this unit.

Delivering the learning aims

It is strongly suggested that the unit is delivered in sequential order, from learning aim A to learning aim B.

Learning aim A concentrates on understanding the benefits and implications of installing and maintaining software in technology systems. You could begin by explaining the different types of software, including software applications (e.g. Microsoft® Office, Internet Explorer®, Google Chrome™ browser), system software (e.g. Disk Cleanup, Disk Defragmenter, System Restore) and operating systems (e.g. Microsoft® Windows®, Linux®, UNIX®, Apple® Mac OS®).

Group discussions are an ideal way of explaining the benefits and implications of maintaining software in technology systems. Learners will probably already have experience of using software and should be familiar with what it is. Encourage learners to talk about the different types of software that they have used and why they have chosen to use that particular piece of software. They should give examples of how it could improve both their own productivity and that of organisations.

Learning aim B focuses on planning the installation and maintenance of software within a given technology system. You will need to give learners a brief that outlines the requirements of the ‘client’. Learners need to think about the purpose of the installation, maintenance and/or customisation of software, and how they are going to address the requirements of the given ‘client’. The unit content and assessment guidance in the specification gives further information about what needs to be included in the brief.

Learning aim C is very much about practical application, where learners now have an opportunity to install, maintain/upgrade and customise software with a given technology system to meet the requirements of a ‘client’. Content might include demonstrating a range of software and explaining how they are installed, maintained/upgraded and customised. Similar to most other units in this qualification, you should ensure that learners are familiar with testing and are able to carry out testing of their software.
In learning aim D, learners will review what they have done. They should refer back to the original requirements and explain the reasoning behind any changes they made. Learners should also consider feedback from others, including the ‘client’.

If resources are limited, it is recommended that learners work in small groups, allowing them to share the resources and still fulfil the same learning aims.
## Getting started

This provides you with a starting place for one way of delivering the unit, based around the suggested assignments and tasks in the specification.

### Unit 15: Installing and Maintaining Computer Software

#### Introduction

Introduce the unit to your learners with a brief outline of the scope of the unit and how it links with other units in the qualification. Engage learners by exploring and discussing how computer software plays an important role in technology systems, drawing on learners’ own experience. Share your own experiences of using computer software, and how it has helped you in your life.

*This unit could be taught in parallel with Unit 14: Installing and Maintaining Computer Hardware.*

#### Learning aim A: Understand the benefits and implications of installing and maintaining software in technology systems

- Consider starting delivery with a discussion to establish what learners already know about different types of software and how they are installed onto technology systems (such as computers, laptops and mobile phones). Use worksheets to discover the types of software that learners use, and why they use them.

- Use previously installed examples (where available) to demonstrate a range of different types of software, including software applications, system software and operating-system software. Use worksheets and group activities that ask learners to identify different types of software. If resources are not available, images of software products and a description of their purpose would be a suitable alternative, so long as the description does not give learners the answer.

- Hold a whole-group discussion about the reasons why people install and maintain software in technology systems. Use plenty of questions and answers to extract learners’ experiences of installing and maintaining software. This is most likely to be on their own computer system or a mobile phone.

- Enable group activities where learners research the benefits and implications of installing and maintaining software in technology systems. Learners can present their findings to the rest of the group and answer any questions (where appropriate).

- Deliver a presentation to your learners on how software could improve productivity for people and organisations. For example, automation features of spreadsheet software will help improve productivity.

- Demonstrate a technology system to the group and explain the different types of software installed. Ask learners, in pairs, to think about the strengths and weaknesses of the software, and to present their findings to the rest of the group.

### Assignment 1: Investigation
### Unit 15: Installing and Maintaining Computer Software

#### Learning aim B: Plan installation and maintenance of software in a technology system

- Provide learners with a ‘client’ brief. The teacher assessment guidance in the specification gives more information of what needs to be included in the brief. Discuss the brief, ensuring that all learners understand the requirements and what is expected of them. It is important that you plan ahead and think about the technology system and software resources you will give learners during their practical assessment, so that you can relate the brief to it.

- Explain at the outset that there is a wide selection of software available, some of which is designed for the same purpose; however, they all have their own benefits and drawbacks. Learners need to select carefully the most appropriate software, with justification. Where possible, learners should also consider different customisation tools and techniques, and how they could improve productivity.

- Deliver a presentation on testing software in technology systems, and explain (with examples) how test plans are produced. Ask learners to think about the range of tests they would carry out on a technology system.

- Provide short activities that cover each of the above points, so that learners have everything they need to prepare a. Learners could present their plans to the ‘client’, as software-installation engineers would do in the working environment. This is a good opportunity for learners to demonstrate their presentation skills.

#### Assignment 2: Planning

#### Learning aim C: Install, maintain and test software in a technology system

- Deliver a series of ‘supervised’ practical workshops that will enable all learners (either individually, in pairs or in small groups) to install, maintain/upgrade and customise software onto technology systems. It is at this stage that learners will need access to technology systems, operating-system installation software, at least two different software applications, and software applications capable of customisation.

- Demonstrate the processes involved in installing, maintaining/upgrading and customising software for a given technology system. Ask learners to observe and take notes. It is recommended to give breaks between demonstrations, giving learners the opportunity to digest what they have seen and practise it with their own technology system.

- Ask learners to refer back to their test plans. Demonstrate how they could complete their test plan while testing their given technology system. Give examples of where test plans have failed and the actions that have been taken to resolve them.

#### Assignment 3: Installing and Maintaining
### Unit 15: Installing and Maintaining Computer Software

#### Learning aim D: Review the modified technology system

- Learners could individually review their work. They should:
  - explain why their modified technology system is suitable for the intended purpose and the original requirements
  - refer to their original plan and check that they have completed the list of installation and maintenance activities
  - check that they have customised the modified technology system successfully.
  - detail whether they experienced any problems and, if they had to change their plan to resolve them, justify the reasons why they had to change their original plan.

- You could ask learners to arrange an interview with the ‘client’ to discuss the modified technology in terms of whether or not the requirements have been fully met. Learners should record the feedback and include this as evidence towards partially satisfying the assessment criteria. Before the interview, get learners to prepare what they will discuss, giving them advice, if necessary.

- Learners should also give suggestions on how the modified technology system could be improved, e.g. by creating macros to further automate tasks in a spreadsheet.

#### Assignment 4: Review
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 2: Technology Systems
- Unit 8: Mobile Apps Development
- Unit 9: Spreadsheet Development
- Unit 11: Computer Networks
- Unit 12: Software Development
- Unit 14: Installing and Maintaining Computer Hardware.

BTEC First in Information Technology (QCF):

- Unit 3: Computer Systems
- Unit 8: Installing Computer Software
- Unit 9: Customising Software
- Unit 19: Object Oriented Programming
- Unit 20: Procedural Programming
- Unit 21: Event Driven Programming.

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.

Provides detailed coverage of how to install, configure and use Microsoft® Windows® 7 operating-system software.

Provides detailed coverage of how to install, configure and use Apple® Mac OS X® Lion operating-system software.

A guide to the Linux operating system.

Journals

Computer Weekly

Keeps you up-to-date with the latest news with technology systems. It is useful for recognising the benefits and implications of installing and maintaining software in technology systems.
Websites

www.openoffice.org/documentation
Gives an overview of the Apache OpenOffice Productivity Suite, including software downloads, user guides, FAQs, samples, templates and training materials. It is useful for obtaining office software with online support.

http://office.microsoft.com/en-gb
Provides information on the Microsoft® Office suite giving access to their range of supporting materials including training materials, help guides, images, templates and customisation tools.

www.libreoffice.org/get-help/documentation/
Gives information on the LibreOffice personal productivity suite.
Unit 16: Automated Computer Systems

Delivery guidance

Approaching the unit
To make this unit engaging and accessible, encourage learners to develop systems that they can see a use for in their daily life. For example, while interesting, developing a bomb-disposal robot is likely to be less relevant to learners’ daily lives than developing a wheeled device that can be controlled by a mobile using Bluetooth, or a central heating controller that responds to feedback from a temperature sensor.

Delivering the learning aims
It is strongly suggested that this unit is delivered in sequential order, from learning aim A to learning aim D.

For learning aim A, learners could investigate where computer control is already used in domestic and industrial situations, from systems that are simple (such as a timed central heating controller that maintains a steady temperature) to more elaborate systems used in industrial processes, such as:

- the Boston Dynamics BigDog autonomous quadruped carrier
- programmed quadrotors that play music (as seen in videos such as http://youtu.be/_sUeGC-8dyk)
- paint robots in car factories, such as robotic painting manipulators
- other examples such as those given in the various videos linked to on the forum www.societyofrobots.com/robotforum/index.php?board=6.0

Discussion about inputs and outputs to and from a control circuit are essential, as is discussion about how these could be reproduced realistically in a learning situation. It is necessary to consider sensors and actuators as well as control circuitry, and to consider how these might be assembled and programmed in the classroom. Examples might include the following.

- Kits such as Lego Mindstorms NXT that include sensors, motors and the programmable ‘brick’ along with a bespoke programming environment. An alternative environment for programming NXT is called Enchanting, which enables the NXT to be programmed through this Scratch offshoot, an environment that may be familiar to learners from Key Stage 2 and Key Stage 3.
- PICAXE kits, which include a device that can sort sweets by colour, a caterpillar walking ‘bot, and a maze solver.
- Arduino is another affordable solution. It is a microcontroller with a number of analogue and digital input and output pins to which can be connected various sensors and actuators. Examples of automated robots can be found at http://arduino.cc/blog/category/robot/

By examining a number of uses of automated systems, such as traffic-light sequencers and tree-climbing robots (e.g. http://youtu.be/zkpH1BjD6Wc), learners will be able to identify the characteristics of automation and the means to achieve it. This will help develop their knowledge and understanding of loops, conditional loops and variables by analysing linear systems and those involving loops and feedback.

Learning aim B gives an opportunity to introduce learners to the design process. You should present learners with a purpose and a design brief from a ‘client’ and outline the fact that they are required to produce a specification and a test plan. Once you
UNIT 16: AUTOMATED COMPUTER SYSTEMS

have taught them about the product development cycle, provide them with opportunities to learn some coding skills.

Learning aim C involves developing and testing the system. Introduce learners to a number of actuators (e.g. motors, servos) and sensors (e.g. proximity sensors, light sensors) so they can make an informed choice for their own design. Through examples and exploration, they can develop the necessary coding skills to build and program an automated vehicle that will follow a path between two points. Examples of applications for this might be to improve the productivity of workers in a factory or to assist exploration on the surface of another planet or moon.

Learning aim D offers an opportunity for reflection on the completed device, and on the entire learning process. Learners should consider future developments and any constraints they found in the development of their device.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

### Unit 16: Automated Computer Systems

#### Introduction

Introduce the unit by showing video clips of automated systems in action. Initiate a discussion about why automated systems might be used. Make sure learners are aware that systems have multiple components and devices, and that they respond to inputs/outputs in a manner defined by their programming.

#### Learning aim A: Understand the characteristics of automated systems

- You could use group discussion and whole-class feedback to find out what learners already know about the ways that automated machines can be used instead of humans. How would a machine be used? What risks would there be in using a machine? What are the benefits of using a machine?
- Offer learners a number of different sensors and explain what they do. Using a single sensor of their choice, learners could work in pairs to develop a podcast that introduces how the sensor might be used in a machine or in a situation of their own devising.
- Offer free access to downloaded movies that illustrate how automated machines can be used in rescue and/or bomb-disposal work. Learners could edit the clips with annotations that explain how sensors and actuators work and say why a particular type of sensor has been used.
- Learners could complete online fact-finding to gather examples of existing line-following robots; they could compile a blog post or similar describing each, saying what it is used for (e.g. factory use; line-follower competitions) and suggesting what the hardware requirements would be for a simple line-follower.
- Demonstrate a line-follower in the classroom (e.g. using Lego NXT) so that learners can see it operating, taking note of any light source and the light sensor. Through discussion, learners can break down its action and work out how it follows a line, producing a flow chart to show how it works.
- Give more able learners extension activities involving calibration of light sensors.
- In a workshop, learners could use simulation software (e.g. Flowol) to emulate traffic lights and produce a program that sequences traffic lights in increasingly complex arrangements (e.g. one set at roadworks, two sets at a crossroads, more sets at a controlled roundabout). Discuss ways of developing a means for testing each stage of development. Introduce the idea of subroutines.
- In a workshop, learners could use Arduino (or other programmable controller) to switch traffic lights on and off, following the UK sequence for the lights. They could then adapt the program to read from button sensors (which simulate real-world inductance sensors) to indicate when a car is present.
- During development, you could for example show learners how to produce a truth table for a system. They can then produce a truth table for the traffic-light program and show how this is essential in ensuring safety by making sure that no two conflicting lights show green at the same time.

#### Assignment 1: Automated Systems in Action

*Please note that for this assignment you should allow learners to investigate two different systems. One system should be a working kit-based system that can be demonstrated in the classroom and the other should be a commercial system. For the basic classroom system, the control program should be made available for learners to investigate.*
UNIT 16: AUTOMATED COMPUTER SYSTEMS

Learning aim B: Design an automated system

- Introduce learners to the ‘systems development lifecycle’, showing the traditional route that projects take.
- Provide learners with a design brief as if it comes from a client; if they generate their own brief, you should approve it before they start working from it. Ensure that learners understand that the brief is a statement of requirements and that each item must be shown to be met, otherwise the client will reject their proposal.
- To assist understanding of how to meet a brief, give a case study of the requirements of a system, using component cards to identify and assemble the required elements of the system. Learners could reject unneeded items, justifying both their rejections and their decisions regarding the items they keep.
- Ask learners to research the hardware requirements that they will need to meet the requirement. Stress that the outcome for this section is the design for the system, not the build; more thought at the design stage makes the build easier. They will need to specify sensors, actuators and a controller. Learners should be able to use a schematic diagram to show how the components will be connected.
- Deliver a presentation about system testing, explaining (with examples) how test plans are produced. Consider traditional testing, with data and conditions that are in bounds/out of bounds/at boundary edges.
- Use formal lessons to introduce the structure of design documentation. These should include how to construct a hardware diagram showing how devices will be connected, how to write a test plan that includes development milestones, and how to write a system specification.
- Formal teaching sessions about how to approach a coding problem, from plain English to (possibly) flow charts, pseudo code and subsequent code, could be followed by activities that demonstrate and allow learners to practise coding. Ensure that learners can recognise at least conditional loops, and possibly procedures/subroutines with parameters.
- The working specification should include:
  - a statement of the purpose for the device
  - user requirements, including interface requirements
  - a list of input and output devices, and a hardware diagram showing how they will be connected
  - a description of how the machine will follow a line
  - a listing of any code that will be used
  - a specification for a control program
  - any constraints that the prototype will have that might not be present in a production device
  - a test plan
  - justification as to how the design is effective and efficient.

Assignment 2: Design for an Automated Vehicle
**Unit 16: Automated Computer Systems**

**Learning aim C: Develop and test an automated system**

- Deliver a series of tiered workshops that give opportunities to develop the following programming constructs:
  - sequential instructions and selections
  - using loops
  - using conditional loops (counter-controlled and interrogating sensors)
  - using code libraries
  - using variables
  - using subroutines
  - using parameters.
- Provide demonstration programs for learners to deconstruct and explain their operation. At higher levels this will include code with subroutines and variables that learners can program into the device and adapt to their needs.
- Use specialised workshops to introduce motors, servos, sensors and controllers so that learners can experiment with step-by-step methods of learning to program the device.
- Higher-ability learners should make suggestions for improving code efficiency as development progresses.
- Use supported workshops to enable learners to use their knowledge to write and test a program that will follow a line. Extensions might include the use of further sensors and routines that inform the vehicle of obstacles and enable it to negotiate a path around them before finding the line again.
- Demonstrate the safe use of tools and good working practices with hardware, including fault-finding techniques.
- Opportunities to improve the device include practical activities of modifying an existing chassis, and some way of driving and steering. Low-ability learners might assess refinements to a basic (given) chassis.
- Learners assemble the vehicle and program it to follow a line. They should test that it performs as required and note any modifications. They should also seek comments from other people and make improvements based on that feedback.
- Learners could independently investigate different ways of accomplishing this by modifying their own code, or existing (supplied) code.
- Learners should be encouraged to use comment lines in their code to help other people follow it.
- If the device cannot find the line, learners should make it fail to a safe state.
- Call for timely reviews against the test plan to make sure development is on-track and that learners are using new knowledge to apply to their project. For example, each activity should include reflection on ‘how I would use this’.
- Demonstrate how to test against a test plan, and give example scenarios and briefs against which learners can rehearse by testing the success of a case study project against its test plan. Does it do what was asked in the brief? Give some that do and some that do not.
- Finally, learners should test their device against the original brief and test plan. Does the device perform as required? They should describe how it meets the original requirements of the brief.

**Assignment 3: Develop and Test the Automated Vehicle**
**Learning aim D: Review the finished automated system**

- Learners could keep a project diary in which they note such things as progress made, new things learned and modifications made. They can use this to reflect on the development process.
- Learners could note which things slowed them down in the project, e.g. learning a programming language, hardware availability.
- Learners could document the project’s accomplishments and how it could be improved.
- A final group review would allow learners to compare their solutions with those of others, evaluating their design against the final system and making suggestions for further improvements.

**Assignment 4: Review the Automated Vehicle**
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 2: Technology Systems**
- **Unit 8: Mobile Apps Development**
- **Unit 11: Computer Networks**
- **Unit 12: Software Development**
- **Unit 14: Installing and Maintaining Computer Hardware.**

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Learners can develop Lego NXT programming skills with this book.

Websites

Link to a PDF of the *Experimenter’s Guide for Arduino*.

http://byob.berkeley.edu
Build your own blocks – a Scratch variant that allows users to create their own procedures.

Link to PDF version of Earthshine Electronics’ *Arduino Starter Kit Manual*.

http://enchanting.robotclub.ab.ca/tiki-index.php
Enchanting – a Scratch variant that connects to Lego Mindstorms NXT.

http://ladyada.net/learn/arduino
Learn Arduino tutorial; useful for learning basic Arduino programming. It includes a series of graded exercises.

Lego Mindstorms.

http://scratch.mit.edu
Scratch programming language.

http://seaside.citilab.eu/scratch/arduino
Scratch for Arduino

http://societyofrobots.com
Self-proclaimed ‘number one website to learn how to make a robot’.
Unit 17: Multimedia Products Development

Delivery guidance

Approaching the unit

In this unit, your learners will develop their understanding of how multimedia products are used and the typical features they contain. They will apply their findings from investigating existing multimedia products and will design, develop, and test their own multimedia products against a brief. Your learners should enjoy the challenge of creating successful multimedia products that retain attention, are visually interesting and present an intuitive interface.

Delivering the learning aims

It is strongly suggested that the unit is delivered in sequential order, from learning aim A to learning aim D.

Learning aim A starts the unit with an investigation of commercial multimedia products intended for different purposes and targeted towards different audiences. The multimedia products should range from linear presentations to complex interactive simulations and computer games. The investigation must cover at least one linear and one interactive multimedia product designed for different purposes, although a wider range of products would promote better understanding of the uses of these products and their features.

You could organise your learners to work in groups to analyse selected examples, identifying good features and weaknesses, considering suggestions for improvement, and finding further examples to support their views. Within the groups, encourage them to discuss the examples in order to identify the specific features incorporated within the products that make them effective, purposeful and suitable for the intended audience.

Learning aim B focuses on the design of multimedia products prior to final implementation. You should give your learners a series of client briefs that provide opportunities to explore ideas for content and layout for both linear and interactive products. Learners should be encouraged to experiment, move beyond their first ideas and follow the prototype–review–improve development cycle. Learners should display their design ideas and prototypes within their groups and take this opportunity to further develop multimedia skills in the presentation of the design work.

Learning aim C is very much about presenting the final outcomes of the design and prototyping process. Learners will know what their intended multimedia products will do, what they will look like, and how they will be tested. They should be ready to apply their practical skills and knowledge to combine mainly ready-made assets to develop their products and test their outcomes. Many of the ready-made assets will have either been gathered from third parties (for example those available on the internet) while taking due consideration of copyright, or created by completing Unit 4: Creating Digital Animation, Unit 5: Creating Digital Audio, Unit 6: Creating Digital Graphics and/or Unit 7: Creating Digital Video. Learners may decide to produce additional original assets, but this should not be the focus of the unit.

Finally, for learning aim D, learners will review what they have created. They should evaluate their initial design ideas/prototypes against the final multimedia products, justifying any changes that were made during development. Learners should also consider feedback from others, including the client.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

Unit 17: Multimedia Products Development

Introduction

You could introduce this unit to your learners with a brief outline of the scope of the unit and how it links with other units, such as Unit 4: Creating Digital Animation; Unit 5: Creating Digital Audio; Unit 6: Creating Digital Graphics and/or Unit 7: Creating Digital Video.

This could be followed by a discussion about the characteristics of multimedia products. Encourage learners to draw on their own experiences of interacting with multimedia to identify the main features, such as the fact that they are computer controlled, integrate text, graphics, still and moving images, animation and sound, and can involve interactivity with the user.

Explain to the learners that they will design, develop and test their own multimedia products against a brief and, once completed, will review their work and obtain feedback from others.

Learning aim A: Understand the uses and features of multimedia products

- You could start delivery with a discussion to establish what learners already know about multimedia products and how they are created. Learners will be able to draw on their own use of technology to identify a range of multimedia products.
- Enable group activities where learners carry out their own internet-based research into the characteristics of at least one linear and one interactive multimedia product. Ask each group to identify their top product from both categories.
- Each group should identify at least two good features and one weakness from their chosen multimedia products and prepare notes that can be used to present their products to the rest of the group. For each product, learners will need to identify its purpose and intended audience and consider the different features of the products in terms of the overall experience provided.
- Enable whole-class discussion about the chosen products and compile, through the use of mind maps or diamond-ranking activities, the most important features of successful multimedia products.
- Deliver a presentation that summarises the features of successful multimedia products and gives specific suggestions for further improvement.

Assignment 1: Investigation
## Unit 17: Multimedia Products Development

### Learning aim B: Design multimedia products

- Learners need to develop a good understanding of the ICT skills required to create their multimedia products. Acquisition of skills in the use of tools and techniques should be ongoing. You could demonstrate the use of the software to learners and encourage them to use online video tutorials to support this development and to ensure that outcomes are engaging and exciting. Delivery should be planned so that it builds on software skills gained from earlier units.

- Deliver a presentation on design techniques to your learners. Learners need to be able to develop and document a design for each product. Make sure that the designs include the elements listed in the bullet list in assignment 2 (see specification) and meet the requirements in the final paragraphs.

- Demonstrate design techniques, such as storyboarding and mind mapping, and show how they can be used to develop ideas.

- Introduce a range of short activities that require the gathering of assets and application of skills, such as video editing and synchronisation of sound with animation. The activities should promote an understanding of layout, timelines, transitions and alternative methods for user interaction. At this stage learners could return to their groups to consider the tools and techniques used in the production of the commercial products reviewed earlier.

- Support learners as they create the designs for their own multimedia products.

- Facilitate learners to record/document how their designs fulfil the stated purpose and audience/user requirements, to clarify why any ideas were rejected, and to describe any constraints that affected the final design. Where necessary, you could provide learners with writing frames to structure their work.

### Assignment 2: Design Multimedia Products

### Learning aim C: Develop and test multimedia products

- Explain to learners that the work produced for learning aim B will provide them with all the information and skills that they will need to develop both of the multimedia products described in the brief.

- Demonstrate the skills required to develop the multimedia products through combining the gathered and prepared assets. Learners should now be able to develop each multimedia product to fulfil the purpose and requirements set out in the brief.

- Discuss with the learners the need to test multimedia products before they can be released to the client or end user. In groups, the learners could identify practical methods for the thorough testing of their products. Learners should now be able to test each multimedia product against the test plan, checking the original requirements are still being met, document any changes made and refine each multimedia product, using feedback from others, where appropriate, to enhance the audience/user experience.

- Facilitate learners’ testing and documenting of their multimedia products.

- Divide the learners into groups and ask them to provide critical feedback to their peers on the multimedia products. Facilitate learners to make improvements to their multimedia products in light of the feedback received from peers.

### Assignment 3: Develop and Test Multimedia Products
**Learning aim D: Review the finished multimedia products**

- Explain to learners that this review does not result in changes being made but informs future projects.
- Discuss with learners the importance of explaining the reasons for any changes between original designs and final outcomes.
- The review should cover strengths of the products, explain why the design has changed during the development, and include specific suggestions for the further improvement of each product.
- Facilitate learners as they produce the review of their multimedia products. The outcomes from the review are likely to include:
  - an evaluation report
  - end-user feedback from others
  - annotated design documents.

**Assignment 4: Review the Multimedia Products**
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 1: The Online World**
- **Unit 4: Creating Digital Animation**
- **Unit 5: Creating Digital Audio**
- **Unit 6: Creating Digital Graphics**
- **Unit 7: Creating Digital Video**
- **Unit 12: Software Development.**

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Provides useful advice on investigating existing multimedia products and guidance on design and implementation.

Websites


A 15-minute programme from Teachers’ TV on teaching multimedia skills.

https://audionetwork.lgfl.org.uk

A source of copyright-free music. The site can only be used for downloading audio files in schools and colleges across the UK.

www.bgfl.org/bgfl/45.cfm

A website that provides guidance on the creation and hosting of podcasts.

www.channel4.com/learning/microsites/I/ideashfactory/pixnmix/index.html

A website with information about VJs (video jockeys) and how to combine audio and video assets.

www.pbs.org/kcts/videogamerevolution/history/index.html

A useful website that charts the development of multimedia games and provides guidance on the creation of original interactive games.
Unit 18: Computational Thinking

Delivery guidance

Approaching the unit

Computational thinking is a problem-solving process that involves formulating problems in a way that allows us to use a computer to produce a solution. To succeed in today’s world, computational thinking has to be a fundamental part of the way that learners think and act. This unit is designed to inspire learners and allow them to understand some of the mathematical methods that underpin the computational thinking skills needed to solve these problems.

This unit covers three types of important computational thinking skills (logical, algorithmic and optimal) that your learners will develop as they work through this unit and succeed in solving given problems. The unit is designed to encourage learners to successfully organise their thoughts, present them in a structured way and refine their solutions to produce an efficient solution.

Delivering the learning aims

Some learners find mathematics to be an abstract concept and find it hard to imagine when they will use any of what is taught in the classroom in their real lives. To deliver this unit successfully you will need to ensure that learners are able to understand the importance of the role maths has played in the development of the technologies we use today. In particular, you may want to concentrate on the importance of maths in gaming, to engage your students.

Almost all learners will be familiar with much of the content covered in learning aim A, such as the different types of numbers and basic calculations, from their maths lessons. However, topics such as binary and hexadecimal numbers are likely to be new to them as are the examples of the use of numbers systems in computers.

You may need to revisit some of the basic ideas to ensure that learners are confident in the use of base 10 numbers before you progress to the other content of the learning aim. You may find that one of the easiest ways of teaching the binary content is to parallel use of binary numbers with denary numbers. You will find that the concept of place value is probably the most critical idea to support the learners. As long as you can compare thousands, hundreds, tens and units to the binary values of 16s, 8s, 4s, 2s and units, learners should be able to understand the new number base.

Many learners will have experienced some of the content of learning aim B such as functions and their graphical representations. They may have come across logic gates in science or electronics, but it is more likely that this content will be new to them in this context. They will need to recognise the importance of logic gates in the hardware of the computer and how they are used to implement program instructions. There are many good web-based examples of the use of individual and combined logic gates. Learners may find the topic more accessible if they can see a simulation of logic gates in operation. There is a wide range of online logic gate simulators; details of two are included at the end of this guide.

For learning aim C, learners will be required to apply their computational thinking skills to solve a simple problem. The specification offers guidance on the steps they will need to follow to solve a problem using the computational thinking process. The process will require them to use the three identified computational thinking skills to solve a given problem. Learners will benefit from following the process through for
several simple problems before undertaking their assessed task to ensure that they understand the processes.

It is particularly important that they develop the skills required to design their solutions and to present the design using recognised methods such as pseudo code, flowcharts, Boolean operations or an algorithm. Some learners may find methods such as pseudo code rather complex and would benefit from using a more visual method such as a flowchart.

The learning aims are designed to support the learners as they develop their thinking skills and include mathematics relevant to computing. It is important that they feel confident in the use of the mathematical concepts before they undertake their assignment work. Some students may not have had great success with maths at KS3 and will need to be supported with some of the more complex areas of study.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

**Unit 18: Computational Thinking**

**Introduction**

Begin by explaining to learners that mathematics is all around us in everyday life, from telling the time to working out how much money we can afford to spend on lunch. Ask learners to work in small groups to construct spidergrams recording all their uses of mathematics on a daily basis, for example during school activities, leisure activities, seasonal activities such as holidays and the ways in which their parents/carers use mathematics. Ask each group of learners to create a presentation to share their ideas with the whole class to build up a comprehensive understanding of the relationship of maths and computational thinking in everyday life.

**Learning aim A: Understand mathematical methods for calculations and their uses in computational thinking**

- Drawing on learners’ prior knowledge of the use of mathematics in everyday life, introduce the need to use a variety of number systems. Good examples here include 60 minutes in an hour, 24 hours in a day, seven days in a week.
- Set the learners a series of tasks to convert minutes into hours and hours into days. Include fractional examples such as 25 minutes as hours or 10 hours as a part of a day.
- Explain to learners that not all calculations can produce exact answers, 10 divided by 3 being a good example. Introduce the concept of rounding an answer to a set number of digits.
- Through whole class discussion identify other situations in which the ‘answer’ produced may not be accurate. Introduce the idea that by using a calculator it is hard to have exact representation of very large or very small numbers as there are a limited number of digits in the display.
- Deliver a presentation to the learners on the nature of a computer as a digital device that processes binary data.
- Ask learners to work in groups to research into the binary number system and to produce a presentation to their peers to explain how numbers are represented using binary notation.
- Demonstrate the relationship between denary place value and binary place value to ensure that the learners understand that hundreds, tens and units are replaced by 4s, 2s and units.
- Set learners a series of tasks to convert between base 10 and binary numbers and binary numbers and base 10 numbers.
- Ask learners to research into hexadecimal numbers. Learners should then work in pairs or small groups to share their research before a class discussion on the need for hexadecimal notation.
- Introduce the assignment brief to learners and discuss the important points that need to be included in the induction booklet.
- The brief uses the neutral context of ‘a company’. You may prefer to identify a particular company or sector that will be familiar to learners and may allow them to set the work in context.
- Ask learners to create individual spidergrams of the content that they wish to include.
Unit 18: Computational Thinking

- Remind learners that there is no right answer and that they should include the points that they think are important.
- Learners can present their evidence for this learning aim in a variety of ways. You may prefer learners to concentrate on one method of presentation, or to use a variety of methods to engage and motivate them.
- If learners find some topics difficult to present in this way, you may want to set a series of straightforward mathematical tasks or exercises to cover the content for the learning aim.
- Provide learners with review points when they can discuss their progress with a peer or yourself and plan how to complete the brief.

Assignment 1: Calculations

Learning aim B: Understand mathematical methods for functions and Boolean operations and their uses in computational thinking

- Give a presentation on what is meant by a function and a range of examples of how simple problems can be expressed as functions. It is a good idea to use familiar examples such as the area of a rectangle or triangle.
- Provide the learners with a set of functions and, in groups, ask them to express the functions in words.
- Set the learners a series of tasks that involve plotting functions on graph paper such as:
  - \( y = mx + c \)
  - \( y = x^2 \)
  - \( y = x^2 + 2 \)
- Challenge learners to create a screen layout using a series of points plotted using \((x,y)\) coordinates.
- Ask learners to carry out research on the difference between linear and quadratic functions. In groups, learners should produce presentations, including graphs of common linear and quadratic functions.
- Introduce the learners to the brief and hold a whole class session on how their understanding and knowledge can be used to create the brief guide required by the company.
- Ask each learner to plan their guides and then introduce a peer review session.
- Some learners will find concepts such as quadratic functions hard to explain and you may need to set them a series of tasks to demonstrate their understanding.
- Revisit the idea that computers are digital machines that use binary notation to describe data and processing. Give a presentation to learners of the inputs and outputs from logic gates including AND, OR, NOT and XOR.
- Ask learners to work in groups to research and then create individual presentations on Boolean operations and their use in digital devices.
- Ask learners to work in groups to investigate the result of combining various inputs for each type of gate. More able learners should consider the effect of combining a series of gates to produce a single output.
- Each learner should produce their own evidence of this work which can be in any format that the learner wishes to use.
Unit 18: Computational Thinking

Assignments

Two assignments are suggested to cover learning aim B due to the diverse nature of the content.
You may wish to use the same context as assignment 1. However, if you feel there are other more appropriate contexts, then you should change the focus of the work.
The brief guide can be presented using any of the methods listed in the assessment evidence section of the suggested assignment outlines table in the specification. Again, you need to provide a set of mathematical tasks to ensure coverage of the total content.

Assignment 3: The logical choice
- Note that the first part of assignment 3 asks learners to create a presentation on Boolean operations and how they are used in digital devices. This will limit their methods of presentation.
- The second part gives them more latitude about the way in which their evidence is presented.

Learning aim C: Apply computational thinking to solve a simple problem
- It is quite possible that you will want to set differentiated assignments for your learners. The most important thing to consider is whether your chosen assignments provide appropriate challenge for your learners and that there is sufficient scope to allow them to meet the assessment criteria.
- The problem you choose must allow the learners to develop a solution covering the computational skills they have gained in the previous learning aims. The suggested problem will allow them to use Boolean logic, number sorting/ranking and a repetitive problem-solving algorithm.
- The chosen problem should have a defined outcome that will allow learners to test their models/methods of solution to see if the model produces the correct outcome.
- Introduce the problem to learners through a brainstorming session to ensure that all learners are clear about what is required and the various methods of solution that they can consider using.
- Not all learners will produce equally sophisticated models and some learners may need more support in the design of the model to allow them to access credit for testing and evaluating the solution.

Assignment 4: Solving a problem
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 8: Mobile Apps Development
- Unit 9: Spreadsheet Development
- Unit 10: Database development
- Unit 12: Software development.

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites

www.exploringbinary.com/how-i-taught-third-graders-binary-numbers/
This site clearly introduces binary numbers to younger children. The blog gives some very useful ideas regarding a variety of number bases.

www.binarymath.info/decimal-conversion.php
This site provides clear explanations of methods for converting binary and denary numbers.

http://isweb.redwoods.cc.ca.us/instruct/calderwoodd/diglogic/and.htm
The site provides useful animations of the full range of logic gates. Learners can choose inputs to see the correct output.

www.neuroproductions.be/logic-lab/
www.cs.kent.edu/~volkert/F10-10051/notes/logsim.html
Online logic simulators.

This site details the mathematics used to create computer games.
Unit 19: Computing in the Workplace

Delivery guidance

Approaching the unit
For learners to be successful in today’s challenging job market, it is essential that they understand computing in a wider context, and the skills and abilities they will require to fulfil job roles in the computing industry. Learners will be given the opportunity to look at actual IT/computing job advertisements, produce their own, and then go through the process of applying for a job. This is both important and motivational for learners as increasingly young people are aware that education should be leading towards a future career. It allows them to evaluate themselves and see what skills they have and how they might improve, either in order to get a job or apprenticeship after the course, or to develop as they continue their education through level 3. This part of the unit will be enhanced for learners if you are able to provide them with audio and video facilities. Learners need to know and understand that social media and communications technology are an integral part of the workplace and are changing the way that projects are set-up and delivered. This unit allows learners to apply their own knowledge and understanding of social media and communications technology to set up and investigate various technologies in a work context.

Delivering the learning aims
One of the key elements to decide before delivering this unit is whether you are going to assess it entirely discretely or whether there are elements you could merge with/deliver alongside other projects or units. Learning aims A and D lend themselves well to this approach.

For learning aim A, learners need to understand the personal characteristics valued by employers in the workplace and, more importantly, demonstrate them. There are a variety of ways this can be done, and when planning to deliver this unit you need to consider which method(s) you will use. Learners could be assessed discretely, for example they could produce a presentation or short video demonstrating their skills. For merit, this would need to be in a business situation, so a group could hold a meeting which is filmed and then afterwards each learner edits their own copy of the footage to demonstrate their individual skills. Alternatively, this learning aim could be assessed holistically as part of this unit, or even as part of another unit. For example, when carrying out activities for learning aim D, learners could show their skills and work concurrently on a group activity or an individual project (based on another unit) for learning aim D and an individual portfolio of skills evidence for learning aim A. Similarly, they could demonstrate their skills when carrying out tasks in other units.

For learning aim B, learners should investigate different job roles in the computing and creative industries and choose one for which they will apply. They could use their personal characteristics analysis from learning aim A to help them. The application process needs to be as realistic as possible, and you could even assemble a panel within your college or school to review the applications and choose whose applications may have resulted in a successful invitation for interview.

For learning aim C, learners should look at case studies of how businesses use social media. They could consider both situations where the use of social media has been successful and where it has caused problems, for individual employees and the business as a whole. You should include a range of business types such as multi-national and large not-for-profit organisations. Learners could produce evidence in a variety of ways such as a mini-website, audio podcast or written report.
For learning aim D, learners should use, review and evaluate social media as part of a project. You could do this discretely by giving them a project that would enable them to demonstrate their use of social media, such as preparing for an in-college competition or assembly presentation. Alternatively, this could be as part of another unit where they are already carrying out a project and are given additional tasks to use social media to support it.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

<table>
<thead>
<tr>
<th>Unit 19: Computing in the Workplace</th>
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<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Introduce the unit by giving learners an overview of what they are going to learn about and do. You could give them a list of both positive and negative characteristics and ask them to choose which might be valued by employers and which might not. This is a good opportunity to consider literacy in the form of words they may not have seen before such as ‘articulate’ or ‘apathetic’. They could then be asked to evaluate themselves and choose which skills they think they have already and which they might need to develop. You should encourage discussions, justification and use of examples. Learners could develop this further by looking at job specifications, example CVs and other resources.</td>
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<table>
<thead>
<tr>
<th>Learning aim A: Understand and demonstrate the personal characteristics valued by employers in the workplace</th>
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<tbody>
<tr>
<td>● In small groups, give learners a variety of actual job advertisements and ask them to analyse what personal characteristics are identified. They should explain why these are especially required. Encourage them to discuss why some characteristics are explicitly asked for and others are assumed.</td>
</tr>
<tr>
<td>● Then ask learners to produce a spidergram for each job, thinking about what it will involve and what sort of person might be needed. In groups of four, learners could discuss their spidergrams, adding extra ideas to them. This could be broadened into a class discussion.</td>
</tr>
<tr>
<td>● In pairs, learners should then write a job advertisement.</td>
</tr>
<tr>
<td>● Having completed the advertisements, learners could prepare a presentation to the class, explaining their advertisement and analysing why they have included specific personal characteristics.</td>
</tr>
<tr>
<td>● Learners should consider what characteristics they have used during these tasks and produce a short written report detailing these.</td>
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**Assignment 1: Characteristics of a candidate**
Unit 19: Computing in the Workplace

Learning aim B: Prepare an application for an IT/computing job role

- In small groups, ask learners to discuss the different types of jobs available in the IT and creative computing industries e.g. computer games development. They should divide the jobs they have thought of between themselves and each research those particular jobs, feeding back their research to their group and discussing what they have found.
- Individually, learners should find and select a relevant job for which they would like to apply. Give guidance to learners, as required, to ensure they select an appropriate role.
- Ask learners to analyse example covering letters and CVs, and make notes on good points and bad points. They should then write their own covering letter and CV specifically.
- Divide learners into pairs and provide each pair with a specific job role and accompanying description. Learners should then amend their covering letter and CV specifically for that job role. Review these in pairs or small groups.
- Set up individual interviews for learners (with yourself and if possible with someone they are less familiar with). It should be treated as a proper interview, for example they are expected to dress appropriately. In the interview, learners should discuss their documents and be given feedback. Interviews could be recorded both to provide evidence and to allow individual learners to listen again at a later date.

Assignment 2: Applying for a job

Learning aim C: Understand how social media and communication technologies are used in the workplace

- Suggested organisations to provide a context for this learning aim include educational centres, global retail businesses, local sports clubs, pharmaceutical companies, telecommunications businesses, television and film organisations, publishing companies, etc.
- Ask learners to work in pairs to research and draw up a timeline of social media and communication technologies. Provide learners with a basic timeline to work from and give each pair one date to start with (i.e. the launch of Facebook, MySpace etc.).
- As a class, look at two real-world case studies of social media and communication technologies, one positive and one negative.
- Learners work in small groups to analyse another two real-world case studies, and then feed back to the class.
- In different small groups, provide learners with the name of an organisation and the different social media and communication technologies used by that organisation. Provide learners with blank spidergrams containing the following in the centre circles:
  - how the social media and communication technologies are accessed
  - the impact each has on the organisation
  - the positive effects of the technologies on the organisation
  - the negative effects of the technologies on the organisation.
This will allow learners to develop the necessary focus.

Assignment 3: Computing in the workplace
## Unit 19: Computing in the Workplace

### Learning aim D: Demonstrate how social media and communication technologies can be used to improve the delivery of a project

- Example projects may include an individual or group project for a different unit, an assembly, a charity fundraiser, an enrichment event run by learners, promotion of a college social event, working with a real client from a local business.

- As a class, ask learners to create a spidergram of all of the different social media and communication technologies available. Breaking into pairs, they should analyse the effectiveness, availability and ease of use of each.

- Divide learners into small groups. Provide learners with a sample project that requires the use of social media and communication technologies. Learners should then pick and prepare to use several different social media and communication technologies, and one interconnected system. This may involve registering an account, downloading software or locating a suitable method. It may also require you to work with IT Services, for example if you have an internet filter at your school.

- Learners should review their use of technology and also ask their peers for feedback. This could be a group discussion followed by teaming up with others and comparing solutions. It could also involve the client giving their opinion of the use of technology. Learners should then use this information and improve their use of each technology.

- Throughout this review learners should make notes explaining how they improved their sample project, what refinements they made and why as a result of the feedback, any constraints they found and their effects, evaluate each technology and the impact they had on the project and make future recommendations for next time. Each group should present back to the class.

### Assignment 4: Using social media and communication technologies
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

This unit fits with all other units, but specifically BTEC Firsts in Information and Creative Technology:

- **Unit 1: The Online World**
- **Unit 5: Creating Digital Audio**
- **Unit 6: Creating Digital Graphics**
- **Unit 7: Creating Digital Video**
- **Unit 8: Mobile Apps Development**
- **Unit 13: Website Development.**

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


This book gives practical, realistic advice for applying for a range of jobs, is full of ideas and easily digestible.


The most commonly used social media and communication technologies have related books and internet resources that explain how to use their various features.


Websites

There are numerous online resources that cover applying for jobs and the personal characteristics valued by employers.

www.open.ac.uk/careers/applying-for-jobs.php

The Open University Careers Advisory Service website offers helpful advice on producing CVs and how to make effective job applications.

http://mindthis.ca/tech-resume/

This site offers information on what to do when applying for a tech job.

www.jobs.ac.uk/careers-advice/interview-tips/1337/what-are-employers-looking-for-skills-and-qualifications/

A useful article: ‘What are employers looking for? Skills and qualifications’

www.jobs.ac.uk/careers-advice/interview-tips/1515/employability-what-are-employers-looking-for/

A useful article: ‘Employability – what employers are looking for?’
www.exeter.ac.uk/careers/events/employers/
The University of Exeter Career Zone website looks at the key skills that employers are looking for.

Job Applications:
http://www.prospects.ac.uk/job_application_advice.htm
https://nationalcareersservice.direct.gov.uk/advice/getajob/applications/Pages/default.aspx

Interviews:
https://nationalcareersservice.direct.gov.uk/advice/getajob/interviews/Pages/default.aspx
http://www.jobs.ac.uk/careers-advice/interview-tips

Health and Safety:
http://www.hse.gov.uk/legislation/hswa.htm
http://www.healthandsafetyatwork.com/hsw/

Websites which specialise in ICT and computing jobs:
www.computerweekly.com/jobs
www.jobsite.co.uk/jobs/it
www.theitjobboard.co.uk
Unit 20: Building a Personal Computer

Delivery guidance

Approaching the unit
Most learners use personal computers (PCs) in their daily lives, both at home and in college/school, and they may take them for granted. This practical unit ‘lifts the lid’ on PCs, giving learners the opportunity to explore what’s inside and to understand how computers work and how to improve their performance. Learners should enjoy the practical aspects of the unit, as it covers specifying, building and testing PCs. Learners will also consider how the choice of components affects the performance of a PC. You will need to give learners access to computer components that can be assembled, and in some cases modified, where they do not function correctly or to improve the performance of the computer. As a minimum, these should include a range of internal hardware components and external hardware devices that will allow learners to build a working computer to match ‘client’ requirements. Other essentials include an appropriate operating system, device driver and testing software, and appropriate manuals, software keys/licences and registration details. (See learning aim A in the specification for examples of the types of computer that learners should be able to build.)

This unit could be delivered alongside Unit 2 Technology Systems, which covers many of the theoretical aspects of how personal computers work. In addition, much of the practical skills, knowledge and understanding covered in this unit on PCs will apply to other digital devices and technology systems.

This unit would also naturally lead onto Unit 14 Installing and Maintaining Computer Hardware and Unit 15 Installing and Maintaining Computer Software.

Delivering the learning aims
This unit is best delivered in sequential order, from learning aim A to learning aim C.

Organisations often regard buying PCs as a major purchase. Learners are likely to have been involved with making purchase decisions for themselves, if not for a personal computer, then for some other technology-based device such as a mobile phone or a game console. Learning aim A encourages learners to discuss this within their group, including how they carried out their research/specified their requirements and what compromises they need to make for budgetary and other reasons. Group discussions, including ones based on relevant case studies, are useful for examining the wide range of choice available for PC components. They will also lead into the planning stage, learning aim B.

Learning aim B focuses on planning the building and testing of PCs to meet user requirements. You will need to give learners a brief outline of ‘client’ requirements. Learners need to think about the components of the PC and how they can be integrated to produce a machine that addresses the requirements of a ‘client’. The unit content and assessment guidance in the specification indicates the types of PCs and components that would be appropriate to use. The details of the ‘client specification’ leaves plenty of room for you to produce a brief that takes into account the hardware and software that you have available for the learners to choose from.

Learning aim C focuses on practical application, where learners have an opportunity to build and test a PC to meet the requirements of a ‘client’ and to test performance of the working machine. You could demonstrate a range of internal hardware components or external hardware devices available, explaining how they are installed.
and tested, and describe the common assembly faults (and relevant remedies) associated with them. You could also demonstrate the installation of appropriate operating system and performance evaluation software, checking for correct/latest versions and updating software as needed. This would lead into learners building and testing a working PC. Learners do not need to install other software, such as a spreadsheet application or an internet browser, as this topic is covered in Unit 15 Installing and Maintaining Computer Software.

The technology used in PC architecture moves on very quickly; new generations of almost all component types are released every year, if not more often. Although the items available for learners to use in the assessments are unlikely to contain the latest of everything, learners should be encouraged to keep abreast of developments.

You should give learners appropriate tools, and health and safety equipment, to allow them to perform the practical activities. If resources are limited, it is recommended that learners work in small groups that will allow them to share the resources and still fulfil the learning aims.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

**Unit 20: Building a Personal Computer**

**Introduction**

Begin by giving learners a brief outline of the unit and how it links with other units, such as 2, 14 and 15, in the qualification. Engage learners by giving them the tools to look inside a PC and explain that by the end of this unit they will have covered the skills needed to build, test and evaluate the performance of a PC.

It is important that learners understand why PCs are built to particular specifications and how the choice of components, such as motherboard, memory, processor, power supply unit, can be critical to how well a PC fulfils its role.

**Learning aim A: Understand the uses, costs and specifications of different personal computers**

- An initial class discussion will help to establish what learners already know about PCs in terms of what they are, how they are used and how they are built. Learners will most likely talk about their own PCs or ones that they have used in college/school and why they use them, for example for writing reports, playing games or surfing the Internet.

- You could use physical examples, where available, to demonstrate PCs with a range of internal hardware components and external hardware devices. Learners could discuss the suitability of the different PCs for different roles. The issue of compromise and multi-role machines could be brought up at this stage. Use worksheets and group activities to get learners to identify different types of PC and hardware components. If physical examples are not available, images (photographs, videos or diagrams) would be a suitable alternative.

- Hold a group discussion about the reasons why most people replace PCs. Use plenty of questions and answers to extract learners’ experiences of making improvements to their own/family PCs. Their previous experiences are most likely to relate to simple upgrades such as improved software drivers, software patches, better mice or monitors, but a few learners will have tried something more ambitious such as building a PC.

- Difficulties encountered in upgrading their own PCs could lead to discussions of why and how people choose a new machine. Enable group activities where learners research and discuss current pre-built and bespoke PCs. The conflict of budget versus wish list will probably emerge here.

- Enable group activities where learners research the latest developments in PCs and/or components, for example the next generation of CPU or graphics card. Learners could present their findings to the rest of the group and answer any questions (where appropriate).

- Demonstrate a PC build to the group, explaining its individual internal hardware components, external hardware devices and operating system software requirements. Ask learners, in pairs, to think about the strengths and weaknesses of the PC in terms of suitability for a particular role, and to present their findings to the rest of the group.

**Assignment 1: A Personal Computer**

**Learning aim B: Produce a plan to build a personal computer**

- Explain to learners that there is always more than one way of fulfilling a brief, and give examples.
UNIT 20: BUILDING A PERSONAL COMPUTER

Unit 20: Building a Personal Computer

- Give learners a ‘client’ brief which should allow some leeway for them to make decisions and justify their choices.
- Discuss the brief, ensuring that all learners understand the requirements and what is expected of them. It is important that you plan ahead and think about the PC build that you will give learners during their practical assessment, so that you can relate the brief to it. You should ensure that the brief can be fulfilled with the resources available.
- Demonstrate a range of safety procedures and fault-finding tools and techniques, such as anti-static equipment, computer toolkits and diagnostic software, that learners will use for the practical assessment.
- Ask learners to research suitable internal hardware components and external hardware devices that would meet the ‘client’ requirements.
- Ask learners to research what operating system and performance testing software will be needed and what the licensing/registration requirements are.
- Deliver a presentation to your learners on testing PCs, and explain, with examples, how test plans are produced. Ask learners to think about the range of tests they would carry out on their build and the sort of problems that they anticipate.

Assignment 2: Planning

Learning aim C: Build and test a personal computer

- Deliver a series of ‘supervised’ practical workshops that will enable all learners, individually, in pairs or in small groups, to build a PC. It is at this stage that learners will need access to components that can be assembled, dismantled, tested and upgraded. Learners will also need access to tools that will enable them to install and test hardware, as well as to fault-finding/troubleshooting software.
- Demonstrate the processes involved with installing and maintaining a range of internal hardware components and external hardware devices in a PC. Ask learners to observe and take notes. It is recommended to give breaks between demonstrations, giving learners the opportunity to digest what they have seen and practise it with their own PC build.
- Demonstrate how to use the correct tools and techniques to test internal hardware components or external hardware devices, and the appropriate remedies to fix common assembly faults.
- Remind learners of the importance of health and safety, and how to handle and use the equipment correctly and safely.
- Ask learners to refer back to their test plans. Demonstrate how they could implement their test plan to determine if their PC is functional against the desired purpose. Give examples of where test plans have failed and the actions that have been taken to resolve them. Learners should also carry out performance tests on the functional PC.
- Learners should modify their PCs using at least two alternative design ideas from the plan. They should then retest the PC for functionality and purpose repairing any faults. After conducting further performance tests learners should explain the probable reasons for any changes in performance. The tests results should also be used to explain how further refinements to the PC could improve performance further.
- You could ask learners to arrange an interview with the ‘client’ to discuss the modified technology in terms of whether or not the requirements have been fully met. Learners could record the feedback. Before the interview, ask learners to prepare what they will discuss, giving them advice, if necessary.

Assignment 3: Building and testing
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- Unit 2: Technology Systems
- Unit 11: Computer Networks
- Unit 14: Installing and Maintaining Computer Hardware
- Unit 15: Installing and Maintaining Computer Software.

BTEC Firsts in Information Technology (QCF):

- Unit 3: Computer Systems
- Unit 7: Installing Computer Hardware
- Unit 8: Installing Computer Software
- Unit 13: IT Fault Diagnosis and Remedy.

Resources

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.

A practical guide to building PCs.

This book covers how to find common faults with computer systems and how to fix them, using appropriate tools and techniques.

This book focuses on how computer systems work and covers every hardware component inside a computer system.

Journals

Computer Weekly  
Keeps you up to date with the latest news regarding technology systems.

Websites

www.buildyourown.org.uk/  
This site gives a large amount of information on how to select and connect almost any PC component.

www.youtube.com/show/buildingapc/videos?view=0  
A set of 12 videos showing how to build a PC.
Unit 21: A Technology Business

Delivery guidance

Approaching the unit

This unit gives learners an exciting, practical introduction to entrepreneurship and business concepts that will enable them to create their own business plan for a real technology-based business opportunity.

Ideally the learner will select different ideas for a technology business, based on a range of prototype technology-based products or services completed on the BTEC Firsts in Information and Creative Technology course. For example, this might be based on a mobile app, a database product, a computer game or an automated computer system. If a learner cannot identify a suitable technology-based business idea then you should help them select a suitable product or service, perhaps based on an existing product or service. You should also encourage and challenge them to produce business ideas that are practical and feasible.

This unit should be completed towards the end of the course so that learners have covered most or all the units that could provide an idea for a technology-based product or service. Teachers should alert learners to this concept at the start of the course so that higher-ability learners can prepare accordingly.

Delivering the learning aims

Throughout the unit, teaching should be learner-centred and include a variety of learning activities.

For learning aim A, learners can access a wealth of web-based information on businesses that provide technology-based products and services. Learners will become aware through their research that successful technology-based businesses tend to be led by highly innovative individuals who create entrepreneurial corporate cultures.

Learning aim B builds on the principles of marketing covered in learning aim A and introduces the learner to market research. By giving learners activities which involve market research, they will realise that this research can identify market trends, demographics, economic shifts, customers’ buying habits and important information on the competition. When learners select their potential prototype technology-based product or service, you will need to give guidance to ensure their selections are feasible.

For learning aim C, learners need to understand the importance of a technology-based business producing a breakeven chart. They need to know that the breakeven point is when the business is making enough sales to cover its expenditures. The preferred teaching strategy for this topic is one that encourages learners to build confidence in producing breakeven charts and their interpretation. You should allow learners to create breakeven charts using both graph paper and by using Excel spreadsheets.

For learning aim D, learners will put to use the knowledge and skills gained in the other learning aims and produce a business plan for their technology-based product or service. Learners will need to understand that just as they would plan a route for a journey they may be going on, they must also plan a route for their businesses. You should encourage learners to review existing business plans for real businesses and to understand how vital an accurate business plan is for the success of the business.
You can make this unit fun for learners by introducing an element of competition. A small team of local business owners could be invited to act as the team along the lines of the BBC’s ‘Dragons’ Den’. Learners are given three minutes to pitch their business ideas to the team who will evaluate each idea. A prize can be awarded for the best idea.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

### Unit 21: A Technology Business

#### Introduction

Introduce the unit and initiate activities that encourage learners to think about what it takes to run a technology-based business. A good starting point would be a discussion on the purpose of a business allowing learners to express their perceptions of what they think a business is. You may find it useful at this stage to review the learning content and assessment criteria with learners to ensure they have a clear focus of what is required.

#### Learning aim A: Understand the principles of marketing and investigate successful technology-based product(s) and service(s)

- Working in small groups, ask learners to research a variety of successful technology-based businesses. They should describe each business and identify factors that make it successful. Learners could then present their findings to the class.
- Ask learners to work in small groups and select one of the technology-based businesses and research the business further making notes on how the business performs in gaining market share, identifying new market opportunities, evaluating competitor products and encouraging customer loyalty.
- As a follow-up, ask learners to research the features and functions offered by one product or service of their chosen technology-based business. As a class, ask learners to describe the benefits and features of a number of products, for example a hole in the wall is the benefit that an electric drill provides. Learners will then begin to understand that customers tend to buy benefits provided by a product or service.
- In small groups or pairs, ask learners to investigate the unique selling points of a variety of products. As a class, ask learners to obtain a number of product and service adverts. They then have to identify how each business uses its unique selling points within the message contained in the advert.

### Assignment 1: Successful Technology-based Product(s) and Service(s)
### Unit 21: A Technology Business

**Learning aim B: Select and conduct market research on a prototype technology-based product or service**

- For this learning aim, learners need to select a suitable prototype technology-based product or service, ideally one which they have/are currently developing as part of another unit on the course. To help learners to think creatively, you could ask them to list as many new uses for a familiar object such as objects around the classroom. This could develop into a brainstorming exercise on how their selected technology-based product could be improved.

- To help learners finalise which product or service they are going to select, you should ask them to list all their possible selections and evaluate the chances of each one being successful. This exercise could be carried out in small groups or pairs. Give learners a pre-prepared worksheet consisting of a three-column table. The first column is for identifying the possible product and the other two columns identify advantages and disadvantages of why the idea should be progressed or not.

- Working in pairs, learners carry out secondary market research for their selected product or service using the internet and technology journals to find products or services similar to their selection. They then complete a review of a major competitor or substitute product and through their research estimate the size of the market. Learners should create their own secondary data collection sheets which will prompt them to find information on price, features and functions.

- In small groups, learners produce a questionnaire which will examine what customers are prepared to pay, what they think about the features and functions and also whether the product would meet their needs. They should also validate (check) their original assumptions for choosing the product or service with potential customers. You could ask them to make a mini presentation of their market research findings to the rest of the class including a comparison with the major competitor’s product or a substitute. Encourage the class to ask questions during the presentation of each pair’s findings.

- Individual discussions between you and the learners should take place to find out how they are going to refine their product based on the results of market research. The learners need to justify to you clearly why these changes are being made, but they do not have to implement the changes.

**Assignment 2: Select a Product or Service and Conduct Market Research**
### Unit 21: A Technology Business

**Learning aim C: Produce a basic breakeven analysis for a prototype technology-based product or service**

- Give learners some very simple examples of breakeven, initially to allow them to grasp the basics before moving on to more complex scenarios.
- Breakeven interactive programs can be very useful in showing learners what happens to the breakeven point when revenue and costs change. You could present a series of ‘what if’ scenarios to the learners and they can follow the impact of these changes on the breakeven point and profitability.
- Once learners have grasped how breakeven works they can then begin to consider how breakeven can be used to inform business decisions. You should give them plenty of examples of breakeven analysis questions that involve interpretation so that they will be able to apply this to their own prototype product or service.

**Assignment 3: Produce a Breakeven Analysis**

**Learning aim D: Produce and present a business plan for a technology-based product or service**

- Ask learners to research business plans on the internet. It would also be useful if a local technology-based business owner could be invited to talk to the class on the business planning process and its importance for the success of the business.
- Many banks provide business planning templates and learners can be given class exercises in completing these for their own business idea.
- You should make learners aware that all the work they have covered in learning aims A, B and C will come together for learning aim D. Learners can work in small groups or pairs and organise their information so that extracting information for the business plan can be made easier.
- When the learners have completed their business plans, it is important that they are made aware that they will need to present the completed plan to a review panel.
- Encourage learners to plan their content for this presentation very carefully. This is particularly true if they are going to use PowerPoint®. It very easy for learners to fall into the trap of entering text on the slides without a great deal of thought about how the content should drive the design of the presentation.
- Suggest to learners that they use a plain background and remove any unnecessary detail so that they are able to demonstrate clearly why the product or service is appropriate, how it meets potential customers’ needs and how it measures up to competitor products or services.
- Learners should be advised to stick to one idea or point per slide to avoid the information becoming cluttered and distracting for the audience.
- To make the presentation more effective learners should be encouraged to support headlines with graphic evidence wherever possible. This can include photos, images, charts and diagrams.
- If a learner has a lot of information for their presentation, then they should be advised to put detail in their handouts to make their visual presentation clearer.
- Ask learners to practise answering questions about their business plans. This can be carried out in small group work prior to the formal presentations.

**Assignment 4: Produce a Business Plan**

**Assignment 5: Present the Business Plan**
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:
This unit is relevant to all other units within the qualification.

BTEC Specialist Qualifications: Understanding Enterprise and Entrepreneurship (level 2) (QCF):
- Unit 1: The Entrepreneurial Mindset
- Unit 2: Creating a Vision for your Business Plan
- Unit 4: Researching your Market
- Unit 5: The Marketing Plan
- Unit 6: Financial Modelling and Forecasting
- Unit 7: Preparing and Pitching a Business Plan
- Unit 9: Toolkits for Idea Generation.

Resources

Textbooks
In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.

This book is useful for anyone planning to establish a small business from scratch.

A very helpful book on how a business plan should be produced.

An interesting review of how some very large, successful businesses started with just an innovative idea.

This book is useful for anyone planning to establish a small business from scratch.

This book is useful for anyone planning to establish a small business from scratch.

Journals
Business Review Magazine (Phillip Allan Publishers – see www.philipallan.co.uk)
The Economist and quality newspapers, especially the business sections

All these publications contain interesting reports and articles on what is happening in the business world and include technology-based businesses and their products and services.
Websites

www.cim.co.uk
The website of the Chartered Institute of Marketing contains lots of interesting information on how businesses are developing their marketing strategies.

businesshelp.lloydstsbbusiness.com/
Business guidance for small business owners to help them to run their businesses more effectively.

www.sfedi.co.uk
The website of the Small Firms Enterprise Development Initiative (sfedi) contains useful research for all those thinking of, preparing for, starting or running their own self-employed or micro enterprise.

www.gov.uk/browse/business
UK Government website which provides useful information for the self employed and start-up businesses.

www.peterjones.com
Helpful information on starting a business by a successful entrepreneur.
Unit 22: Computer Security in Practice

Delivery guidance

Approaching the unit
Most computer users have experienced a security problem themselves or know someone who has. This could be a phishing attempt, a browser hi-jack or someone trying to log on to their account.

This unit explores a range of security threats and computer vulnerabilities and will equip learners with the skills needed to counter those threats and vulnerabilities. Learners should enjoy the practical aspects of the unit, implementing security measures, and testing and evaluating their effectiveness.

Learners will need access to practical resources and suitable technology. They can also use simulators or multimedia tools to gain prior experience before handling 'live resources'. It is essential that learners work in an environment which WILL NOT allow them to access system critical resources. The use of virtual machines and/or sandboxes is recommended. The use of real malware for testing the effectiveness of security measures is NOT advised. A malware testfile suitable for use in testing may be obtained from EICAR (see Resources below for a link to the malware testfile).

Talks by external practitioners and technical support staff could be a very useful way of allowing learners to understand the security issues that relate to both their own and other systems with different needs and technologies.

Delivering the learning aims
This unit is best delivered in sequential order, from learning aim A to learning aim D. Learners are likely to have been involved with security issues themselves, either, for example, on their own personal computer or on another technology system such as a mobile device or a game console. For learning aim A, encourage them to discuss this within the group. The discussion could include how they recognised that a security issue had arisen, the effect it had, both on them and on their computer, and how they went about solving the problem. Group discussions, including ones based on relevant case studies, are useful for examining the wide range of threats and vulnerabilities that affect computers. It will be useful if the discussions bring out both internal and external threats and the three types of protection measures. Using the learners’ own experiences will probably have the most impact, but case studies should be available to fill in the gaps. The discussions will also lead into the planning stage, learning aim B.

Learning aim B focuses on planning a security regime that will reduce the risk of a security breach. You will need to give learners a brief outlining the requirements of a ‘client’. Learners need to think about the possible security threats and how the ‘client’s’ system can be configured or modified to meet those threats. The unit content and assessment guidance in the specification indicates the types of threat that would be appropriate to consider. The details of the ‘client’ leaves plenty of room for you to produce a brief that takes into account the hardware and software that you have available for the learners to work with. Learners will need to produce a risk assessment and a security plan based on that assessment. It is therefore essential that the brief includes sufficient detail for learners to be able to identify the threats, vulnerabilities and risk severity of the situation. This information could all be in
written form, but an oral component, where a client talks about their situation and concerns might be a useful addition.

Learning aim C focuses on practical application, where learners have an opportunity to configure and test a computer system to meet the requirements of a ‘client’. You could demonstrate a range of hardware devices, explaining how they are configured and tested, and describing the common threats, and relevant remedies, associated with them. You could also demonstrate installation and configuration of appropriate software, checking for correct/latest versions and updating software as needed. This could lead on to learners attempting to penetrate or nullify the defences using testing software. The role of users in creating security breaches should be considered, together with methods of mitigating this such as user training and the enforcement of security policies for employees.

Learning aim D is perhaps the most difficult for many learners as it involves reviewing and evaluating their own work. Learners are often reluctant to point out weaknesses in their own work, even when this would lead to suggestions for improvements and potentially accessing a higher grade. One approach might be to initiate group discussions on different scenarios so that learners can develop the ability to evaluate both positive and negative outcomes before they need to look at what they have produced in their own assessments.
### Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

<table>
<thead>
<tr>
<th>Unit 22: Computer Security in Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
</tr>
<tr>
<td>Begin by giving learners a brief outline of the unit and how it links with other units in the qualification. Engage learners by describing and demonstrating the effects of some common security breaches and explain that by the end of this unit they will have covered the skills needed to identify threats and configure a computer system to protect it against them. It is important learners understand that although there are a lot of common threats, different systems can attract and be vulnerable to specifically targeted threats as well.</td>
</tr>
<tr>
<td><strong>Learning aim A: Understand the common security threats and vulnerabilities that affect computers and technology systems and common security protection measures</strong></td>
</tr>
<tr>
<td>● An initial group discussion will help to establish what learners already know about computer security in terms of what it is, how they or others have been affected by it and recent or classic security exploits that have been in the press or featured in online media. Learners will probably talk about their own experiences, but they may also be familiar with well-known cases of identity fraud or mass password compromises in, for example, online games.</td>
</tr>
<tr>
<td>● You could use real examples to demonstrate computer systems, preferably virtual ones, affected by a range of malware and other security issues. There are also numerous videos available via the internet, which demonstrate the effects of malware and other threats. Learners could discuss the consequences of these issues to individuals and organisations.</td>
</tr>
<tr>
<td>● Hold a group discussion about what makes a system vulnerable to security threats. Learners should be guided to consider both hardware and software configurations. The discussion could start with simple, stand-alone machines and then be extended to look at how threats increase as machines are networking and linked to the internet.</td>
</tr>
<tr>
<td>● Enable group activities where learners research the human aspect of security breaches, such as password security, social manipulation, to exploit human weaknesses.</td>
</tr>
<tr>
<td>● Enable group activities where learners research the latest developments in computer security or where they trace the development of one aspect of computer security, for example the use of firewalls or the development of biometrics. Learners could present their findings to the rest of the group and answer questions where appropriate.</td>
</tr>
<tr>
<td>● Demonstrate a protected computer system to the group, explaining how the configuration of its hardware and software components combines to protect it against a range of common threats. Ask learners, in pairs, to think about the strengths and weaknesses of the system in terms of protection, ease of use and suitability for a particular role, and to present their findings to the rest of the group.</td>
</tr>
</tbody>
</table>

**Assignment 1: Interview**
Unit 22: Computer Security in Practice

Learning aim B: Plan security measures to protect a technology system

- Begin by explaining that there is always more than one way of fulfilling a brief, and give examples.
- Provide learners with a ‘client’ brief. The unit content and assessment guidance in the specification indicate the types of threats that would be appropriate to use. The brief should allow some leeway for the learners to make decisions and justify their choices. The brief should include the types and roles of users as well as a description of the technology system.
- Discuss the brief, ensuring that all learners understand the requirements and what is expected of them. It is important that you plan ahead and think about the system that you will give learners to use during their practical assessment, so that you can relate the brief to it. You should ensure that the brief can be fulfilled with the resources available.
- Demonstrate a range of tools and techniques for assessing vulnerabilities. These should include, but not be limited to, those that learners might be expected to use in their practical assessment work. Give the learners opportunities to use and become familiar with those tools and techniques, selecting which ones they intend to use in their practical assessment.
- Explain how to assess risk severity and ask learners to make and discuss assessments for a number of real-life and/or scenarios.
- Enable group activities where learners develop risk assessment forms/questionnaires, which will help them to perform risk assessment for a number of real-life and/or teacher-set scenarios. Ask each group to read and constructively criticise other groups’ work and improve their own forms/questionnaires.
- Provide short activities that cover each of the above points, so that learners have everything they need in order to prepare their plan. Learners could present their plans to the ‘client’, as IT technicians would do in the working environment. This is a good opportunity for learners to demonstrate their presentation skills.

Assignment 2: Plan, Assess and Evaluate
Unit 22: Computer Security in Practice

Learning aim C: Implement security measures to protect a technology system

- Deliver a series of 'supervised' practical workshops that will enable all learners, either individually, in pairs or in small groups, to implement security measures on a computer system. At this stage, learners will need access to a suitable computer system, either real or virtual, plus manuals, and a set of testing/diagnostic software.

- Demonstrate the processes involved with installing and maintaining a range of security measures in a computer system. Ask learners to observe and take notes. It is recommended to give breaks between demonstrations, giving learners the opportunity to digest what they have seen and practise it with their own system.

- Demonstrate how to use the correct tools and techniques to test that the implemented security measures have been installed correctly and are functioning as expected, and the appropriate remedies to fix common faults.

- Demonstrate how to use the correct tools and techniques to challenge the implemented security measures, how to interpret the results and the appropriate methods to report and fix any threats detected.

- Ask learners to refer back to their plans, checking that they have completed them. Discuss how plans should be modified for future use as the result of lessons learned during the implementation and testing process.

- Learners should detail whether they experienced any problems and, if they had to change their plan to resolve them, should justify the changes to their original plan.

- You could ask learners to arrange an interview with the ‘client’ to discuss the modified technology in terms of whether or not the requirements have been fully met. Learners should record the feedback. Before the interview, ensure learners prepare what they will discuss.

Assignment 3: Doing the Deed

Learning aim D: Review the finished security measures taken to protect a technology system

- Explain that a complex process such as implementing multiple security measures rarely goes completely smoothly. Possibly refer back to problems that you or the learners experienced when delivering learning aims A or B.

- Get learners to examine their own notes from the implementation process together with ones from the client feedback interview. Ask them to list both the positive and the negative aspects of their work.

- Enable individual activities where learners research solutions to problems that they did not solve in their testing. Explain that not every problem might be solvable with the resources that they currently have available but that they should be able to discover potential solutions and make recommendations for improving their security measures.

- Learners should produce a report, presentation, etc., which evaluates their work and suggests improvements.

Assignment 4: Reviewing the results
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information Technology (QCF)
- Unit 11: IT Security.

BTEC Level 1/Level 2 First Award in Information and Creative Technology
- Unit 1: The Online World
- Unit 2: Technology Systems
- Unit 11: Computer Networks
- Unit 14: Installing and Maintaining Computer Hardware
- Unit 15: Installing and Maintaining Computer Software
- Unit 20: Building a Personal Computer
- Unit 23: Computer Systems Support in Practice

Resources

Textbooks
In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Journals
Computer Weekly
Keeps you up to date with the latest news regarding technology systems.

Websites
http://sectools.org/
A good selection of network security tools.
www.securitytube.net/
A wide range of videos on computer security topics.
www.eicar.org/85-0-Download.html
A link to the EICAR malware testfile.
Unit 23: Computer Systems Support in Practice

Delivery guidance

Approaching the unit
As computer systems advance, the need for supporting and introducing new systems is paramount to the success of the organisation. This is an exciting and expanding area of the IT industry, with a wide range of job opportunities.

The unit works particularly well if work experience opportunities can be arranged, as learners will be able to see the theoretical aspects of the support requirements of a system’s life cycle in context and will enjoy consolidating their work in a real-time environment. If work experience is not an option, then simulations can be designed which have the benefits of consistency and facilitating assessment. Visits to helpdesks or talks by helpdesk operators will also be invaluable.

Delivering the learning aims
For learning aim A, learners will investigate the types of support required and how support needs will vary over the system’s life cycle stages, i.e. design and build, operate and decommission. Examples include the user forgetting login details in the operation stage of the system development.

It is important that learners understand the impact of providing support to system users across the system’s life cycle. For example, if the user is unable to access the system this may result in chaos within the organisation.

For learning aim B, learners are asked to investigate the incident diagnostic processes in terms of identifying the most appropriate method when diagnosing a problem. To prepare the learner you could develop typical faults (such as the user not being able to access a PDF document) that are realistic but limited and solvable, in order to build the learners’ confidence. Learners tend to learn best in a realistic environment where they would experience a variety of faults with regards to users, hardware and software, and the three different levels of support available to the system user, from the initial support to the specialist technician who handles the most difficult or advanced specific back-end faults.

Learners should also review how the incident diagnostic processes and the levels of support available could impact the support provided, for example the consequences of not recording the issue and/or fault information accurately and instigating the appropriate level of support due to the severity of the problem.

As well as identifying the most appropriate method when diagnosing a problem, learners should understand that support service evaluation could improve the support service and performance of the system, and ultimately customer satisfaction.

You will need to create a variety of faults for learners to identify. Learners should then carry out further research as well as simple checks to confirm that a logical approach was taken when identifying the remedy. Learners could work in pairs or small groups, with each learner identifying a fault and other group members identifying the remedy.

Work shadowing or access to help desk/work logs/contact with technicians may provide excellent opportunities to broaden learners’ system problem-solving skills and common remedies for technology system faults.
Learning aim C allows learners to plan the support for a computer system containing at least two computers. A case study could be developed that identifies the purpose of the support and the client’s requirements and focuses on the operational stage of the system’s life cycle, while covering the other stages in less detail. The support plan should identify the hardware and software to be supported, the types of support required, the incident diagnostic process and how the support service will be evaluated.

The support plan should also detail alternative solutions and considerations for disaster recovery, capacity and security planning.

Learning aim D is about providing operational support for a computer system and reviewing the outcome, including how to communicate the right information, providing advice and guidance, and following procedures.

The learner should report and resolve a combination of any user, hardware and software faults and seek feedback from the ‘user’ about the support provided. They can then review trends in operational support of the system, demonstrating awareness of capacity planning and putting in place disaster recovery measures.

They should also justify any changes that were made, explain the rationale for those changes and give recommendations for at least three operational support improvements. However they do not need to provide the support.

Learners can use simulators or multimedia tools to gain experience before handling ‘live’ resources. It is recommended that free resources are obtained for the practical activities. The internet has a good variety of system diagnostic tools, remote access software and fault solutions. Practical activities should take place in a workshop with appropriate tools and take account of health and safety requirements.
Getting started
This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

### Unit 23: Computer Systems Support in Practice

#### Introduction
Introduce the unit to learners, covering the aims and objectives. Provide an overview of the unit assessment and the importance of support requirements of the system life cycle. Outline the practical skills that learners will develop when investigating how common system support issues and faults vary over the system’s life cycle and how they will explore the incident diagnostic process and investigate some of the common fault remedies used in the role of a computer system support job.

<table>
<thead>
<tr>
<th>Learning aim A: Understand how support needs vary over the computer system’s life cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Begin by explaining the differences between a computer and a technology system so that learners understand the different components. In pairs, learners should provide examples of each. They can present these to the class.</td>
</tr>
<tr>
<td>● You can use formal presentation to introduce learners to the system’s life cycle stages of design and build, operate and decommission.</td>
</tr>
<tr>
<td>● In pairs, learners should report on the differences between issues and faults and identify examples of each within each of the system’s life cycle stages.</td>
</tr>
<tr>
<td>● In pairs, learners should report on the types of support required across each of the system’s life cycle stages, explaining why the support changes from time to time.</td>
</tr>
<tr>
<td>● Lead a class discussion on the impact of providing support across the system’s life cycle, and also consider the compromises in providing systems support, such as the operational availability of the service and the increased cost and environmental impact.</td>
</tr>
</tbody>
</table>

| Assignment 1: Computer System’s Life Cycle Support Needs |

<table>
<thead>
<tr>
<th>Learning aim B: Investigate the incident diagnostic processes, common system remedies and how to evaluate a support service</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Begin by asking learners to identify what they think incident diagnostic processes involve.</td>
</tr>
<tr>
<td>● Initiate a discussion on what learners have experienced in this area, for example being unable to access the internet on a home computer, and what remedial action was taken. Did they access technical manuals on the internet, use the IT help desk or use fault diagnostic software?</td>
</tr>
<tr>
<td>● Develop a worksheet on the levels of support available and ask the learners to complete the worksheet.</td>
</tr>
<tr>
<td>● In pairs, learners should identify how the incident diagnostic processes could affect the support provided.</td>
</tr>
<tr>
<td>● In pairs, learners should investigate what system faults and remedies can be associated with user, hardware and software and its impact on the technology system, and to present their findings to the class.</td>
</tr>
<tr>
<td>● Initiate a discussion on the difference between faults and issues and ask the learner to investigate the remedies and their impact on the technology system.</td>
</tr>
<tr>
<td>● Introduce the concept of support service evaluation and how investigating service trends can result in improvements to the support service.</td>
</tr>
</tbody>
</table>

| Assignment 2: Systems Life Cycle Support |
UNIT 23: COMPUTER SYSTEMS SUPPORT IN PRACTICE

Learning aim C: Plan the support for a computer system over the system’s life cycle

- In pairs, learners should identify the support requirements of each stage of the system life cycle, i.e. design and build stage, operate stage and decommissioning stage.
- In small groups, learners should investigate the incident diagnostic process and report their findings back to the rest of the group.
- Lead a class discussion on how the support service may be evaluated.
- In small groups, learners should research and discuss alternative support solutions and then share their findings with the class.
- Lead a class discussion on the considerations for disaster recovery, capacity and security planning.
- In small groups, learners should discuss and research how the requirements can be achieved using alternative solutions for elements within the support service, rather than creating whole new solutions.
- Outline to learners how to create a support plan by showing them examples. You could provide them with a template for creating their own support plan.

Assignment 3: Support Plan

Learning aim D: Provide operational support for a computer system and review the outcome

- Learners will require a computer system with at least five different issues/faults. These may be a combination of any user, hardware and software issues or faults (for example replacing a faulty keyboard or mouse). You could complete an observation record to evidence how the learner addressed each system issue or fault.
- In small groups, learners should research and discuss the trends in operational support of a system, demonstrating awareness of capacity planning and disaster recovery measures and how it can be applied to prevent significant damage to systems.
- Again, in small groups, learners should give further examples and provide alternative support for a computer system based on the evaluation of support trends carried out in the last activity.
- In pairs, learners could produce a survey of users’ experience of system downtime, analysing the data to identify and consider trends.
- Lead a class discussion on how the operational support is suitable for the intended purpose and the original requirements.
- Outline to learners how to create a questionnaire to capture user feedback by showing them examples. Using the questionnaire to record their findings, learners should interview a user about the support provided.

Assignment 4: Operational Support and Review
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Level 1/Level 2 First Award in Information and Creative Technology:
- Unit 11: Computer Networks
- Unit 14: Installing and Maintaining Computer Hardware
- Unit 15: Installing and Maintaining Computer Software.

BTEC First IT QCF:
- Unit 3: Computer Systems
- Unit 5: Supporting Organisations with IT
- Unit 12: IT Support
- Unit 13: IT Fault Diagnosis and Remedy.

Resources

Learners will need access to practical resources and suitable technology. They can also use IT Help Desk simulators or multimedia tools to gain prior experience before handling 'live resources'.

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Journals

*Webuser*
PC tips to help you improve your PC.

*Computer active*
Tips, articles, reviews and forums.

*PCpro*
Pages of news, reviews and advice.

*PCadvisor*
Reviews, forums advise and videos.
Websites

A wide variety of resources is available on the internet. Take care when selecting particular sites. Those recommended for use by learners should be checked first.

www.pcguide.com/vb/
The PC Guide Discussion Forums for troubleshooting and questions related to PC hardware.

www.pcguide.com
The PC Guide and detailed PC reference information.

www.pcworld.com/
News, tips and reviews on PCs.

www.tomshardware.com/
Tom’s Hardware includes latest computer component reviews, articles and forums.

www.dmoz.org/Computers/Software/Help_Desk/Support_and_Management/
The Open Directory Project for further information on helpdesk support and management.

This site provides access to a list of free helpdesk support software.

www.networktutorials.info/index.html
For detailed networking and hardware tutorials and access network information.

www.practicallynetworked.com/
For reviews and forums on network and computer components.

http://somehelp.software.informer.com/1.1/
A simple IT help desk software for IT team/support desk to manage and administrate support calls.

www.spiceworks.com/
The Spiceworks Community of IT pros for tips and problem-solving suggestions. Enables you to create tickets and fault logs.
Unit 24: Software Systems Development

Delivery guidance

Approaching the unit

Learners are likely to be familiar with some aspects of this unit through their use of social networking sites and multi-player online gaming. The aim is to build on their understanding of integrated technologies to design, develop and test their own more complex software system. The skills developed will enable learners to seek software developer roles within the IT sector and creative computing industry.

Delivering the learning aims

For learning aim A, it is important that the two existing technology-based systems learners investigate provide them with a range of experiences that they will be able to draw on when they are developing their own systems. You will need to consider the way they ‘live’ online when choosing appropriate examples; remember that learners are unlikely to use email or sites such as Twitter to communicate with friends.

Learners will need to be able to identify the purpose of the two chosen systems. You may wish to direct them to systems such as e-commerce sites or other suitable websites that collect and process data. Although some learners may have experience of shopping online, it is likely that many may not as their access to credit or debit cards is limited. However, they are more likely to have experience of systems such as automated supermarket checkouts that accept cash as well as cards. Many will have wide experience of online collaborative gaming and the recording of high scores and progress through levels of the game.

Learners will have used a range of the software systems and will be able to recognise the importance of quality assuring the systems to make sure that they are robust and function correctly so that users will return to the site. Learners will be familiar with the frustration of using a website that is very slow or crashes at crucial moments! A whole class discussion will allow learners to draw on their own experiences and to consider the consequences of unreliable software or systems.

You will need to introduce learners to a variety of testing methods including functionality, usability, load and compatibility. Learners could work in groups to research testing methods and present their conclusions to their peers. They will need to consider whether the systems work correctly, produce the correct answers, are navigable and work with peripherals such as monitors and printers. The use of these testing methods should ensure that the software system is robust and will attract users who are happy with the way the system works. A happy user is much more likely to become a happy customer!

The content and assignments for Learning aim B will provide you with a clear understanding of the volume and quality of evidence required to access the full range of grades. Learners may well benefit from being familiar with the assessment grids to plan their work and identify the tasks to be carried out. Learners will need to have a sound understanding of the aims and objectives for their systems in order to be able to develop meaningful and workable designs. Learners should aim to produce designs that could be implemented by a competent third party.

Learning aim C includes a clear list of the types of constructs and techniques that learners can use to create their solutions to the given problem. The choice of constructs and techniques used will depend on the way in which information is stored.
and retrieved. Using a programming language with database connectivity is often the best way to produce a solution to a problem such as the example used in this guide. Learners will need to test their solutions once they are complete and ask for feedback from users to allow them to refine and improve their systems. You should encourage learners to diagnose and fix any errors they encounter to perfect their systems.

Learning aim D requires the learners to take a step backwards and to review their completed systems in light of end user feedback. They need to consider how well the solution matches the design and consider why changes have been introduced during the implementation.

For learning aims B, C and D, you may wish to use the sample scenario (see specification) or develop your own task. Regardless of the scenario, assignments 2, 3 and 4 will guide the learners through this process.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

### Unit 24: Software Systems Development

#### Introduction

This unit concentrates on the integration of technologies to provide a working solution to a given problem or need. You will find it worthwhile to draw on your learners’ experiences of using such systems on a daily basis. A whole class brain-storming session leading to the construction of a class spidergram to identify such systems and to consider the technologies used, will provide the learners with a clear overview of the content of the unit.

Learners will have experience of developing systems for other units of this qualification. However, you will need to take account of the content of the units covered when introducing this unit. If learners have little experience of database and software development, then you will need to allow more time to build on their prior knowledge before they undertake assignment 1, so that they can properly identify the features of the two systems under consideration.

#### Learning aim A: Understand the uses of software systems and the quality assurance of software programs

- Give learners a presentation on the concept of maintainability and quality assurance. It is important to stress that many systems are not static but undergo updates that must improve them while ensuring that they are still robust. Learners may be familiar with problems that have been associated with system updates such as privacy issues with Facebook.

#### Assignment 1: Research Software Systems
### Unit 24: Software Systems Development

#### Learning aim B: Design a software system

- Provide learners with a sample brief. In small groups have learners consider the given scenario in order to be able to describe the ‘client’ requirements for the software system. Ensure that learners are able to identify both a target audience and purpose for the system.
- In their small groups learners should produce a method of solution that includes the use of different technologies that can be combined. One of the technologies should be a database and another technology should be used to provide a front end for the system which may be web based or may be screen based such as forms from Visual Basic.
- Demonstrate to learners how to present process stages as algorithms. They may find it easier to use flowcharts rather than pseudo code to describe processes such as data input and output.

#### Assignment 2: Design a Software System

#### Learning aim C: Develop the software system and undertake system testing

- Once learners have completed their designs they will be in a position to start implementing them. Learners may find that they need to revise their designs as they go. There is no need to re-do the design work but the changes should be presented on the annotated design documents.
- Learners need to make use of their test plans to fully test their software systems. You should also ensure that they gather feedback and that the more able react to the feedback received by refining their implementations.

#### Assignment 3: Develop and Test a Software System

#### Learning aim D: Review the finished software system

- Discuss with learners the importance of reviewing a software system to make sure it meets the client's brief. Explain that they will need to consider the following.
  - Is the system suitable for the target audience?
  - Is the system easy to use or does the user need lots of instructions?
  - Does the system work efficiently or do users have to repeat actions such as entering username?
  - Are the user interfaces well designed and appropriate for the target age group?
  - Does the finished system match the original designs? If not, then what changes have been made and why were they made?
- Learners often have difficulty in writing a review of their own work and tend to produce a narrative rather than an evaluation. You may find it helpful to encourage them to make specific suggestions for improvements for elements of the system and explain why these improvements are needed.

#### Assignment 4: Review the Software System
Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:
- Unit 8: Mobile Apps Development
- Unit 10: Database Development
- Unit 12: Software Development
- Unit 13: Website Development
- Unit 16: Automated Computer Systems
- Unit 17: Multimedia Products Development

Resources

Textbooks
In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.

A comprehensive guide to creating a software system with data-handling facilities.

A practical guide to creating software systems.

Websites

http://msdn.microsoft.com/en-gb/vstudio/
A website providing information on learning to program in Visual Basic, Visual C#, Visual C++ that will guide learners through many well-structured tutorials.

http://smallbasic.com/
A Microsoft website with a wide range of resources to support learners in their use of small basic.

www.codecademy.com
An excellent website with well structured tutorials on PHP, JQuery, JavaScript, Python and Ruby.

http://support.microsoft.com/ph/1117
A support site for Visual Studio 2010.
Unit 25: IT Work Experience

Delivery guidance

Approaching the unit

IT work experience may be most learners’ first taste of working in the sector or the creative computing industry, so it is essential that they are able to benefit to the fullest extent from their placement. You will need to support learners as they seek and undertake a work experience placement and encourage them to analyse their development and contribution to the organisation as they take part and once they return to school or college. How they approach the placement and their experiences in the workplace may determine their career aspirations and how they envisage their career path.

Delivering the learning aims

This unit is quite flexible, so that it can be tailored to fit around the type of work placement that has been obtained by individual learners. You may wish to write a general assignment brief and ask each learner to tailor it to fit their placement. Alternatively, you could write a specific assignment brief for each individual learner’s placement. Probably the most practical would be to write a general brief and then a supplementary explanation of tasks, written in cooperation with the learners, to meet their placement’s individual needs.

For learning aim A, learners will need to find at least three possible opportunities for IT work experience. These could be three companies which they can contact to enquire if they offer work experience placements. Learners should apply to all three for work experience with a covering letter and CV. They may have some knowledge in the format and structure of a business letter/email, but it would be useful to show examples or provide an outline of the content of this type of communication. When they receive replies, you may need to be very supportive if learners are turned down, and help them build resilience and determination to try again. You may wish to encourage them to be aspirational, but also realistic.

As part of the application process, they will also need to complete an application form, technical and employability skills review and a digital portfolio. Before submitting these to the organisation, learners should seek good quality feedback from those involved and make improvements where necessary. To obtain this feedback, learners could swap their work with another class and they could carry out peer assessment, with them evaluating whether the other student’s work is effective and highlighting good points and areas for improvement. To make this a bigger event, the cohort could arrange a careers fair and invite learners from more junior classes to visit and learn about how to apply for jobs, as well as giving feedback on their individual work.

In addition, learners should think about the health and safety aspects of employment by observing good practice in their placements and following health and safety policies. You could show them photographs of good and bad health and safety practice in the workplace, or even ask them to carry out a review of your own school, putting them into groups and allocating different areas such as IT, Science, Sport and so on. Different businesses will have different requirements, and learners should analyse their placement and identify three risks and explain how to reduce those risks. These could include aspects of using computers for a prolonged period of time, travelling as part of the job or working with electrical equipment.
UNIT 25: IT WORK EXPERIENCE

For learning aim B, learners should provide evidence of technical and employability skills they have used in their placement. This will depend on the type of organisation and skills required and how they can be evidenced. One way may be for learners to show a finished product they have made for the organisation and photographs of them taking part in meetings and communicating with clients. After their placement they could then explain and evaluate these in detail. Advanced employability skills include:

- working with autonomy
- demonstrating leadership skills (when working with others)
- managing a team/persuading others to commit to your ideas
- problem solving, e.g. finding a new way to complete tasks by using technology, like social media, to complete tasks more efficiently or to organise projects.

Learners could be asked to put together a presentation explaining their placement and evaluating their skills. Whether the students are on placement at the same time or different times, when they return and prepare their presentations, they could be delivered to the class to share their experiences and questions could be asked to prompt further explanation or evaluation, with a recording made and a witness statement completed for each. This could go one stage further where the best presentations could be selected for presentation at an assembly to the school, at an open evening or to the school governors.

For learning aim C, learners should describe how their placement has benefited the organisation and the benefits to them as an individual. This feedback could also be useful if you are looking to persuade other companies to take learners on work placements and show the valuable experience to both learner and business. Learners should also look at how they could have improved and the impact it will make on their future. This is likely to be a section which learners will find difficult. To support them in this, they could be given key words which they could use to help identify skills and personal attributes or a breakdown of the task so they approach it in stages, for example first they only need to list about five things they thought they did well and then they can start to add more detail.
Getting started

This provides you with a starting point for one way of delivering the unit, based around the suggested assignments in the specification.

<table>
<thead>
<tr>
<th>Unit 25: IT Work Experience</th>
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</table>

Introduction
Introduce the unit by giving learners an overview of all of the tasks they will be undertaking. As they will be leading and directing a lot of the content of this unit, they need to be aware of everything which is being asked of them, the timescales involved and which parts must be done on placement and which can be done afterwards. You may ask them to take their assignment brief and analyse it in pairs, creating an individual action plan to make sure they have a thorough understanding.

The majority of this unit will be undertaken individually. However, you may wish to create a ‘buddy’ system where learners have a partner in their class who they can contact for help and support if needed. Although they may have their own friends, this could give them an extra someone to prevent any of them from being isolated during this unit.

Learning aim A: Prepare for and secure your IT work experience

- Begin by discussing how one might find a job, and relate this to finding work experience. Ask learners the differences between the two and the positives and negatives of a company taking a learner on work experience. Make sure they have a realistic appreciation of work experience from the company’s point of view.
- Demonstrate to learners how to effectively search for job roles. Ensure learners know of the best way to collate the evidence of job searches. You may need to help them contact companies by proofreading emails or practising telephone conversations.
- Learners could then be shown good and bad examples of application forms to analyse, and also discuss the particular terminology used.
- Health and safety is a key area of this unit and learners could be asked to carry out a risk assessment of their potential workplace. Templates could be provided to support this. Alternatively, the learners could visit a local workplace and carry out a risk assessment.
- At any point during this section, guest speakers of local employers would be hugely valuable, allowing learners to get a real insight into what skills and characteristics are looked for in potential employees and a glimpse at the professional work they will be joining.
- Learners should prepare for their interview for placement, researching the business and evaluating their own skills so they are ready to answer typical interview questions. As part of this, they could be given mock interviews which are scheduled and run as formal interviews, including expecting the students to dress appropriately. To encourage their performance in these, the interviewer could be someone on the staff with whom they are less familiar and there could be a competition where the learner who would have been successful in getting the ‘job’ is given a reward.

Assignment 1: Preparation for my IT Work Experience
## Unit 25: IT Work Experience

### Learning aim B: Use technical and employability skills during your IT work experience

- Discuss with learners the different types of company and the work that they may undertake, explaining that the evidence produced will vary depending upon the work placement. Learners should decide what evidence they are going to produce and how they are going to collect it. It would be advisable to discuss this with them before they begin their placement, as once it is over they may not be able to go back. Ensure learners are prepared with the equipment and paperwork they will need, such as a camera and blank witness statements. Learners should be reminded to seek permission when taking photographs in the workplace and ensure they do not compromise confidentiality.

- Discuss with learners why certain technical and employability skills may be valued by employers. Explain how learners could consult with colleagues and could participate in informal recorded discussions, interviews with colleagues or questionnaires to understand which of these skills are valued on their work placement.

- Discuss with learners what they will need to present upon returning from their placement. They should be prepared to assemble a presentation about their placement which includes:
  - the organisation and its role
  - their contribution to the organisation, explaining how they made a difference and evaluating their impact on the organisation
  - the personal benefits gained from the work experience
  - their own career aspirations and how the work experience might have benefited or changed them, recommending how this might benefit them now and in the future.

- Each learner could deliver their presentation to the class which will not only form their assessment but also be of benefit to fellow learners, allowing them to see what each other has done on placement and share their experiences.

### Assignment 2: IT Work Experience and Review

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Details of links to other BTEC units and qualifications, and to other relevant units/qualifications

BTEC Firsts in Information and Creative Technology:

- **Unit 19: Computing in the Workplace.**

There is significant overlap with learning aim B, and Units 19 and 25 would be ideal to teach holistically as one unit.

Depending on the type of placement, Unit 25 could be integrated with a practical unit, for example a placement in a business where the learner is developing part of a website for the company, could link with **Unit 13: Website Development.**

Resources

The resources needed will depend on the type of placement and role being undertaken. In addition, the business itself may have useful resources to help the work placement learner.

Textbooks

In addition to the resources listed below, publishers are likely to produce endorsed textbooks that support this unit of the BTEC Firsts in Information and Creative Technology. Check the website (www.edexcel.com/resources) for more information as titles achieve endorsement.


Websites

There are numerous online resources that cover applying for jobs and the personal characteristics valued by employers.

www.open.ac.uk/careers/applying-for-jobs.php

The Open University Careers Advisory Service website offers helpful advice on producing CVs and how to make effective job applications.

http://mindthis.ca/tech-resume/

This site offers information on what to do when applying for a tech job.

www.jobs.ac.uk/careers-advice/interview-tips/1337/what-are-employers-looking-for-skills-and-qualifications/

A useful article: ‘What are employers looking for? Skills and qualifications’

www.jobs.ac.uk/careers-advice/interview-tips/1515/employability-what-are-employers-looking-for/

A useful article: ‘Employability – what employers are looking for?’

www.exeter.ac.uk/careers/events/employers/

The University of Exeter Career Zone website looks at the key skills that employers are looking for.

Job Applications:

http://www.prospects.ac.uk/job_application_advice.htm

https://nationalcareersservice.direct.gov.uk/advice/getajob/applications/Pages/default.aspx
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Interviews:
https://nationalcareersservice.direct.gov.uk/advice/getajob/interviews/Pages/default.aspx
http://www.jobs.ac.uk/careers-advice/interview-tips

Health and Safety:
http://www.hse.gov.uk/legislation/hswa.htm
http://www.healthandsafetyatwork.com/hsw/
Definitions of terms used in assessment criteria grids

Most assessment criteria start with a command word – ‘describe’, ‘explain’, ‘evaluate’ etc. These words relate to how complex a learners’ answer should be.

Learners will need to provide evidence that meets the command-word requirements of a criterion. Some terms in the assessment criteria grids have particular meanings in the I&CT sector. For clarification, definitions are given below for each of the terms used.

You can use this glossary with your learners to:

- help them understand what the language used in the criteria means
- what they will need to do to attain a specific grade
- to give further clarification on how their work has been assessed.

You may also find it useful as a means of providing further guidance when you are assessing learner work against the assessment criteria.

<table>
<thead>
<tr>
<th>Assessment word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carry out</td>
<td>Complete task using a structured approach.</td>
</tr>
<tr>
<td>Comment on</td>
<td>Put forward thoughts.</td>
</tr>
<tr>
<td>Create</td>
<td>Use techniques to create a product or system.</td>
</tr>
<tr>
<td>Describe</td>
<td>Give a clear description that includes all the relevant features – think of it as ‘painting a picture with words’.</td>
</tr>
<tr>
<td>Develop</td>
<td>Use techniques to develop a product or system.</td>
</tr>
<tr>
<td>Discuss</td>
<td>Consider different aspects of a topic, how they interrelate, and the extent to which they are important.</td>
</tr>
<tr>
<td>Edit</td>
<td>Review and correct.</td>
</tr>
<tr>
<td>Evaluate</td>
<td>Bring together all information and review it to form a conclusion. Give evidence for each view or statement.</td>
</tr>
</tbody>
</table>
| Explain                 | Provide details and give reasons and/or evidence to support the arguments being made. Start by introducing the topic, then give the ‘how?’ or ‘why?’.
| Gather                  | Bring together the appropriate information.                                                      |
| Identify                | Indicate the main features or purpose of something.                                              |
| Install and maintain    | Put in and keep up to date.                                                                     |
| Justify                 | Give reasons or evidence to support an opinion.                                                  |
| Optimise                | Make the best of.                                                                               |
| Prepare                 | Gather together and organise.                                                                   |
| Produce                 | To create, develop, construct or make.                                                           |
| Record Audio            | Evidence in audio format.                                                                       |
| Refine                  | Improve initial work taking into account feedback and aims.                                     |
| Review                  | Look at again or reconsider.                                                                    |
| Select                  | Choose the best or most suitable option.                                                         |
| Test                    | Check and trial.                                                                                 |