

Delegate Booklet

Course Title:

**Pearson Edexcel International GCSE Human  
Biology: Welcome to Pearson (Module 2)**

Course Code:

**4HBI-20102**





# About this event

Course Title:

**International GCSE in Human Biology**

Course Code:

**4HBI-20IO2**

## Aims and Objectives

- Understand the assessment objectives for the qualification
- Understand the question types for the qualification
- Understand the mark schemes for the qualification
- Practice using the mark schemes using exemplar student material
- Learn about the support provided by Pearson around assessment and exemplars



# Agenda

| Time        | Item                                    |
|-------------|---|
| 08:00-10.20 | Welcome and introductions               |
| 08.20-10.45 | Assessment objectives                   |
| 08.45-11.10 | Question types                          |
| 09.10-11.35 | Understanding and using the mark scheme |
| 09.35-11.45 | Resources and support                   |
| 09.45-12.00 | Final questions                         |
| 10.00       | Close                                   |



# Activity 1 – opening questions

## Purpose

- To help you get to know the other delegates
- To understand your experience of teaching and assessing the International GCSE in Human Biology



# Assessment objectives (AOs)

**AO1**

Knowledge and understanding of Human Biology

**40%**  
**(36 marks)**  
of total marks

To meet this AO students will be expected to:

- *recall scientific facts (maximum of 14 marks) and demonstrate understanding of scientific techniques and procedures*
- Students will not be expected to design, improve or evaluate practical methods
- Recall questions tend to carry few marks and include a limited range of command words.

**AO2**

Application of knowledge and understanding, analysis and evaluation of Human Biology

**40%**  
**(36 marks)**  
of total marks

To meet this AO students will be expected to:

- *apply knowledge and understanding of scientific ideas*

It also builds on expectations given in AO1 by expecting students to

- *apply their knowledge and understanding of scientific enquiry, techniques and procedures*

**AO3**

Experimental skills, analysis and evaluation of data and methods in Human Biology

**20%**  
**(18 marks)**

To meet the criteria for AO3 students are expected to:

- *Interpret and evaluate*
- *Make judgements and draw conclusions*
- *Develop and improve experimental procedures*



## Activity 2 – Command words

### Task

- Read through the list of command words
- Identify four command words that might be used in questions testing scientific recall
- Please type your response into the chat panel

| Command word          | Definition   |
|-----------------------|--|
| Add/Label             | Requires the addition or labelling of a stimulus material given in the question, e.g. labelling a diagram or adding units to a table.  |
| Calculate             | Obtain a numerical answer, showing relevant working.   |
| Comment on            | Requires the synthesis of a number of variables from data/information to form a judgement.   |
| Complete              | Requires the completion of a table/diagram.  |
| Deduce                | Draw/reach conclusion(s) from the information provided.  |
| Describe              | To give an account of something. Statements in the response need to be developed, as they are often linked but <b>do not</b> need to include a justification or reason.  |
| Determine             | The answer must have an element that is quantitative from the stimulus provided, or must show how the answer can be reached quantitatively. To gain maximum marks, there must be a quantitative element to the answer.   |
| Design                | Plan or invent a procedure from existing principles/ideas.   |
| Discuss               | <ul style="list-style-type: none"><li>• Identify the issue/situation/problem/argument that is being assessed within the question.</li><li>• Explore all aspects of an issue/situation/problem/argument.</li><li>• Investigate the issue/situation etc. by reasoning or argument.</li></ul> |
| Draw                  | Produce a diagram either using a ruler or freehand.  |
| Estimate              | Find an approximate value, number or quantity from a diagram/given data or through a calculation.  |
| Evaluate              | Review information (e.g. data, methods) then bring it together to form a conclusion, drawing on evidence including strengths, weaknesses, alternative actions, relevant data or information. Come to a supported judgement of a subject's quality and relate it to its context.            |
| Explain               | An explanation requires a justification/exemplification of a point. The answer must contain some element of reasoning/justification – this can include mathematical explanations.  |
| Give/State/Name       | All of these command words are really synonyms. They generally all require recall of one or more pieces of information.  |
| Give a reason/reasons | When a statement has been made and the requirement is only to give the reason(s) why.  |
| Identify              | Usually requires some key information to be selected from a given stimulus/resource.   |



| Command word                          | Definition  |
|---------------------------------------|---|
| Justify                               | Give evidence to support (either the statement given in the question or an earlier answer).   |
| Plot                                  | Produce a graph by marking points accurately on a grid from data that is provided and then draw a line of best fit through these points. A suitable scale and appropriately labelled axes must be included if these are not provided in the question. |
| Predict                               | Give an expected result.  |
| Show that                             | Verify the statement given in the question.   |
| Sketch                                | Produce a freehand drawing. For a graph, this would need a line and labelled axes with important features indicated. The axes are not scaled.   |
| State what is meant by                | When the meaning of a term is expected but there are different ways for how this can be described.  |
| Suggest                               | Use your knowledge to propose a solution to a problem in a novel context.   |
| <b>Verb proceeding a command word</b> |   |
| Analyse the data/graph to explain     | Examine the data/graph in detail to provide an explanation.   |
| <b>Multiple choice questions</b>      |   |
| What, Why                             | Direct command words used for multiple-choice questions.  |



## Activity 3 – Recall questions

### Task

- Take a look at the following questions
- Please type the question number(s) for those that are recall into the chat panel on screen

1. Lipids are large molecules that are found in cells.

(a) Name the two components of a lipid.

(2)

2. Describe a test to show if there is lipid present in a piece of food.

(4)

3. State one precaution that reduces the safety risk of working with bacteria.

(1)

4. The two strands of the DNA molecule are held together by base pairs.

(a) How are the bases paired in DNA?

- ☐ **A** A-A and T-T
- ☐ **B** C-C and G-G
- ☐ **C** A-T and C-G
- ☐ **D** C-T and A-G





## Activity 4 – Application questions

### Task

- Look at the questions found in the delegates booklet.
- Please type the question number(s) for those that expect students to apply knowledge and understanding

### Question 1

The passage describes what happens when the order of bases on a DNA strand changes.

Use information from the box to complete the passage.

(3)

|              |    |            |         |
|--------------|----|------------|---------|
| 46           | 23 | amino acid | protein |
| carbohydrate | 3  | sugar      | 4       |

Each set of ..... bases along a strand of DNA is a code for  
one ..... . If the order of bases changes, then the  
final ..... made may not function correctly.

### Question 2

Describe how the function of a tendon is different from the function of a ligament.

(2)

### Question 3

Explain why MRSA bacteria increase more rapidly in people with weakened immune systems (lines 5 and 6).

(2)



#### **Question 4**

Caffeine is a type of drug.

Statements X and Y give information about drugs.

Statement X Drugs alter the way in which chemical reactions take place in the body.

Statement Y All drugs are illegal because they are addictive.

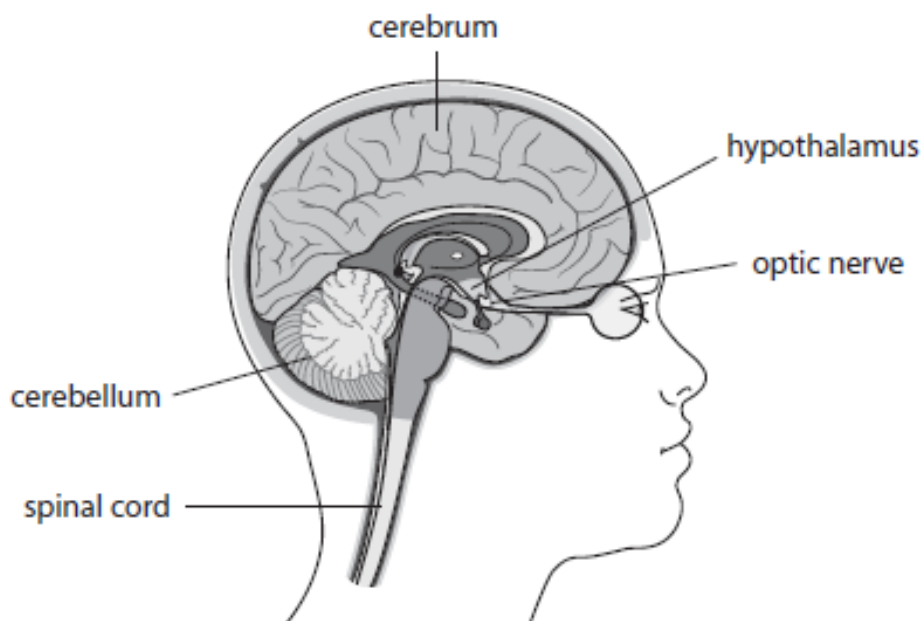
Which of these statements is correct?

(1)

- A** statement X only
- B** statement Y only
- C** statements X and Y
- D** neither statement X or Y

#### **Question 5**

The diagram shows a human brain.



(a) Draw a label line to the pituitary gland on the diagram and label this line X.

(1)



### **Question 6**

Use data from the graph to calculate the rate of breathing at rest.

Give your answer in breaths per minute.

(2)

rate of breathing = ..... breaths per minute



## Activity 5 – MCQ questions

### Task

- Please type your response to the questions below into the chat panel
  - Which assessment objective is covered by this question?
  - What problems might you anticipate when students answer this type of question?

(a) The menstrual cycle of a female is 28 days.

On which day of the cycle is the ovum (egg) likely to be released?

- ☐ **A** 1
- ☐ **B** 14
- ☐ **C** 20
- ☐ **D** 28

## Activity 6 – Multiple choice

### Task

- Take a look at question below
- Is the question shown an example of a multiple choice question?
- Please type yes or no into the chat box



(ii) These statements are about the use of immobilised enzymes in the food and beverage industry.

1. Amylase is used to convert lactose to galactose and glucose in the production of lactose-free milk.
2. Glucose and fructose are produced from sucrose in the production of slimming foods.

Which of the statements are correct?

(1)

- ☐ A 1 only
- ☐ B 2 only
- ☐ C Both statements 1 and 2
- ☐ D Neither statement 1 nor statement 2

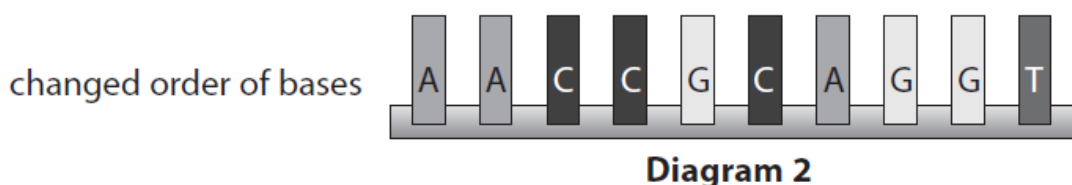
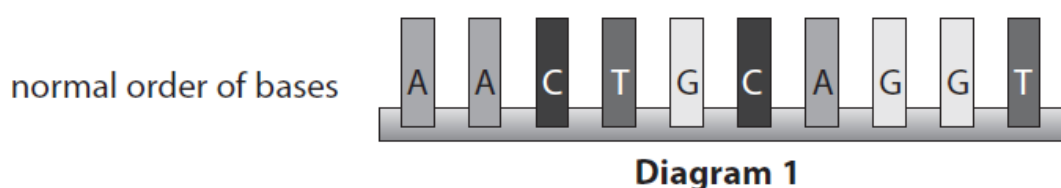
## Activity 7 – Short objective questions

### Task

- Please type your response to the question into the chat panel
- Which assessment objective is covered by this question?

(c) Diagram 1 shows the normal order of bases along one strand of a DNA molecule.

Diagram 2 shows the same DNA strand but with a change in the order of bases.



- (i) Use the diagrams to describe the change in the order of bases on the DNA strand.
- (2)





## Maths content

|          |   | HB |
|----------|---|----|
| <b>1</b> | <b>Arithmetic and numerical computation</b>   |    |
| A        | Recognise and use numbers in decimal form   | ✓  |
| B        | Recognise and use numbers in standard form  | ✓  |
| C        | Use ratios, fractions, percentages, powers and roots  | ✓  |
| D        | Make estimates of the results of simple calculations, without using a calculator  | ✓  |
| E        | Use calculators to handle $\sin x$ and $\sin^{-1} x$ , where $x$ is expressed in degrees  |    |
| <b>2</b> | <b>Handling data</b>  |    |
| A        | Use an appropriate number of significant figures  | ✓  |
| B        | Understand and find the arithmetic mean (average)   | ✓  |
| C        | Construct and interpret bar charts  | ✓  |
| D        | Construct and interpret frequency tables, diagrams and histograms   | ✓  |
| E        | Understand the principles of sampling as applied to scientific data   | ✓  |
| F        | Understand simple probability   | ✓  |
| G        | Understand the terms mode and median  | ✓  |
| H        | Use a scatter diagram to identify a pattern or trend between two variables  | ✓  |
| I        | Make order of magnitude calculations  | ✓  |
| <b>3</b> | <b>Algebra</b>  |    |
| A        | Understand and use the symbols $<$ , $>$ , $\alpha$ , $\sim$  |    |
| B        | Change the subject of an equation   | ✓  |
| C        | Substitute numerical values into algebraic equations using appropriate units for physical quantities                              | ✓  |
| D        | Solve simple algebraic equations  | ✓  |
| <b>4</b> | <b>Graphs</b>   |    |
| A        | Translate information between graphical and numerical form  | ✓  |
| B        | Understand that $y = mx + c$ represents a linear relationship   |    |
| C        | Plot two variables (discrete and continuous) from experimental or other data  | ✓  |
| D        | Determine the slope and intercept of a linear graph   | ✓  |
| E        | Understand, draw and use the slope of a tangent to a curve as a measure of rate of change   |    |
| F        | Understand the physical significance of area between a curve and the $x$ -axis, and measure it by counting squares as appropriate |    |



|   |  | HB |
|---|--|----|
| 5 | Geometry and trigonometry  |    |
| A | Use angular measures in degrees  |    |
| B | Visualise and represent 2D and 3D objects, including two dimensional representations of 3D objects |    |
| C | Calculate areas of triangles and rectangles, surface areas and volumes of cubes                    | ✓  |

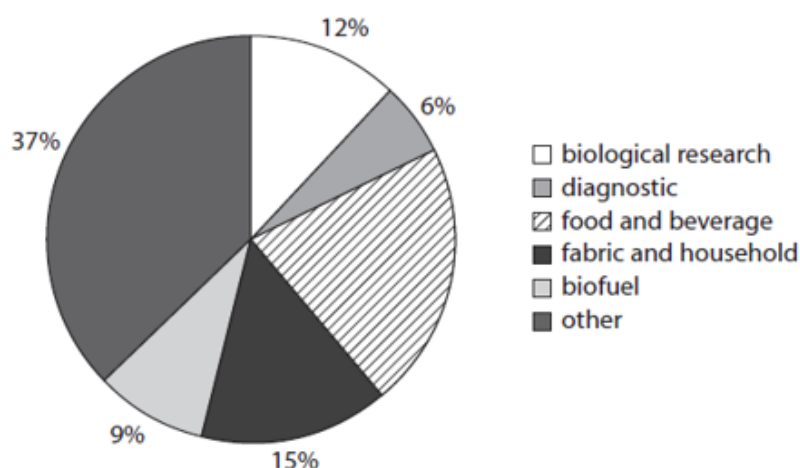
## Activity 8 – Maths skills

### Task

- Look at the example questions given below.
- Decide which maths skill each covers. Note that example 4 is in two parts (4i and 4ii)
- Please type your responses into the chat panel adding the example number for each

### Example 1: Maths skills

The pie chart shows the worldwide industrial uses of immobilised enzymes.



- (i) The total estimated market value of industries that use immobilised enzymes is £3.9 billion (£3 900 000 000).

Calculate the estimated value of immobilised enzymes in the food and beverage industry.

(2)





## Example 2: Maths skills

Calculate the percentage change in the number of reported cases of MRSA between 2003 and 2011 (lines 12 and 13).

(3)

### 6 Read the passage below.

Use the information in the passage and your own knowledge to answer the questions that follow.

Methicillin-resistant *Staphylococcus aureus* (MRSA) are harmless bacteria found on the surface of the skin. However, if these bacteria enter the body of a human it can be fatal. Most bacterial infections can be treated with antibiotics that destroy bacteria. MRSA are resistant to many antibiotics, even methicillin which is a powerful antibiotic. Once inside the body, the number of MRSA bacteria increase rapidly, particularly in people who have weakened immune systems. The bacteria spread quickly throughout the body causing life-threatening infections in bones, joints, surgical wounds, the bloodstream, heart valves and lungs.

MRSA are transmitted from person to person by skin-to-skin contact, or a person may become infected by touching contaminated objects. Infections caused by MRSA bacteria are particularly common in hospital patients who have recently had surgery. In 2003, 7700 cases of MRSA were reported by UK hospitals although in 2011, the number of reported cases dropped significantly to 1481. This was as a result of the 'Clean Your Hands' campaign, which was introduced in hospitals and other medical centres in 2004. This campaign encouraged all hospital staff and visitors to clean their hands using alcohol gel.

Scientists are researching new ways to treat MRSA infections. Tests have found that a liquid from cockroach brains can kill more than 90% of MRSA without the need for antibiotics, some of which can cause serious and unwanted side effects. These tests involve growing MRSA on agar plates using aseptic techniques and adding the liquid from cockroach brains.

One type of honey has also been shown to be highly effective in treating MRSA infections. Tests have been carried out on rats and clinical trials have been carried out on patients with an MRSA infection. The honey, combined with an antibiotic, cleared the MRSA infection far more quickly and effectively than the antibiotic alone.



### Example 3: Maths skills

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)

### Example 4: Maths skills

- (i) Use data from the graph to calculate the rate of breathing at rest.

Give your answer in breaths per minute.

(2)

rate of breathing = ..... breaths per minute

- (ii) The mean tidal volume (depth) of breathing at rest is  $0.3 \text{ dm}^3$ .

Calculate the mean tidal volume of breathing between 35 and 45 seconds.

(3)



## Activity 9 – Mark schemes

### Task

- Use the mark schemes to allocate a mark to each response given
- Please type your mark allocation into the chat panel in the same order that each response is shown

### Question 1

- (ii) Describe what further information is required to help form the conclusion that cigarette smoking is the only cause of COPD.

(2)

### Mark scheme

| Question number | Answer  | Notes   | Marks |
|-----------------|---|---|-------|
| (ii)            | Information required about other factors, such as diet/exercise/alcohol consumption/age/gender/exposure to pollution/(genetic) history/smokers or non smokers;; | Allow one mark for reference to lifestyles only | 2     |

### Response A

~~Find out if people~~ look at other factors of peoples life styles with COPD

### Response B

The amount of pollution in the air in the area that person lives in, any history of genetically linked lung diseases in that persons family. Also the amount of exercise that person does, and other aspects of lifestyle and working environment.



## Question 2

(c) Haemophilia is a sex-linked blood disorder that reduces the ability of the blood to clot.

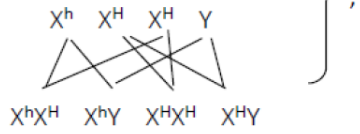
These are the genotypes of four offspring, P, Q, R and S.

| P         | Q       | R         | S       |
|-----------|---------|-----------|---------|
| $X^H X^h$ | $X^h Y$ | $X^H X^H$ | $X^H Y$ |

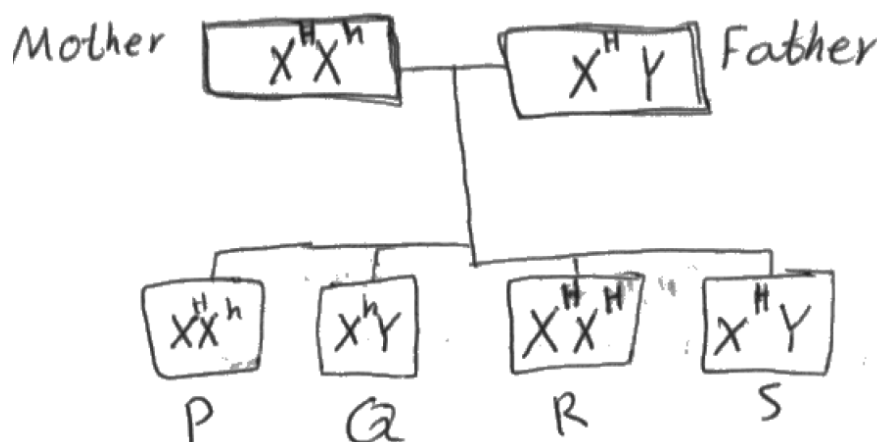
(i) Draw a genetic diagram to show how these offspring are produced from one set of parents.

(2)

### Mark scheme

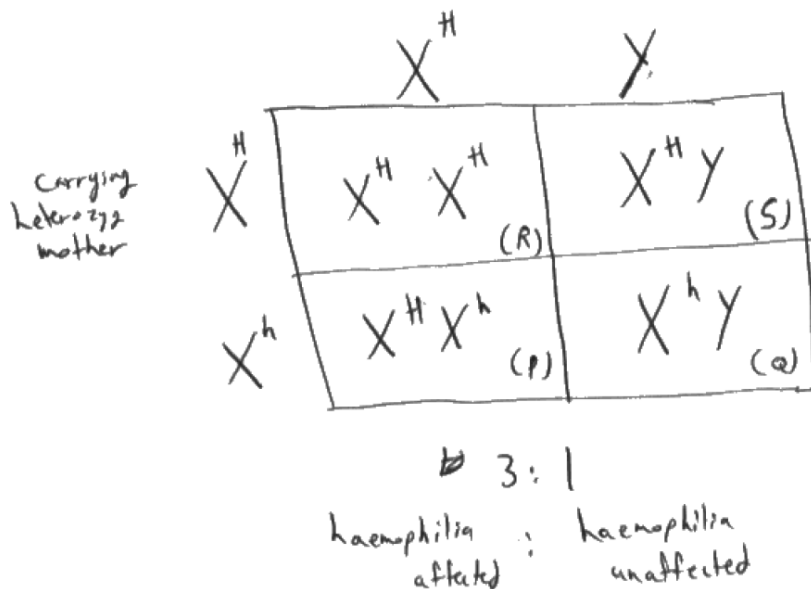
| Question number | Answer   | Notes  | Marks             |
|-----------------|--|--|-------------------|
| (c) (i)         | <p>parent genotypes<br/><math>X^h X^H</math> and <math>X^H Y</math>;</p> <p>gametes and linkage<br/><math>X^h \quad X^H \quad X^H \quad Y</math></p>  | <p>One mark for parent genotypes and one mark for gametes <b>and</b> linkage</p> | <p>1</p> <p>1</p> |

### Response C





### Response D



### Question 3

(b) State the meaning of the term pathogens (line 7).

### Mark scheme

|     |  |   |
|-----|--|---|
| (b) | a microorganism/named microorganism that causes disease; | 1 |
|-----|--|---|

### Response E

An organism that causes disease in the organism infects.

### Response F

A microorganism that causes disease





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