Unit 52: 3D Animation

Unit code: H/502/5668

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

Aim and purpose

The aim of this unit is to introduce learners to the theory and use of 3D animation software. Learners will develop an awareness of how 3D animations are displayed on a computer screen and investigate the geometric theory underlying 3D animation work. Learners will plan and produce a 3D animated scene and reflect critically on their own work.

Unit introduction

3D animation is the art of creating moving images by means of 3D computer graphics. Sometimes the platform for the animation is the computer itself, sometimes it is another medium such as film. These animations are referred to as 'computer-generated images' (CGI). 3D animators are responsible for the portrayal of movement and behaviour. Most often this is applied to give life to characters and creatures, but sometimes animations are applied to other elements such as objects, scenery, vegetation and environmental effects. Specialist software packages are used to create the animations and animators will portray movement and behaviour in an efficient and effective way which makes best use of this technology. Depending on the platform for which the animation is designed they will maximise the opportunities for interactivity.

In this unit learners will have the opportunity to use a 3D animation software application to produce a 3D animated scene. 3D animation concepts are complex and in this unit learners are encouraged to research the use of 3D animation within the interactive media and computer games industries. Learners will develop an awareness of how 3D animations are displayed on a computer screen. An appreciation of the geometric theory underlying 3D work will help learners understand the technical language used by animators.

Learners following this unit will have the opportunity to devise and develop original ideas from interpreting creative briefs and considering potential target audiences. Learners will develop skills in drafting pre-visualisation sketches and storyboards. Developing these planning skills will form a habit of preparation and workflow management of value to any entrant to the interactive media industry.

Through studying this unit, learners will develop practical computer animation skills and will create 3D animations using a range of techniques, including key frame animation and rendering.

This unit will also develop learners' ability to reflect critically on their own work, as they will need this professional skill in any future career.

Learning outcomes

On completion of this unit a learner should:

1 Understand theory and applications of 3D

2 Be able to devise a 3D animation

3 Be able to create a 3D animation following industry practice.

Unit content

1 Understand theory and applications of 3D

Applications of 3D: eg environments, models, product design, animations, TV, film, web, games, education, architectural walk-through

Displaying 3D polygon animations: application programming interface eg Direct3D, OpenGL; graphics pipeline eg modelling, lighting, viewing, projection, clipping, scan conversion, texturing and shading, display; rendering techniques (radiosity, ray tracing); rendering engines; distributed rendering techniques; lighting; textures; fogging; shadowing; vertex and pixel shaders; level of detail

Geometric theory: vertices; lines; curves; edge; polygons; element; face; primitives; meshes eg wireframe; coordinate geometry (two-dimensional, three-dimensional); surfaces

Mesh construction: box modelling; extrusion modelling; using common primitives eg cubes, pyramids, cylinders, spheres

3D development software: software eg 3D Studio Max, Maya, Lightwave, AutoCAD, Cinema 4D, Softimage|XSI; file formats eg 3ds, .mb, .lwo, .C4d, .dxf, .obj; plug-ins

Constraints: polygon count; file size; rendering time

2 Be able to devise a 3D animation

Stimulus: eg client brief, own brief, from market research

Ideas: brainstorming; sketches; pre-visualisation (concept drawings, storyboards)

Legal and ethical considerations: legal eg copyright; ethical eg confidentiality, decency; representation eg race, gender, religion, sexuality

Specification: target audience; key visual themes; storyboards; constraints eg polygon count, image resolution, frame rate, output size and aspect ratio, file type, file size

3 Be able to create a 3D animation following industry practice

Plan: asset management (file storage and retrieval, naming conventions); workflow (scheduling, efficient time management); deadlines (production milestones, deliverables, quality assurance)

Software interface: files eg loading, properties, merging, replacing, importing, saving, backup and auto-saving; viewports eg viewport configuration, viewport controls; workspace eg command panels, floating palettes and toolbars, drawing aids; animation controls eg time, trajectories, pivot points, forward kinematics, inverse kinematics, morphing, effects, key frames and playback

Animation: layers; object naming conventions; tools eg move, stretch, rotate pivot points, linking, kinematics, skeletons, deformations, skin, particle systems, real-world physics

Animation techniques: time-based (animating with key frames); motion control; kinematics (inverse, forward); staging the animation eg lights, cameras, supports, tripods; biped; deformations; paths/trajectories; effects eg motion blur, glow, particle systems, real-world physics; object hierarchies; parent-child inheritance and relationship

Animation process: animating eg objects, lights, cameras, textures, morphs and transformations

Virtual camera: cameras eg target, free, camera view; camera parameters eg lens length, field of vision (FOV), focus, depth of field aperture; camera animation

Lighting techniques: light types eg ambient, distant, area, spot, point, linear, photometric, raytraced; lighting controls and effects eg projector, attenuation, colour, shadows; atmospheric eg clouds, smoke, fire; volumetric eg fog, mist

Texturing techniques: texturing process eg creating, loading textures, applying textures; using materials eg materials editor, mapping materials, material modifiers; material types eg bitmap, procedural, using avi video files as textures

Rendering: scene rendering eg rendering controls, rendering options, output size and aspect ratio, safe-frame, file type, file size; image resolution eg TV, film, game, web

Industry practice: reflect on finished product (compared with original intentions, fitness for purpose, technical qualities, aesthetic qualities); production skills (ideas generation, animation specification, workflow and time management, technical competence, teamwork)

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	**To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:**	**To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:**
P1 summarise accurately theory and applications of 3D using some subject terminology appropriately	**M1** explain theory and applications of 3D with reference to detailed illustrative examples and with generally correct use of subject terminology	**D1** comprehensively explain theory and applications of 3D with elucidated examples and consistently using subject terminology correctly
P2 generate outline ideas for a 3D animation working within appropriate conventions and with some assistance [CT; SM]	**M2** generate detailed ideas for a 3D animation showing some imagination and with only occasional assistance	**D2** generate thoroughly thought-through ideas for a 3D animation showing creativity and flair and working independently to professional expectations
P3 create a 3D animation following industry practice, working within appropriate conventions and with some assistance. [CT; SM; RL]	**M3** create a 3D animation to a good technical standard following industry practice, showing some imagination and with only occasional assistance.	**D3** create a 3D animation to a technical quality that reflects near-professional standards following industry practice, showing creativity and flair and working independently to professional expectations.

PLTS: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key			
	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

It is suggested that teaching follows the order of the learning outcomes, teaching the concepts and principles of 3D initially, followed by generating ideas and planning 3D animations and, finally, producing 3D animations.

Tutors should note that if the content relating to learning outcome 1 has been covered in either *3D Modelling* or *3D Environments* there is no need to cover it again here.

This unit could be taught through a variety of activities including lectures, group discussions, practical sessions and demonstrations. The largest proportion of time should be spent in practical sessions using 3D animation application software though an emphasis should also be put on developing and refining drawing skills, as these are fundamental to 3D animation work.

Formal lectures and independent study will be the main methods used to teach the understanding of concepts and the principles of 3D. Learners could research a range of contemporary 3D animation work and investigate how professional 3D animators incorporate their work into a range of multimedia applications.

Learners will need to appreciate the application of 3D and the principles of 3D geometric theory, mesh construction and the development of 3D animation software. They will also need to understand the features of a 3D animation application and the techniques and methods used in the development of 3D animations. All this can be achieved through a mix of formal lectures, independent study and the practical use of 3D animation software to create animations. Learners will need access to a range of 3D design tools and plug-ins. These tools are available on the internet and will allow learners to modify existing animations or create their own.

3D animation software teaching is best done in short, carefully structured stages, each stage being reinforced with small practical projects which, when completed, allow progress to other stages.

Learners must complete a 3D animation to a brief that could be specified by a client or be a simulated assignment. This will develop the knowledge, skills and techniques associated with industry-standard 3D animation software.

Reflective practice is an important part of development and design. Learners should be encouraged to compare their completed 3D animations with their original intentions and with current and past professional work.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way of planning the teaching and assessment of this unit.

Topics and suggested assignments and activities
Introduction to unit and unit assessment.
Introduction to concepts and principles of 3D. Learners will receive lectures and demonstrations, and hold discussions to: • examine how 3D is used by the interactive media and computer games industries • explain how 3D animations are displayed • explain how 3D models are constructed • examine the types of development software used in the production of 3D animations.
Assignment 1: 3D: the Basics Learners write an article entitled '3D: the basics' for an online 3D art ezine, examining the application and use of 3D models within interactive media and computer game products. The article must cover: • applications of 3D • displaying 3D polygon animations • geometric theory • mesh construction • 3D development software • constraints.
Introduction to and review of ideas generation and recording.
Assignment 2: 3D Animated Sequence Stage 1 Learners will generate ideas and specification documentation for a 3D animation to match a brief from the college management to provide an animated sequence for an interactive CD to promote the college. Learners will: • consider and interpret the brief • generate and record ideas • select and develop one idea • carry out pre-production planning for that idea • compile a comprehensive development log evidencing their creative work.
Sessions on development of practical web animation skills, with brief introductory lectures, covering: • basic software interface tools • advanced software interface tools • animation production processes • reviewing own 3D animation production work.

Topics and suggested assignments and activities
Assignment 2 Stage 2 Learners will create the 3D animation from the idea developed in Part 1 of this assignment. Learners will: • undertake production following their planned ideas • present 3D animation production work • review their own 3D animation production work.
Unit learning and assessment review.

Assessment

Evidence for assessment

As evidence of the achievement of learning outcome 1 learners can present researched information. This could be through a presentation or report explaining the applications of 3D, geometric theory, mesh construction, 3D development software and constraints. Research could include extracts from books, journals, articles, material published on the internet or trade publications. Evidence relating to learning outcome 1 might also be presented in the form of wiki articles.

Tutors should note that if learners have already been assessed for either 3D Modelling or 3D Environments there is no need for them to provide additional evidence for the assessment of this element of 3D Animation as the content relating to learning outcome 1 is the same in all three units and one body of evidence is sufficient for all three. Some learners may, however, wish to take the opportunity to improve their grade for this element of the assessment by submitting new or additional evidence produced when covering this unit.

For learning outcomes 2 and 3, learners must produce documentation showing ideas generation, an outline specification, and a 3D animation using 3D application software. Documentation could be presented as annotated screen grabs or via screen capture software with voiceover.

Presentations must be recorded for the purposes of internal and external verification.

For some elements of this unit, and for some learners, a formal viva voce assessment might be appropriate. When more than one learner in a cohort is assessed in this way, care must be taken to ensure that all learners are asked equivalent questions, and that all are given equal opportunities to expand or clarify their answers. Interviewers must also ensure that questions are not phrased in such a way as to provide or suggest an answer. Formal vivas should be recorded for the purposes of internal and external verification and at least 50 per cent of such assessments must be internally verified.

Application of grading criteria

When applying the grading criteria tutors should follow the advice given below. Please note that any examples of evidence given here are indicative only. This advice is not inclusive and the examples need not be included in a learner's work in order for that learner to achieve the exemplified grade. For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

For each of the criteria learners must present evidence that addresses each italicised sub-heading of the content for the learning outcome.

P1: learners will describe the use of 3D within the interactive media industry and how 3D graphics are displayed, including reference to geometric theory and mesh construction, though at this grade the evidence will typically not discuss displaying 3D polygon environments. The description will not be related through

examples to particular 3D applications. Descriptions of geometric theory and mesh construction will be correct and should cover the main points. A pass grade learner might note when discussing geometric theory, 'Points are the most basic part of every 3D object. The joining of points creates lines, which in turn can then be made into polygons. Points are used to identify a place or location in 3D space. Once you have your points, you can now connect them to make a line.' Evidence will show a basic understanding of technical terminology but learners will generally be unsure about this vocabulary and will make fairly frequent mistakes when they do use it.

P2: evidence will show some recording of ideas generation, outlining ideas through brainstorming sheets, sketches, storyboards or otherwise, though learners will not justify choice of final ideas for implementation. Learners will have constructed a brief specification which will outline the idea and will give some indication of what will be required to produce the animation. Some attempt might have been made to explain intentions but this will be patchy and not always clear. Learners will also show that they have taken account, to some extent, of legal and ethical considerations, though this evidence is likely to be minimal and factual only, lacking consideration of implications for the final animation.

P3: learners will produce a 3D animation of between 500 and 600 frames from ideas generated from their interpretation of the brief. At this grade the learner's use of the 3D animation software to produce their 3D animation will be basic, typically using layers and object naming conventions, animation tools (such as move, stretch, rotate pivot points), linking and using chains, animating with key frames, using ambient, distant, area and spot lighting types, adding a target virtual camera and applying basic textures to objects, and using basic animation rendering techniques. Learners will provide documentation on their use of the 3D application software tools and features used to produce their 3D animation but it will be scanty and lacking in detail. Following industry practice, learners will be able to review their finished 3D animation work in such a way that they move beyond merely describing it. They will make evaluative comments upon what they have done but these comments will be assertions that are not supported by evidence or exemplification They will discuss both production process and finished product comparing it with their original intentions, making comments on fitness for purpose, technical qualities, aesthetic qualities, production skills, ideas generation, workflow and time management, technical competence and teamwork and commenting on how they have used 3D development software to create a solution to the brief. A learner might note for example, 'For my animation I based it on a planet in outer space. I animated my spaceship model by using key frame animation tools to make the ship move from the launch pad and disappear into outer space. I had a problem with my camera behind the spaceship looking down at the planet surface; you could see the square-shaped plane I had used for the landscape with the space station sitting on it. It looked really awful.'

P2 and P3: in terms of the imaginative qualities of their work, pass grade learners will not move beyond the conventional, but the conventions applied will be appropriate to the form or genre within which they are working. Learners working at this grade will require assistance from tutors to prepare and produce their 3D animation ideas. If they have been in frequent need of such help but fail to make use of it, they should not be considered for a pass grade for this unit.

M1: learners will correctly explain the use of 3D within the interactive media industry and how 3D graphics are displayed, including explanation of geometric theory and mesh construction. These must be explained clearly, using generally appropriate subject terminology. At this grade the evidence will include detailed illustrative examples but they will not be elaborated to show how they illustrate the points being made. A learner might note when discussing geometric theory, 'Points are the most basic part of all 3D objects, also known as vertices. The joining of vertices creates lines known as edges. When you connect three or more lines together you have an area which is closed, making a face known as a polygon. Diagram X shows how four points are defined using the Cartesian coordinate system. When connected together the area closed within the lines is called a face otherwise known as a polygon.' Learners will use technical vocabulary for the most part correctly, but may make mistakes or be unsure about usage at times.

M2: learners will be able to generate and plan a 3D animation project which combines the key characteristics of 3D animation in an imaginative way, making use of conventions but not slavishly copying them. Evidence

will reveal imagination beyond the conventional, an organised approach to ideas generation and planning and clear explanations of intentions. Learners will consider the target audience with some care and there will be an awareness of legal and ethical constraints, with some consideration of their implications for the final product.

M3: learners will produce a 3D animation of between 500 and 600 frames from ideas generated through their interpretation of a brief. At this grade the learner will use the 3D application software competently to produce their 3D animation typically using: layers and object naming conventions; animation tools such as move, stretch, rotate pivot points, linking and using chains; animating with key frames, kinematics, deformations and skin; paths/trajectories and effects; object hierarchies and parent-child inheritance and relationship; skeleton and particle systems; using ambient, distant, area, spot, photometric and raytraced lighting types, lighting controls and animation and effects, atmospheric and volumetric lighting; adding and animating cameras and applying camera parameters; creating, loading and applying textures to objects; using the materials editor to modify and map materials and animation rendering techniques to client brief requirements. Learners will document in some detail their use of the 3D application software tools and features used to produce their 3D animation. Following industry practice, learners will review their work, explaining what they have tried to accomplish and how they have worked to try to achieve what they have set out to do. They will explain decisions made and exemplify these explanations through relevant and detailed reference to their own work. Learners will discuss both production process and finished product. They will make comments comparing it with their original intentions, making comments on fitness for purpose, technical qualities, aesthetic qualities, production skills, ideas generation, workflow and time management, technical competence and teamwork and explaining how they have used 3D development software to create a solution to the brief. For example, a learner might note, 'I based my animation on my brief which was to design a 25-second animation to depict a space station on a mysterious planet deep in space. My idea came from researching the TV series *Star Trek*. From my mood board I created my scene for the space station animation using key frame animation tools to help me make the ship move from the launch pad and disappear into outer space. To make my animation look more realistic I used an animated camera to give the perception of a shuddering movement as the space ship took off. I had a problem with my lighting and my camera angles. The finished animation looked really poor. I was not pleased with the lighting of my animation. I should have spent more time working on the lighting. My final animation was not as good as I would have liked as it did not have any particle effects which were part of my original idea.'

M2 and M3: though learners will still be working within recognisable generic conventions, there will be some thought behind the application of technical skills, and codes and conventions will be used with some inventiveness. Learners working at this grade might have required limited assistance from tutors to prepare and produce their 3D animation ideas, particularly when dealing with more complex technology or trying to apply more sophisticated techniques. As with the pass grade learner, they will benefit from such assistance.

D1: learners will explain fully and clearly the use of 3D within the interactive media industry and the ways in which 3D graphics are displayed, including consideration of geometric theory and mesh construction, using explicit examples of particular 3D objects to provide clear explanation of the points being made. They will justify points made using supporting arguments or evidence and draw out of an example precisely what it is about it that exemplifies the point it illustrates. Fuller and more extensive explanation, the better application of examples and provision of supporting argument to support points made will discriminate between this grade and the merit. A distinction grade learner might note when discussing geometric theory, 'Points are the most basic part of all 3D objects known as vertices. The joining of vertices creates lines known as edges. When you connect three or more lines together you have an area which is closed, making a face known as a polygon. More complex polygons can be created out of multiple triangles, or as a single object with more than three vertices. Triangles are the most common shapes used in polygonal modelling. A group of polygons which are connected by shared vertices is referred to as a mesh. Diagram XX shows how four points are defined using the Cartesian coordinate system. When connected together the area closed within the lines is called a face, otherwise known as a polygon.' Technical vocabulary will be secure and used correctly and confidently at all times.

D2: learners will work independently to prepare a final specification document, report or presentation including brainstorming sheets, sketches, and storyboards or otherwise. This will be presented as a final specification suitable for use by another to prepare the animation. Learners will demonstrate a consideration of the target audience which will include a reasoned and justified discussion of implications. Evidence will demonstrate creativity and flair with an organised approach to ideas generation and planning, and all decisions and intentions will be clearly explained. Distinction grade learners will justify the choice of final ideas for implementation. There will be evidence which indicates a thoughtful consideration of the effects of legal and ethical constraints upon the final product.

D3: learners will produce a 3D animation of between 500 and 600 frames from ideas generated through their interpretation of a brief. For this grade the learner will have produced a 3D animation showing creativity and flair, drawing clearly on their interpretation of the brief and the ideas generated. The learner will use the 3D application software with confidence and autonomy to produce their 3D animation using, for example: layers and object naming conventions; animation tools such as move, stretch, rotate pivot points, linking and using chains; animating with key frames, kinematics, deformations and skin; paths/trajectories and effects; object hierarchies and parent-child inheritance and relationship; skeleton and particle systems; ambient, distant, area, spot, photometric and raytraced lighting types, lighting controls and animation and effects, atmospheric and volumetric lighting; adding and animating cameras and applying camera parameters; creating, loading and applying textures to objects, using the materials editor to modify and map materials and animation rendering techniques to client brief requirements. The learner will fully document their use of the 3D application software tools and features used to produce their 3D animation. Following industry practice, learners will review their work by making an accurate and critically objective assessment of their own achievement with detailed reference to examples taken from that work. Evidence will discuss both the production process and the finished product, comparing it with their original intentions, making comments on fitness for purpose, technical qualities, aesthetic qualities, production skills, ideas generation, workflow and time management, technical competence and teamwork and explaining how they have used 3D development software to create a solution to the brief. A learner working at this grade might note, 'I based my animation on my brief which was to design a 25-second animation to depict a space station on a mysterious planet deep in space. My idea came from researching the TV series *Star Trek*. From my mood board I created my scene for the space station animation using key frame animation tools to help me make the ship move from the launch pad and disappear into outer space. To make my animation look more realistic I used an animated camera to give the perception of a shuddering movement as the space ship took off. I had a problem with my lighting and my camera angles and the finished animation looked really poor as I only used one camera. To resolve this I changed the camera view by moving it closer to my spaceship and adding two extra cameras, switching to each camera at different key points in my animation. This enhanced my animation to become more cinematic and professional. I was not pleased with the lighting of my animation; I should have spent more time working with the lighting controls until the animation looked right. I was not pleased with my final animation as it did not have the effects I had intended in my original idea. I should have used effects such as particle systems and glow to give the effect of thrusters on the spaceship engines.'

D2 and D3: learners will apply their technical skills not just with imagination but with ingenuity and even elegance, and codes and conventions will be used with occasionally surprising results. In all practical activity distinction grade learners will be capable of working autonomously and effectively. The term 'working independently' means that they are able to work on their own initiative, do not need constant support or supervision, give the work their full commitment, work positively and cooperatively with others and meet deadlines. In other words, they have the kind of self-management skills that would be expected of them in a professional context. Note also that this criterion should not be taken to mean that learners do not seek advice or that they work without discussing things with their tutor, but rather that they are not dependent upon the support of others and that if they take advice they weigh it carefully for themselves.

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, M1, D1	**Assignment 1**: 3D: the Basics	Article on 3D modelling for an online 3D art ezine.	All preparatory notes. Report document as word-processed or electronic presentation.
P2, M2, D2	**Assignment 2**: 3D Animated Sequence Stage 1	Brief from learner's college to create 3D animated sequence for an interactive CD to promote the college.	Development log containing: • all ideas notes, sketches, concept drawings, storyboard • proposal outline • animation sequence specification.
P3, M3, D3	**Assignment 2** Stage 2	As above.	Project portfolio containing: • planning notes • all production documentation • 3D animated sequence • personal reflective commentary.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Art and Design suite. This unit has particular links with the following units in the BTEC Art and Design suite:

Level 2	Level 3
Working with Moving Image Briefs	2D Animation Production
Working with Digital Art and Design Briefs	Computer Game Engines
	Drawing Concept Art for Computer Games
	Stop Motion Animation Production

There are opportunities to relate the work done for this unit to Skillset National Occupational Standards in Interactive Media and Computer Games as follows:

- IM1 Work effectively in interactive media
- IM2 Obtain assets for use in interactive media products
- IM29 Direct asset production for interactive media products.

Essential resources

Learners must have access to 3D development software such as 3D Studio Max, Maya, Lightwave, AutoCAD Cinema 4D or Softimage|XSI, and internet access to download plug-ins.

Employer engagement and vocational contexts

Centres should develop links with local interactive media production studios which could be approached to provide visiting speakers, study visits or samples of typical products.

Skillset, the Sector Skills Council for the creative media sector, has a substantial section of its website dedicated to careers, including job descriptions – www.skillset.org/careers/.

Further general information on work-related learning can be found at the following websites:

- www.aimhighersw.ac.uk/wbl.htm – work-based learning guidance
- www.businesslink.gov.uk – local, regional business links
- www.nebpn.org – National Education and Business Partnership Network
- www.vocationallearning.org.uk – Learning and Skills Network
- www.warwick.ac.uk/wie/cei/– Centre for Education and Industry, University of Warwick – work experience and workplace learning frameworks.

Indicative reading for learners

Textbooks

Baylis P, Freedman A, Procter N et al – *BTEC Level 3 National Creative Media Production, Student Book* (Pearson, 2010) ISBN 978-1846906725

Baylis P, Freedman A, Procter N et al – *BTEC Level 3 National Creative Media Production, Teaching Resource Pack* (Pearson, 2010) ISBN 978-1846907371

Ahearn L – *3D Game Textures: Create Professional Game Art Using Photoshop* (Focal Press, 2006) ISBN 978-0240807683

Birm J – *Digital Lighting and Rendering* (New Riders, 2006) ISBN 978-0321316318

Brooker D – *Essential CG Lighting Techniques with 3Ds Max* (Focal Press, 2008) ISBN 978-0240521176

Capizzi T – *Inspired 3D Modelling and Texture Mapping* (Premier Press, 2002) ISBN 978-1931841504

Franson D – *2D Artwork and 3D Modelling for Game Artists* (Prima Tech, 2002) ISBN 978-1931841337

Gahan A – *3Ds Max Modeling for Games: Insider's Guide to Game Character, Vehicle, and Environment Modeling* (Focal Press, 2008) ISBN 978-0240810614

Giambruno M – *3D Graphics and Animation* (New Riders, 2004) ISBN 978-1405814720

Summers D – *Texturing: Concepts and Techniques* (Charles River Media, 2004) ISBN 978-1584503002

Weishar P – *Moving Pixels: Blockbuster Animation, Digital Art and 3D Modelling Today* (Thames & Hudson, 2004) ISBN 978-0500512081

Journals

3D World

Websites

www.3dcafe.com – texture and model resources

www.3dworldmag.com – textures, models and 3D tutorials

www.blinkimage.com – use of environment walk-throughs etc

www.turbosquid.com – textures, models and 3D tutorials

Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

Skill	When learners are ...
Creative thinkers	generating ideas for a 3D animation to be used in an interactive context trying out different ways of creating their 3D animation, following ideas through to complete a 3D animation sequence adapting their ideas as circumstances change
Reflective learners	reviewing and reflecting on their 3D animation work and acting on the outcomes to modify and improve their work setting goals with success criteria for their production work inviting feedback on their own work and dealing positively with praise, setbacks and criticism evaluating their learning and experience to inform future progress
Self-managers	producing a 3D animation to be used in an interactive context seeking out challenges or new responsibilities and showing flexibility when circumstances change dealing with competing pressures, including personal and work-related demands responding positively to change, seeking advice and support when needed.

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	carrying out research into theory of 3D animation and its application carrying out research to develop ideas for their own 3D animation sequence
Team workers	if working in a group to produce a 3D animation, taking responsibility for their own role managing their personal contribution to discussions to reach agreements and achieve results.

Functional Skills – Level 2

Skill	When learners are ...
ICT – Use ICT systems	
Select, interact with and use ICT systems independently for a complex task to meet a variety of needs	handling 3D animation systems to create their animated sequence
Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used	planning for the 3D animation of their 3D animated sequence
Manage information storage to enable efficient retrieval	managing assets sourced and created for their animated sequence
Follow and understand the need for safety and security practices	handling 3D animation systems to create their animated sequence
Troubleshoot	handling 3D animation systems to create their animated sequence
ICT – Find and select information	
Select and use a variety of sources of information independently for a complex task	sourcing assets for their animated sequence
Access, search for, select and use ICT-based information and evaluate its fitness for purpose	researching asset types and their limitations for use with their animated sequence
ICT – Develop, present and communicate information	
Enter, develop and format information independently to suit its meaning and purpose including: • text and tables • images • numbers • records	building and presenting their project portfolio showing their interpretation of the brief, their generation of ideas, documenting the management of their chosen assets, considering legal implications and reviewing their own work
Bring together information to suit content and purpose	
Present information in ways that are fit for purpose and audience	
Evaluate the selection and use of ICT tools and facilities used to present information	preparing a report on 3D animation tools and how 3D animation rendering is used
Select and use ICT to communicate and exchange information safely, responsibly and effectively including storage of messages and contact lists	gathering feedback on their 3D animation work as part of their self-reflective practice

Skill	When learners are ...
Mathematics	
Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations	using coordinate geometry to create 2D and 3D animated models
Identify the situation or problem and the mathematical methods needed to tackle it	
Select and apply a range of skills to find solutions	
Use appropriate checking procedures and evaluate their effectiveness at each stage	
Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations	
Draw conclusions and provide mathematical justifications	
English	
Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts	taking part in brainstorming sessions to generate ideas as a response to a creative brief
Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions	studying manufacturers' manuals to research 3D animation software
Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively	creating their project portfolio and generating ideas, notes, production documentation and reflective comment.