

Delegate Booklet

Course Title: Understanding assessment and
improving delivery in International GCSE Biology
4BI1-20IF1

About this event

Course Title: Understanding assessment and improving delivery in International GCSE Biology

Course Code: 4BI1-20IF1

Aims and Objectives of the event

1. Be introduced to the idea of assessment objectives: what are they and why they are used when writing examination papers,
2. Analyse recent question papers and learn which types of question match the different assessment objectives,
3. Investigate different assessment objectives, considering how questions in these areas have been answered by looking at feedback from previous exam series,
4. Discuss strategies for teaching to try and make sure students can access questions targeting different assessment objectives,
5. Review the support Pearson offers for the qualification,
6. Network, discuss best practice and share ideas with other teachers.

Agenda

Time	Item
09.30	Welcome Tea and coffee
10.00	Agenda & Introductions
10.15	International GCSE features / Introduction to the new Edexcel International GCSE in Biology
11.00	Assessment Objectives What are they? Using assessment grids
11.30	Break
12.00	Looking at student responses AO1 How to improve AO1 skills
13.00	Lunch
13.45	Looking at student responses AO2 How to improve AO2 skills
14.30	Looking at student responses AO3 How to improve AO3 skills
15.15	Tea
15.30	Lessons from the examinations
16.00	Final questions



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Activity 1 – How were 2019 papers different from previous ones?

Purpose:

- Review the impact of assessment and specification changes on centres and candidates

Task 1

1. Consider how the reformed papers were different from those from the previous specification.
2. Write down four observations from your centre or from your students.
3. Compare your observations with other delegates on your table.



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Activity 2 – Looking at Assessment Objective Grids

Purpose:

- Look at how papers are designed to examine the assessment objectives
- Look at how papers are designed to examine the specification content
- Look at how papers are designed to examine across the grade range
- Assign assessment objectives, specification content and target grade to items

Task 1

1. Look at the June 2019 paper 1B.
2. Now for all items in Questions 2, 3, 4 and 5 classify these in terms of:
 - Content or specification reference
 - Assessment Objective
 - Target grade
 - Question type
 - Compare your answers to those of other delegates

Biology Paper 1B													
Q	Total marks (110)	Spec ref	AO1 (44±2)	AO2 (44±2)	AO3 (22±1)	Grade 1-3 (30)	Grade 4-6 (40)	Grade 7-9 (40)	Maths skill ref	Maths (11)	Recall (16)	MCQ/Objective (6 to 10)	Question Type
1 b i	1	2.4	1			1							
1 b ii	3	2.21	3			1	2						
1 c	2	2.3	2				2						
2 a													
2 b													
2 c i													
2 c ii													
2 d													
3 a													
3 b													
3 c													
4 a													
4 b													
5 a													
5 b i													
5 b ii													
5 b iii													
5 c i													
5 c ii													



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Activity 3 – Assessment Objective 1 Looking at student responses

Purpose:

- Look at student responses to AO1 items from June 2019 paper 1B
- See how assessment objective is examined
- Appreciate how differences in candidate responses result in different marks
- Understand how mark scheme is applied

Task 1

1. Look at Question 3b.
2. Without reference to published mark scheme rank order samples A–D.
3. Compare your order with other delegates.
4. Now use published mark scheme to mark samples A–D.
5. Compare your marks with those of other delegates.

Question 3b

Sample A

(b) Explain why the energy in the mud worms is not all transferred to the organisms that eat them.

(4)

Some energy is lost in heat as the organisms may heat up their surrounding. Some energy is used in kinetic energy as the energy used to eat the organisms is being lost also.



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Sample B

(b) Explain why the energy in the mud worms is not all transferred to the organisms that eat them.

(4)

There are several reasons, firstly, ~~when you eat~~ some of the energy is used for respiration, some is lost ~~through~~ through excretion and mostly egestion, meaning the energy is not being used, finally, some is used in the body for life processes such as growth. Moreover, some of the energy is used ~~the~~ lost in egestion and excretion because the body cannot convert it and growth and movement require energy to happen.

Sample C

(b) Explain why the energy in the mud worms is not all transferred to the organisms that eat them.

(4)

As they may not eat all of the mudworm, they also may egest some of it in their faeces. Also they may use some of the energy ~~to respire~~ ~~to~~ to move around, or lose it keeping themselves warm. Finally they may also use the energy for metabolic processes such as digestion.



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Sample D

(b) Explain why the energy in the mud worms is not all transferred to the organisms that eat them.

(4)

they lose ~~energy~~ energy through respiration, they
eject and excrete a lot of what they eat, the organisms
eating them may not eat all of them therefore not getting
as much energy from them and they will not be able to obtain
all the energy they can whilst digesting the mud worm. Because
of this only about 10% of the energy will be transferred to
the next trophic level.



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Activity 4 – Assessment Objective 1 Looking at student responses

Purpose:

- Look at student responses to AO1 items from June 2019 paper 1B
- See how assessment objective is examined
- Appreciate how differences in candidate responses result in different marks
- Understand how mark scheme is applied

Task 1

1. Look at Question 9b.
2. Without reference to published mark scheme rank order samples A–D.
3. Compare your order with other delegates.
4. Now use published mark scheme to mark samples A–D.
5. Compare your marks with those of other delegates.



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Question 9b

Sample A

(b) Water pollution can occur if sewage enters a river.

Explain the biological consequences of sewage pollution on a river ecosystem.

(6)

when
Sewage pollution releases toxic waste
into rivers the wildlife fish and
inhabitants of the water get sick because
of all bacteria. sewage pollution also
damages the under water plants as there
will be less oxygen in the river. However
some sewage pollution can be used as
a fertilizer for the plants and help it
grow. Also the bacteria in the sewage
pollution will eat on the plant and
animals. Also the nutrients in the
sewage enter the river and Eutrophication
happens.



Pearson

Sample B

(b) Water pollution can occur if sewage enters a river.

Explain the biological consequences of sewage pollution on a river ecosystem.

(6)

A river being contaminated by sewage can lead to eutrophication and problems throughout a river ecosystem. Sewage contains human waste such as faeces and urine. These contain bacteria and can lead to disease affecting organisms in a river's ecosystem. The sewage could kill organisms by them eating it or getting ill (animals) or by the sewage blocking sunlight from the river meaning that the plants can't photosynthesise and die as they can't survive without food (glucose). This would also mean that fish could die as all of the oxygen has been used by the plants so there's none left for the animals to use in respiration. However the sewage may also contain nutrients which could be used by algae (for example) to grow again leading to it blocking out the sun resulting in the death of organisms and an unbalanced food chain.

(Total for Question 9 = 9 marks)



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Sample C

(b) Water pollution can occur if sewage enters a river.

Explain the biological consequences of sewage pollution on a river ecosystem.

(6)

- Sewage pollution on a river causes eutrophication.
- The sewage carries excess phosphates and nitrates into the water, increasing the number of bacteria.
- This increases algae growth.
- Algal bloom forms, which reduces the light penetration for other larger plants, meaning they can't photosynthesise so they die.
- The death of these plants increases the build up of detritus, as well as removing food sources for fish.
- The detritus build up causes an increase in the number of ~~anaerobic~~ aerobic bacteria.
- These bacteria reduce the oxygen availability for other organisms, meaning the organisms can't respire, therefore killing them.
- Eventually, the water becomes anoxic, and no other organisms can live there, so species diversity decreases.



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Activity 5 – Assessment Objective 2 Looking at student responses

Purpose:

- Look at student responses to AO2 items from June 2019 paper 1B
- See how assessment objective is examined
- Appreciate how differences in candidate responses result in different marks
- Understand how mark scheme is applied

Task 1

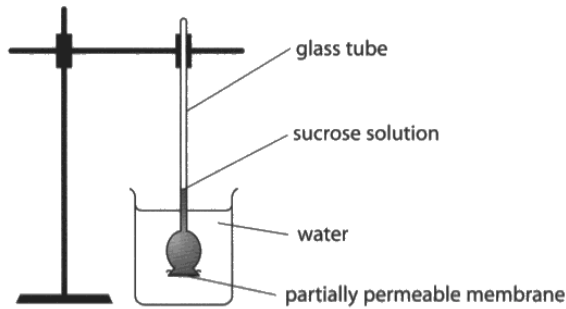
1. Look at Question 4a.
2. Without reference to published mark scheme rank order samples A–D.
3. Compare your order with other delegates.
4. Now use published mark scheme to mark samples A–D.
5. Compare your marks with those of other delegates.



Pearson

Sample A

4 This apparatus can be used to show osmosis.



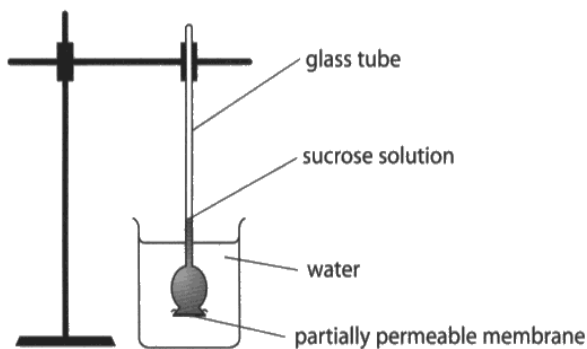
(a) Explain what happens to the level of the sucrose solution in the glass tube.

(3)

The sucrose solution will pass through the partially permeable membrane and disperse into the water of lower concentration through osmosis.

Sample B

4 This apparatus can be used to show osmosis.



(a) Explain what happens to the level of the sucrose solution in the glass tube.

(3)

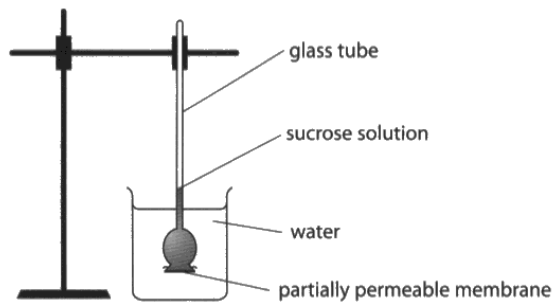
As the water has a higher water potential than the sucrose solution the water would move (through the partially permeable membrane) down the water potential gradient by osmosis into the ~~sucrose~~ sucrose solution. The level of the solution would actually increase as although the amount of sucrose is the same there would be more water and so a larger volume inside the glass tube.



Pearson

Sample C

4 This apparatus can be used to show osmosis.



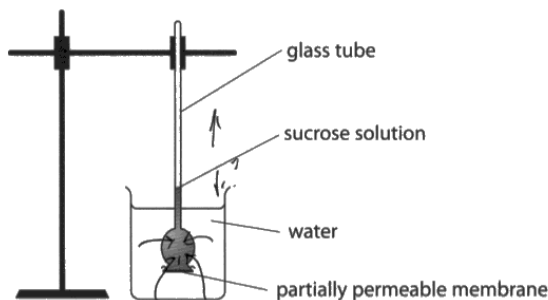
(a) Explain what happens to the level of the sucrose solution in the glass tube.

(3)

The level of the sucrose solution in the glass tube will decrease because the sucrose solution has a higher water potential than the water. Osmosis is the movement of water molecules from an area of higher water potential to an area of lower water potential across a partially permeable membrane. The ~~sucrose~~ solutions will have the same water potential after the water and sucrose solution have mixed. The sucrose molecules will move across the partially permeable membrane into the water.

Sample D

4 This apparatus can be used to show osmosis.



(a) Explain what happens to the level of the sucrose solution in the glass tube.

(3)

It will rise. This is because the sucrose solution has a lower water potential (w.p) than the surrounding water in the beaker. The water goes into the solution via osmosis and so increases the volume of the solution, making the level rise.



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Activity 6 – Assessment Objective 2 Looking at student responses

Purpose:

- Look at student responses to AO2 items from June 2019 paper 1B
- See how assessment objective is examined
- Appreciate how differences in candidate responses result in different marks
- Understand how mark scheme is applied

Task 1

1. Look at Question 5b(iii).
2. Without reference to published mark scheme rank order samples A–D.
3. Compare your order with other delegates.
4. Now use published mark scheme to mark samples A–D.
5. Compare your marks with those of other delegates.



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Sample A

- (iii) The student measures the distance moved by the coloured liquid and converts this to volume of oxygen absorbed.

The volume of oxygen absorbed can be calculated using the formula

$$\text{volume} = \pi \times \text{radius}^2 \times \text{distance}$$

Calculate the volume of oxygen absorbed when the coloured liquid moves a distance of 6.0 mm.

0.6 cm
[diameter of tube = 1.0 mm]
0.1 cm

(3)

$$\pi \times 0.5^2 \times 0.6 =$$

$$\text{volume} = 4.71 \times 10^{-3} \text{ cm}^3$$

Sample B

- (iii) The student measures the distance moved by the coloured liquid and converts this to volume of oxygen absorbed.

The volume of oxygen absorbed can be calculated using the formula

$$\text{volume} = \pi \times \text{radius}^2 \times \text{distance}$$

Calculate the volume of oxygen absorbed when the coloured liquid moves a distance of 6.0 mm.

[diameter of tube = 1.0 mm]

(3)

$$\begin{aligned} &\pi \times 0.5^2 \times 6.0 \\ &= \frac{3}{2} \pi \\ &= 4.71 \text{ (7.5.8)} \\ &= 0.471 \text{ (mm}^3\text{ cm)} \end{aligned}$$

$$\begin{aligned} &0.00471 \\ &\text{volume} = 4.71 \times 10^{-3} \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} &\pi \times 0.05^2 \times 0.6 \\ &= 4.71 \times 10^{-3} \\ &= 0.00471 \end{aligned}$$



Pearson

Sample C

- (iii) The student measures the distance moved by the coloured liquid and converts this to volume of oxygen absorbed.

The volume of oxygen absorbed can be calculated using the formula

$$\text{volume} = \pi \times \text{radius}^2 \times \text{distance}$$

Calculate the volume of oxygen absorbed when the coloured liquid moves a distance of 6.0 mm.

[diameter of tube = 1.0 mm]

(3)

$$\pi \times 0.5 \text{ mm} \times 6 \text{ mm}$$

or

$$0.05 \text{ cm} \times 0.6 \text{ cm}$$

$$\pi \times 0.05^2 \times 0.6$$

$$\text{volume} = \frac{4.71 \times 10^{-3} \text{ cm}^3}{(3 \text{ s.f.})}$$

Sample D

- (iii) The student measures the distance moved by the coloured liquid and converts this to volume of oxygen absorbed.

The volume of oxygen absorbed can be calculated using the formula

$$\text{volume} = \pi \times \text{radius}^2 \times \text{distance}$$

Calculate the volume of oxygen absorbed when the coloured liquid moves a distance of 6.0 mm.

[diameter of tube = 1.0 mm]

(3)

$$\pi \times 0.5^2 \times 6$$

$$\text{volume} = \frac{4.71 \text{ cm}^3}{(3 \text{ s.f.})}$$



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Activity 7 – Assessment Objective 3 Looking at student responses

Purpose:

- Look at student responses to AO3 items from June 2019 paper 1B
- See how assessment objective is examined
- Appreciate how differences in candidate responses result in different marks
- Understand how mark scheme is applied

Task 1

1. Look at Question 4b.
2. Without reference to published mark scheme rank order samples A–D.
3. Compare your order with other delegates.
4. Now use published mark scheme to mark samples A–D.
5. Compare your marks with those of other delegates.

Sample A

(b) Describe how this apparatus could be modified to measure the rate of osmosis at different temperatures.

(3)

Use multiple water beakers and place each one in a different water bath, at different temperatures (5°C apart). Place the glass tube into the water beaker as before and record the time it takes for the concentration gradient to balance, using a stop watch.



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Sample B

(b) Describe how this apparatus could be modified to measure the rate of osmosis at different temperatures.

(3)

The apparatus could be modified by putting the visking tube into a water bath at different temperatures, increasing it by 10°C each time. The ~~time~~ time should be measured for how long it takes for the level of solution to rise to a certain point, the higher the temperature the faster the level rises.

Sample C

(b) Describe how this apparatus could be modified to measure the rate of osmosis at different temperatures.

(3)

The beaker could be replaced by a water bath, with a thermometer to control the temperature. The time taken for the meniscus level to rise under a range of temperatures could be recorded. We could measure how long it takes for the solution to reach a certain height, which can be measured using a ruler. We would also need a stop watch to record the time.



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Sample D

(b) Describe how this apparatus could be modified to measure the rate of osmosis at different temperatures.

(3)

Use a water bath to heat the water at different temperatures (Water temperature is independent variable), then at different water temperatures measure how long it takes (using a stopwatch) for the sucrose solution to rise to a desired point (use a ruler to measure the change in height), then repeat at different temperatures and make sure to keep same concentration and volume of sucrose solution in the tube.



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Activity 8 – Assessment Objective 3 Looking at student responses

Purpose:

- Look at student responses to AO3 items from June 2019 paper 1B
- See how assessment objective is examined
- Appreciate how differences in candidate responses result in different marks
- Understand how mark scheme is applied

Task 1

1. Look at Question 10c.
2. Without reference to published mark scheme rank order samples A–D.
3. Compare your order with other delegates.
4. Now use published mark scheme to mark samples A–D.
5. Compare your marks with those of other delegates.

Sample A

(c) Plant growth substances stimulate root growth from a cut stem.

Describe an investigation to find the best concentration of plant growth substance to stimulate root growth.

You should include experimental details in your answer and write in full sentences.

(6)

CORMISS

Change the concentration of the plant's growth substance during the experiment in different tests. Use a plant e.g. daisy or some type of tree. Use the same species of plant every time during the test to make it fair. Measure the amount grown by the plant in the same time period each in each test. Compare the results and measure the difference. Repeat and take average of experiment. The concentration that has the most root growth is the best one.



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Sample B

(c) Plant growth substances stimulate root growth from a cut stem.

Describe an investigation to find the best concentration of plant growth substance to stimulate root growth.

You should include experimental details in your answer and write in full sentences.

(6)

~~Place 4~~ ⁴ cut stems from the same plant ^{and place them in} 4 separate pots in soil. The plant species should be the control variable as well as the length of the cut stem. Then get 4 separate plant growth substances with different concentrations (for example 1%, 5%, 10% and 20%) this will be ~~the~~ ^{one} independent variable. Then use ~~the~~ ^{one} plant growth substance on one of the ~~plant cut~~ stems. ^{Label which one was used for which stem.} ~~each for a different one~~. Then the others on plant growth substances on the other stems. Place all 4 stems in the same place with the same temperature, access to sunlight and amount of water given. These are all control variables. Then wait 30 days and see which stem has caused the longest root growth. Record your results and repeat to get accurate results and see which concentration ~~has the best~~ stimulates root growth the best.

(Total for Question 10 = 11 marks)

TOTAL FOR PAPER - 110 MARKS



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Sample C

(c) Plant growth substances stimulate root growth from a cut stem.

Describe an investigation to find the best concentration of plant growth substance to stimulate root growth.

You should include experimental details in your answer and write in full sentences.

(6)

Take 5 different stem cuttings all from the same plant. * Use 5 different concentrations of plant growth substances with the same difference in concentration between them. Then leave them to grow for a set period of time e.g. 5 days. You should keep all of the other variables the same like the same light, same ^{conc} volume of water, same temperature. Then after the period of time remove the stems from the plant growth substance and reweigh them. The heaviest plant has had the highest root growth. You should then repeat your experiment and plot your results on a graph.

* They should all be the same weight as well.



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Sample D

- (c) Plant growth substances stimulate root growth from a cut stem. CORMS

Describe an investigation to find the best concentration of plant growth substance to stimulate root growth.

You should include experimental details in your answer and write in full sentences.

(6)

~~change the concentration of plant growth substance each time~~

Change the concentration of plant growth substance each time as the independent variable. Measure the root growth at each different concentration. Use the same species of plant, the same soil, the same temperature, the same water availability and the same age of plant. Repeat the experiment for more accurate results.



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PERSONAL LEARNING

Things to do:

-
-
-
-
-

Things to avoid

-
-
-
-
-

Your ideas: