

# GETTING READY TO TEACH INTERNATIONAL GCSE (9-1) HUMAN BIOLOGY



**16IBAS18**



Getting to  
know you

# Aims and Objectives

- Consider the structure, content and assessment of this qualification, and the support available to guide you through these changes
- Consider the key changes from 4HB0
- Explore possible teaching and delivery strategies for the new qualification
- Have the opportunity to network, discuss best practice, take away resources to help with your planning and delivery, and share ideas with other teachers
- Learn about the introduction of the new 9–1 grading scale.

# Session Agenda

9.30 – 10.00	Welcome : Tea & Coffee
10.00	Agenda & Introductions
10.15 – 11.00	Introductory questions with brief discussion of responses  Group discussion of teaching strategies to overcome difficult subject matter
11.00 – 11.15	Overview of new model of assessment, including new 9 to 1 grading model
11.15 – 11.30	BREAK
11.30 – 12.45	New Specification content and changes.
12.45 – 1.45	LUNCH
1.45 – 2.30	New and retained question types within assessment model
2.30 – 3.00	Practical and mathematical skills
3.00 – 3.30	Supporting Learning
3.30	Plenary: questions and Feedback

MCQ Q1 (i) from January 2017 was not well answered.

Why do you think that this was the case?

**Q 3(a)(i) from January  
2017 paper 2 was poorly  
answered by candidates.**

**Why do you think this  
was the case?**

# ACTIVITY 1

How can teaching be improved to cope with difficult questions e.g. Q 8(b)(ii), 8(b)(iii) and 8(b)(iv)

Specification	Common errors	
9.3 know the role of tissue fluid and explain how this arises as a result of pressure differences and its subsequent drainage into the lymphatic system	8(b)(ii) refs to pumping  8(b)(iii) few refs to loss of fluid, no understanding about resistance of walls	8(b)(iii) confusion concerning pressures, little attempt to discuss pressure differences, no knowledge of pores

# INTERNATIONAL GCSE HUMAN BIOLOGY 2017

## Assessment Overview





# Why are changes happening?

- Internationally benchmarked standards and curriculum
- Encourages deep learning by prioritising depth and cognitive demand
- Assessment tasks which seek to measure higher-order knowledge and skills

- Conceptualises learning as continuous
- Recognises that students progress at different rates and have different learning needs
- Provides detailed information on student achievement and a clear indication of progression possibilities



- Sets and maintains high standards over time
- Reliable and valid assessment tasks and processes that can withstand close scrutiny
- End-users (e.g. employers/universities) can be confident of the knowledge, skills and competencies of certified students

- Assures progression, provides access to a culture and promotes active citizenship
- Develops learner adaptability, initiative, resilience and metacognition
- Builds the capacity to work collaboratively and to lead

## Additional student performance recognition at Grade 9

# Introduction to the specification

## CONTENT

- 12 units
- covering all aspects of human biology, including modern developments in medicine, genetics & molecular biology

## SKILLS COVERAGE

- Knowledge and understanding of human biology processes will form an important skill base.
- Skills in critical thinking and evaluation will be tested as will mathematical skills and comprehension skills
- Experimental skills are an important part of this course and the application of such skills.

# Comparison: 4HB0 with 4HB1

What has changed	Old specification 4HB0	New specification 4HB1
Marks on each paper	<ul style="list-style-type: none"> <li>Paper 1: 120 marks</li> <li>Paper 2: 60 marks</li> </ul>	<ul style="list-style-type: none"> <li>Paper 1: 90 marks</li> <li>Paper 2: 90 marks</li> </ul>
Duration of papers	<ul style="list-style-type: none"> <li>Paper 1: 2 hrs</li> <li>Paper 2: 1 hr</li> </ul>	<ul style="list-style-type: none"> <li>Paper 1: 1 hr 45 mins</li> <li>Paper 2: 1 hr 45 mins</li> </ul>
Balance of Assessment Objectives	<ul style="list-style-type: none"> <li>AO1: 45–55%</li> <li>AO2: 25–35%</li> <li>AO3: 20%</li> </ul>	<ul style="list-style-type: none"> <li>AO1: 38–42 %</li> <li>AO2: 38-42 %</li> <li>AO3: 19-21%</li> </ul>

# New Grading Scale: 9 to 1

- The new grading scale ensures comparability with the regulated GCSE.
- It runs from Grade 1 (lowest) to Grade 9 (highest), where Grade 4 is roughly equivalent to the old grade C
- Grade 9 represents a higher level of achievement than the old A\* grade, and will only be achieved by the very highest performing candidates.

# The new 9-1 grading scale

- Broadly the same proportion of students will achieve a grade 4 and above as currently achieve a grade C and above
- Broadly the same proportion of students will achieve a grade 7 and above as currently achieve a grade A and above
- The bottom of grade 1 will be aligned with the bottom of grade G

New grading structure	Current grading structure
9	A*
8	
7	
6	B
5	
4	C
3	D
2	E
1	F
	G
U	U

**GOOD PASS (DfE)**  
5 and above = top of C and above

**AWARDING**  
4 and above = bottom of C and above

Source:  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/465873/your\\_qualification\\_our\\_regulation.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465873/your_qualification_our_regulation.pdf)

## Grade 9

- Originally intended to be “the top 20% of those scoring Grade 7”
- However, this way of finding Grade 9 has been changed, as this method is not fair on students in subjects with skewed distributions
- New method of working out Grade 9 will be:

Proportion of Grade 7 students who will be awarded Grade 9

$$= (\% \text{ of students who achieved Grade 7} \div 2) + 7\%$$

## Grade 9 – an example

- An exam is sat by 12 000 students
- The grade boundaries are set – and 6 000 students are awarded a Grade 7

### How many students get a Grade 9?

- 50% of the students have achieved a Grade 7
- So,  $(50 \div 2) + 7 = 32\%$  of the Grade 7 students will get a Grade 9
- 32% of 6 000 students = 1 920 students

# INTERNATIONAL GCSE HUMAN BIOLOGY (2017)

## Specification content





# Overview of changes in Human Biology

## ADDITIONS TO THE SPECIFICATION

- DNA/RNA structure, protein synthesis, genetic modification and stem cells.
- Immobilised enzymes.
- Osteoporosis.
- Eye defects.
- Drugs, legal and illegal including the use of statins.
- Dementia in its various forms.
- Circulatory disorders.
- Gene therapy.

# Overview of changes in Human Biology

## REMOVALS FROM THE SPECIFICATION

- Recall that a mutation is rare, random change in genetic material that can be inherited.
- Recall that many mutations are harmful but some are neutral and a few are beneficial.
- Understand that mutant organisms can increase in a population by natural selection.
- Recall that the incidence of mutations can be increased by exposure to ionizing radiation etc.
- Sickle cell anaemia is no longer specifically mentioned in the spec .
- In section 12, polio, influenza, TB and thrush removed as specific named infection
- Schistosoma nutrition, life cycle, prevention of spread removed.
- The whole of Section 14 (Environment) has been removed

# Unit 1: Cells and Tissues

There is a range of new material in Unit 1 relating to DNA/RNA/DNA replication/protein synthesis as outlined on the sheet.

These are areas that students often find difficult to understand given their conceptual nature and lack of visibility.

# Delivery Ideas for Unit 1

Describing DNA/RNA/DNA replication/protein synthesis can be very effectively taught through a modeling approach.

Students can use a variety of materials to create and discuss the structure of DNA and RNA; similarities and differences.

How close can students get to representing the detail needed; for example, of the nature of the nucleotides and complementary base pairing?

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# Delivery Ideas for Unit 1

- Link to the other relevant parts of the specification  
e.g. 1.8 describe protein synthesis and 1.6, RNA features
- A starter activity for protein synthesis might have the following questions:
  - *Where does the RNA come from?*
  - *What is RNA made from (nucleotides)?*
  - *What do nucleotides look like and how are nucleotides linked together (hydrogen bonds)?*

# Activities to support learning

Make models of DNA/RNA base sequences using different coloured card or even use different coloured jelly babies as the bases & show mutations changing the base sequence.

Make plasticine / play-doh models to show transcription / translation.

# Using SAMs questions

These can be very helpful in getting a feel for the style of questions that might be asked and the level of detail required by students.

# ACTIVITY 2

This question concerns RNA, DNA and inheritance

Produce a mark scheme to cover this question

4 (a) Two types of nucleic acid are found in cells. These are DNA and RNA.

Describe **three** differences between DNA and RNA.

(3)

1 .....

2 .....

3 .....

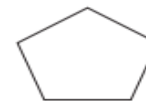
(b) The symbols shown can be used to represent the components of nucleotides that join together to make nucleic acid.



base



phosphate



sugar

Draw a section of RNA consisting of two nucleotides using the symbols given.

(3)



# Summary of assessment

## FAMILIAR ...

100% external assessment – with no coursework

Linear assessment – all exams taken in the same exam session

Mixture of question types – all marked with 'points-based' mark schemes

Single tier of entry (untiered)

Each paper will have some longer questions . These have appeared in the current (legacy) paper 2 (4 – 6 marks)

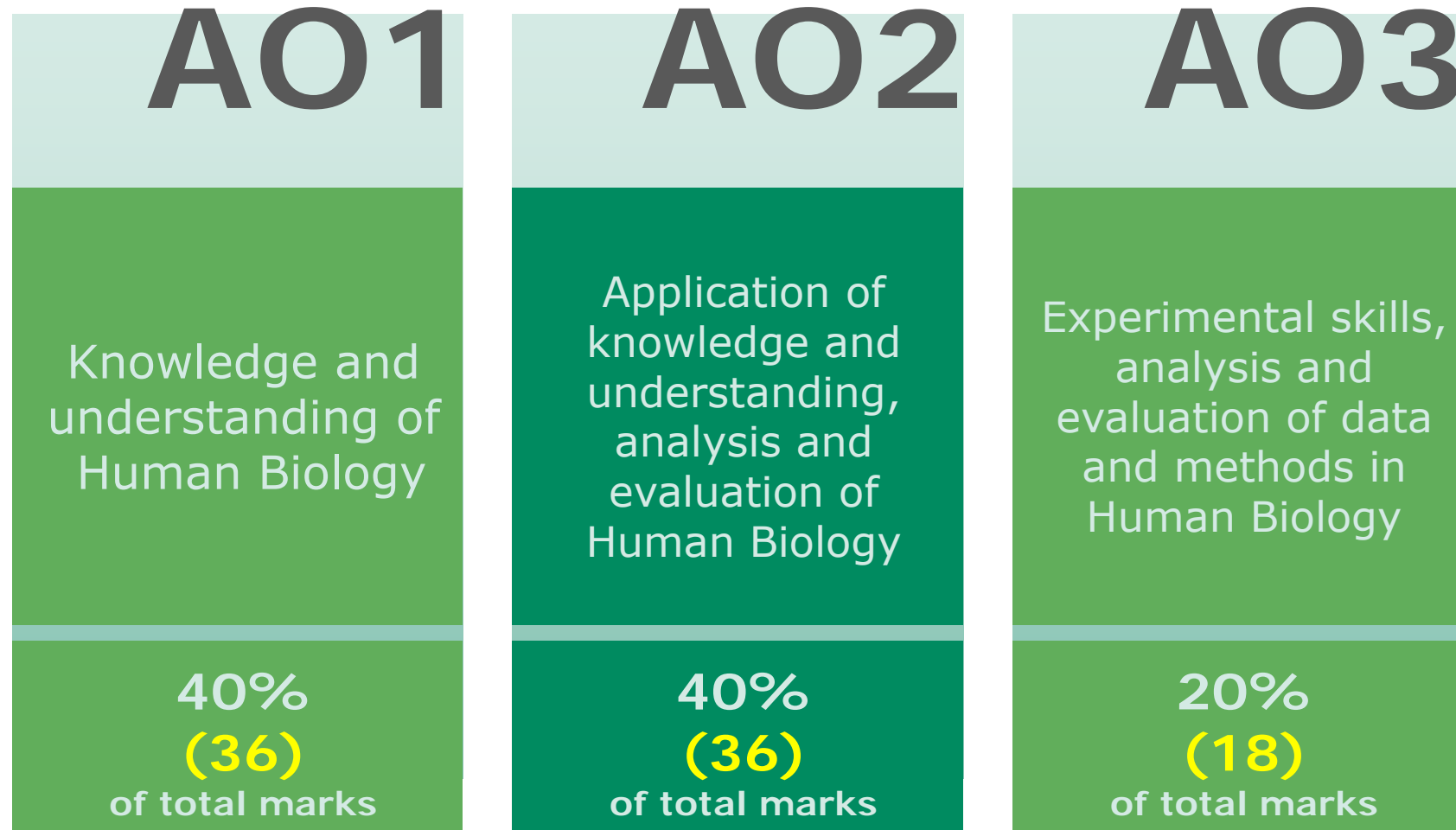
## AND NEW

**Maths skills**  
(10% in H Bio)

**Comprehension**  
type questions

**More data**  
**analysis**

# Assessment objectives



# Assessment summary

## Paper 1

**One hour and 45 minutes; 90 marks**  
includes ALL the specification statements

## Paper 2

**One hour and 45 minutes; 90 marks**  
includes ALL the specification statements

Both papers will contain  
a mixture of AO1,  
AO2 and AO3

The AO3 questions  
are likely to be in a  
practical context

Both papers have similar question types but paper 2 will  
have a passage to read on which questions will be based

# INTERNATIONAL GCSE HUMAN BIOLOGY

## Types of questions



# Recall to Higher Order Thinking

**Pure recall restricted to 15%:**

14 marks in Paper 1

14 marks in Paper 2

Remember AO1 = 36 marks for Paper 1 and Paper 2

**The consequence is fewer:**

- Name the part labelled A....
- What is meant by the term...?
- Complete by writing suitable words on the dotted lines...

# Question Styles Retained

- CORMS
- Graph plotting e.g. Question 2 Paper 1, Question 5 (a) Paper 2 SAM
- Mini Essays - points based marking  
e.g. Question 6 (d) Paper 1 SAM, Question 7(a) Paper 2 SAM
- Calculations: see Mathematics taxonomy  
e.g. Question 7 (b)(ii) Paper 2 SAM
- Data use e.g. Question 6 (c)(i) Paper 2 SAM

# CORMS and devising investigations

- **Change** = + and - / range of values;  
• (control) **Independent variable**
- **Organism** = species / size / age / sex / eq;  
• (biotic) **Controlled variable**
- **Repeat** = more than one reading / eq;  
• (reliable)
- **Measure** = mass / length / units / time / eq;  
• (precise/accurate) **Dependent variable**
- **Same** = temp. / LI / water / eq;  
• (abiotic) **Controlled variable**

# Design an investigation to find out if...

- ... the surface area of a cube of solidified egg white affects the rate at which it is digested by pepsin.
- ...drying is a more effective method of food preservation than freezing.
- ...caffeine in coffee acts as a diuretic.
- ...the sense of smell is more effective in identifying food than the sense of taste.
- ...a sample of food contains fat.



## ACTIVITY 3

**Design an experiment to find out if .....**

**the pulse rate of a class of students varies at rest.**

**Apply the CORMS mark scheme.**

**Design an experiment to find out if .....**

**the pulse rate of a class of students varies at rest.**

- C      number of students i.e. sufficient number/  
         more than 10;
- O      same gender/age/rested for five minutes prior  
         to experiment;
- R      idea of repeats/more than once;
- M      count pulse;
- S      same described method of counting i.e. finger  
         on wrist/neck

## ANSWER 1

*I would use five students and tell them to count their pulses for a period of one minute. I would then compare the results to see if there were any differences.*

## ANSWER 2

*I would use twenty students of the same sex and age and tell them to count their pulses for a period of one minute. They would take their pulses by placing two fingers on their wrist and counting the number of beats during the minute. They would repeat the process two more times. I would compare the results to see if there were any differences after working out a mean for each student.*

# Plotting graphs

Often marked as SLAAP, SLAPU or SLAPUK;

- **S** scale linear and half of each axis
- **L** lines straight, between points and neat
- **A** axis correct way around
- **A** axes labelled
- **P** points plotted correctly
- **U** units correct on each axis
- **K** key if two or more lines

# Mini Essay 1 – ACTIVITY 4

**Explain how your own activities can cause a change in the volume and concentration of urine produced.**

(6)

Please construct your mark scheme for this question.

# Mini Essay 1 – mark scheme

1. more water taken in/more water drunk;
2. increased volume of urine at lower concentration;
3. increase in protein eaten;
4. more amino acids produced/more deamination;
5. increased concentration of urine;
6. increased salt intake;
7. reduced volume of urine;
8. vigorous exercise;
9. reduced volume of urine increase in concentration;
10. because more water lost by sweating;
11. to control body temperature;

## Answer 1

*There could be more water drunk during the day so that more water would be passed out. I could also run about a lot and sweat so less urine would be produced.*



## Answer 2

*I could drink very little water for a day and this would result in less urine being passed but it would be of a higher concentration. I could also exercise a lot so that I was losing water by sweating to cool my body. This would mean that I would produce less urine at a high concentration. If I had a salty meal that would affect how much urine I produced.*

## Mini Essay 2 – ACTIVITY 5

**Explain how your own activities might cause changes to your rate and depth of breathing.**

**(6)**

- Please construct your mark scheme for this question.

## Mini Essay 2 – mark scheme

1. exercise/named physical activity;
2. increased use of oxygen;
3. increased production of carbon dioxide;
4. increased rate of breathing;
5. changes air more frequently;
6. increased depth of breathing;
7. inflates alveoli more;
8. maintains diffusion gradient for oxygen/carbon dioxide;

## Answer 1

*I could exercise more and this would increase the amount of breathing that I do. This means that I would take in more oxygen and give out more carbon dioxide.*

## Answer 2

*I could carry out 50 press ups. I would then be breathing faster and more deeply. This means that there would be more air going in and out of the lungs and this would maintain a steep diffusion gradient for oxygen.*

# INTERNATIONAL GCSE HUMAN BIOLOGY

## Practical and mathematical skills



# Command words

- All our qualifications in science now use a common taxonomy for command words
- These can be found in an appendix at the back of the specification
- Students can still expect a range of command words across the demand range of the exam paper
- Expect to see more questions that start with 'explain'. Also expect to see occasionally a question that asks the candidate to 'evaluate'.

# Practicals in the specification

- Specifications contain a number of suggested practicals
- Further suggestions for practicals appear in an Appendix
- The suggested practicals would form a basis for practical work, on which schools would be encouraged to build
- Questions on exam papers test practical skills, rather than recall of specific techniques – so may be in the context of any practical activity



# Developing practical skills

Students should be familiar with a range of laboratory apparatus and its use, including the reading of scales.

1

Students should be able to plan an experiment and control variables, to collect and record data in a table, and to plot appropriate graphs with lines of best fit.

2

Students should be able to process and analyse data, to identify and account for anomalies, to evaluate data and methods, and to justify a conclusion.

3

The specification includes guidance on the use of terminology within practical and experimental work.

4

# Practical skills in examinations

**Students may be tested on their ability to:**

Describe and plan experiments

Draw conclusions consistent with the evidence, using scientific knowledge and understanding

Describe safe and appropriate practical techniques

Communicate findings from experimental activities using appropriate language, calculations & graphs

Analyse and interpret data from experimental activities

Evaluate data and methods

# Mathematical skills

- The development and use of relevant mathematical skills is key to progress in science subjects
- A list of mathematical skills which should be developed appears in the Appendix for each specification
- These skills will be tested in exam papers within the context of the science
- Assessment of mathematical skills will account for 10% of marks in Human Biology
- See SAMs for an example, but note that mathematics questions have always been asked in previous papers so should not be a surprise

## SAM Paper 1 Q3 (b)

(b) The diagram shows two blood vessels that are connected to the heart.

Blood vessel 1      blood vessel 2

(ii) The diameter of the lumen in blood vessel 1 is 10 mm.  
The diagram has been drawn 50 times larger than the actual size of the blood vessel.

Calculate the actual size of the lumen of this blood vessel.  
Give your answer in micrometres ( $\mu\text{m}$ ). **(2)**

actual size = .....  $\mu\text{m}$

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# INTERNATIONAL GCSE Human Biology 2017

## Support and published resources



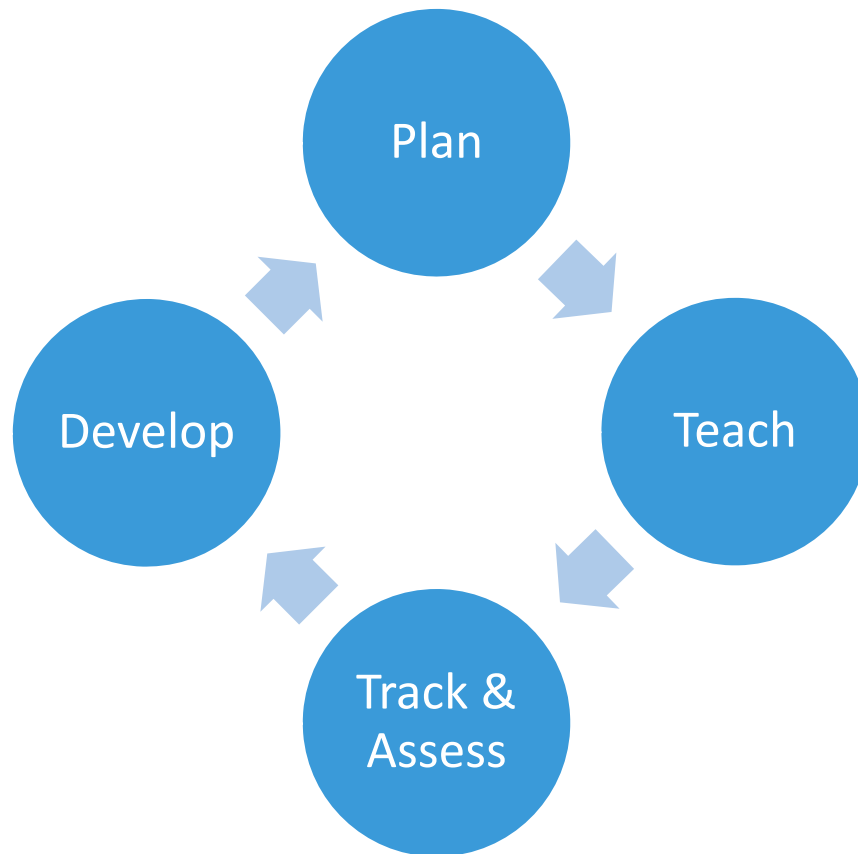
# Course Planner

## Section 4 Bones, Muscles & Joints

**4 hours**

Week 14	4.1, 4.2, 4.3	Skeleton, Joints, structure of synovial joint
Week 15	4.4, 4.5, 4.6	Muscles, dietary factors, osteoporosis

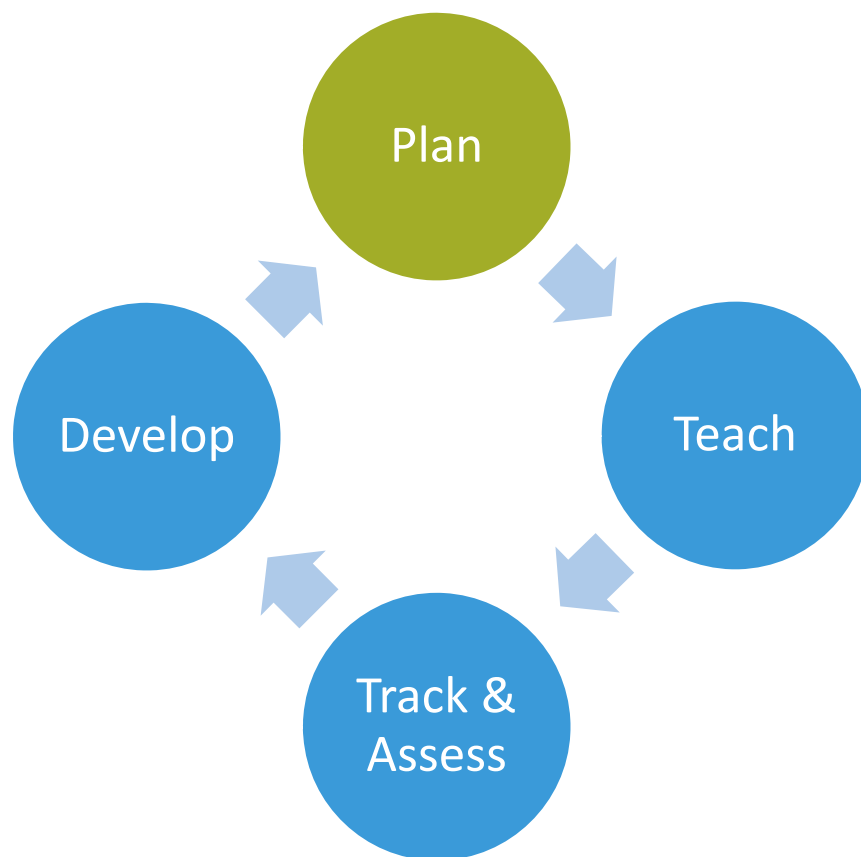
# Supporting great science teaching



- We will provide a range of support to help you plan, teach, track and assess, and develop the new course.
- This includes free qualification support to download from our website as well as published resources\*

\* You do not have to purchase any resources to deliver our qualifications

# Supporting great science teaching



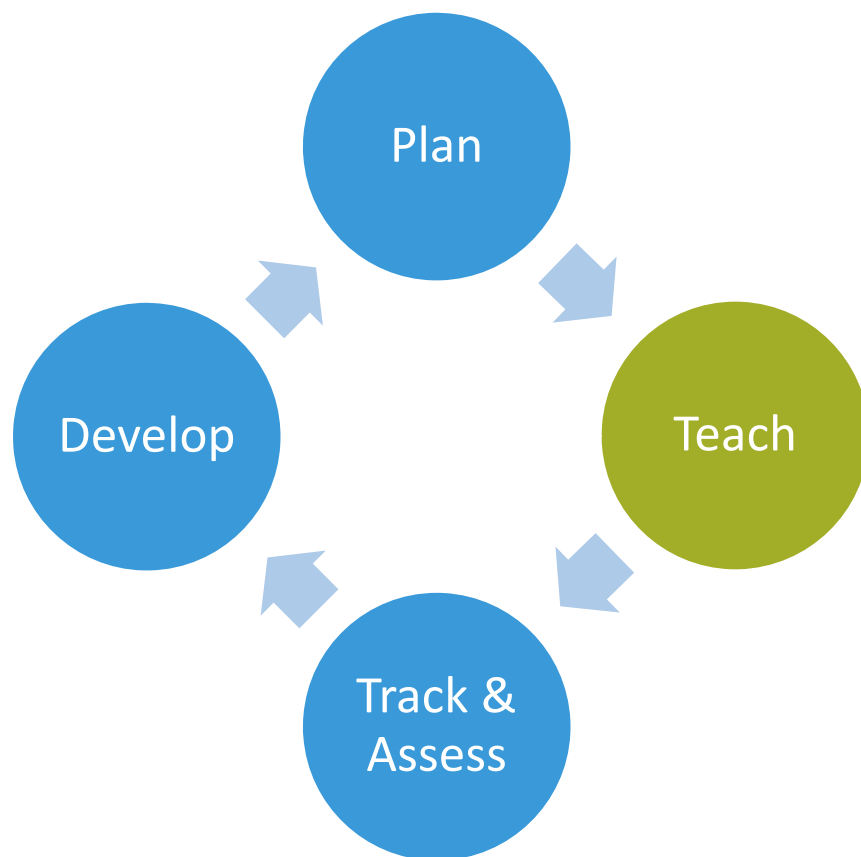
To help you plan the new course we are providing:

## **Free support for the qualification-**

- Getting Started Guide
- Course planners / schemes of work
- Mapping documents



# Supporting great science teaching



There will be teaching and learning support to help you deliver the new qualification:

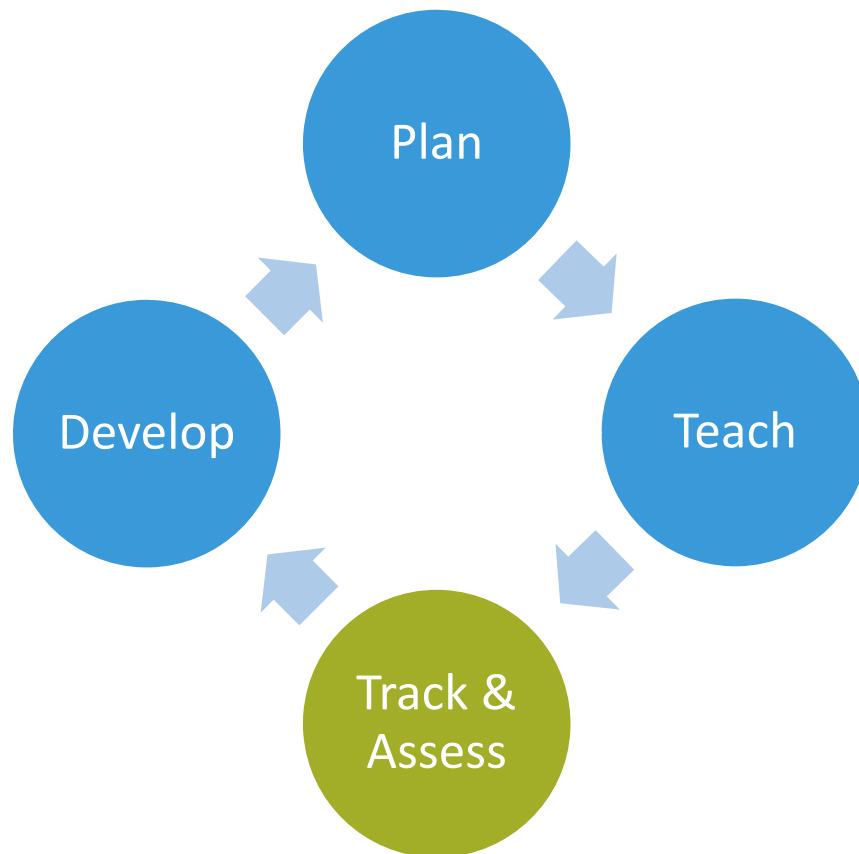
## Free support for the qualification:

- Maths Guide

## Published resources from Pearson:

- Student book and ActiveBook

# Supporting great science teaching



To help you prepare your students for the assessments:

## Free support for the qualification:

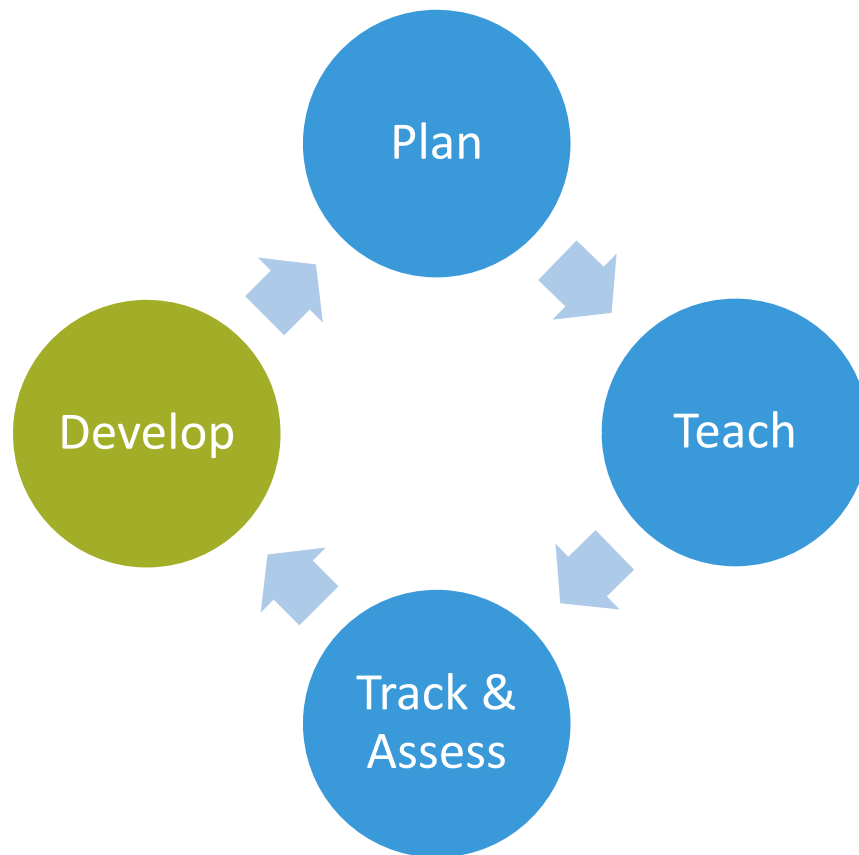
- Specimen papers to support formative assessment and mock exams
- ResultsPlus
- Past papers from current specification

\* You do not have to purchase any resources to deliver our qualification

# ResultsPlus and ExamWizard

- **ResultsPlus** provides the most detailed analysis available of your students' exam performance. This free online service helps you identify topics and skills where students could benefit from further learning, helping them gain a deeper understanding.

# Supporting great science teaching



Our training programme includes:

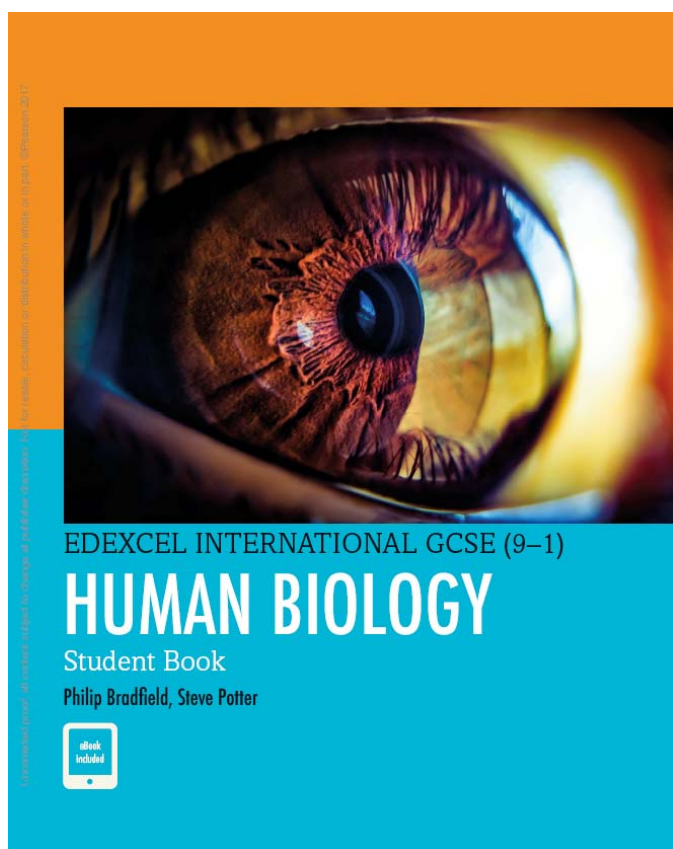
- Launch events
- Getting Ready to Teach events

Our subject advisor team, led by **Stephen Nugus**, will guide you through all the changes and are on hand to answer any questions you might have.

[TeachingScience@pearson.com](mailto:TeachingScience@pearson.com)

# Published resources – Pearson

<http://www.pearsonglobalschools.com>



- **Student Book – from May 2017**

This new resource, which includes access to an eBook, has been developed for the new Edexcel International GCSE specification with progression, international relevance and support at their core, and is designed to supply students with the best preparation possible for the examination.

- **Teacher Pack– from August 2017**

This new resource, available online, will include videos, worksheets, lesson plans and other support to help you deliver the International GCSE in Chemistry.

# Other useful links

## 1. [Grade Boundaries](#)

This page shows the minimum marks needed to achieve a certain grade for all UK and international examinations. Also refer to the examiners report which is available for download with other documents.

## 2. [Examination Results Statistics](#)

Results statistics summarise the overall grade outcomes of candidates sitting Edexcel examinations.

## 3. [Results Plus](#)

- Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance.
- See your students' scores for every exam question.
- Understand how your students' performance compares with Edexcel national averages.

**Any questions?**

**Thank you for  
attending this event.**

*How did we do?*

*Please fill in the evaluation form that you'll  
receive via e-mail in a few minutes.*

# **There's so much more to learn**

Find out more about our range of events at  
<http://qualifications.pearson.com/training>