OCR GCSE GATEWAY BIOLOGY A · J247

BIOLOGY



EXAM QUESTION PACK

WS1.1 DEVELOPMENT OF SCIENTIFIC THINKING

SCORE	PERCENTAGE
/45	%

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Gateway Biology A (9-1)

Development in scientific thinking

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:
Additional resources may be supplied with this paper.

Other materials required:
- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **45**.
- The total number of marks may take into account some 'either/or' question choices.

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1 A student models the process of mitosis using cookies and sprinkles.



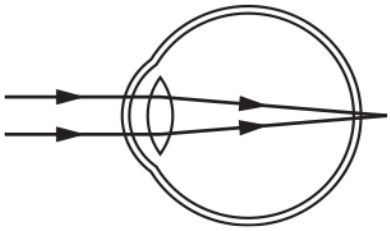
Mitosis is part of the cell cycle.

Which part of the cell cycle has the student modelled?

A Cell division
B Chromosome movement
C DNA replication
D Growth of cell

Your answer ☐ [1]

2 Look at the diagram showing an eye defect.



What is the defect and which lens could be used to correct it?

A Long-sightedness, corrected with a concave lens
B Long-sightedness, corrected with a convex lens
C Short-sightedness, corrected with a concave lens
D Short-sightedness, corrected with a convex lens

Your answer ☐ [1]

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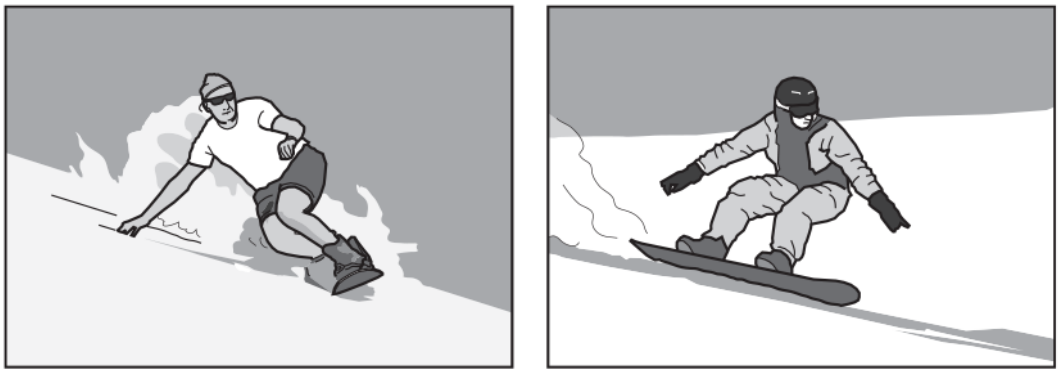
(i) Explain why overheating of the body may stop chemical reactions in cells.

---

[2]

(ii) * Look at **Fig. 20.2** which shows two people riding on boards.

Person A is riding a board on sand in a hot desert. **Person B** is riding a board on snow.



Person A Person B

Fig. 20.2

Explain the different problems of temperature regulation for these two people and give examples of the ways their bodies solve these problems.

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[6]

4 Many types of cancer have been linked to certain genes.

Scientists are trying to find ways to change the genes in embryos to reduce the risks of cancer.

(i) What name is given to the process scientists use to change the genes of an organism?

[1]

(ii) Write down **one** reason why some people disagree with the process given in **(i)**.

[1]

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5 A student models the process of mitosis using cookies and sprinkles.



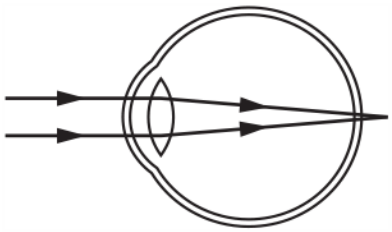
Mitosis is part of the cell cycle.

Which process in the cell cycle has the student modelled?

A Cell division
B Chromosome movement
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Your answer ☐ [1]

6 Look at the diagram showing an eye defect.



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Your answer ☐ [1]

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7 In people with multiple sclerosis their immune cells stop working as they should. HSCT is a treatment for multiple sclerosis which destroys all the immune cells.

Once the immune cells are destroyed, cells from a patient's bone marrow can replace the immune cells.

What type of cell is used to replace the destroyed immune cells?

A Neurone cell
B Red blood cell
C Stem cell
D White blood cell

Your answer ☐ [1]

8 A side effect of some antibiotics is to inhibit the release of thyroxine into the blood.

What will these antibiotics do to levels of TSH and TRH?

A Both decrease
B Both increase
C Both stay the same
D TSH increases and TRH decreases

Your answer ☐ [1]

9(a) Carolina horsenettle is a weed that grows in crop fields in the USA.

New horsenettle shoots develop from buds on roots in spring. The shoots die in the autumn but the roots remain alive under the ground.

Effective weed control involves stopping seed production and killing the root system.

Selective herbicides are used to control Carolina horsenettle.

The best time to apply selective herbicide is when the horsenettle is actively growing between the bud and flower stage.

(i) Describe how a selective herbicide works.

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[2]

(ii) **Fig. 20.1** and **Table 20.1** show information about four different herbicides **A, B, C** and **D**.

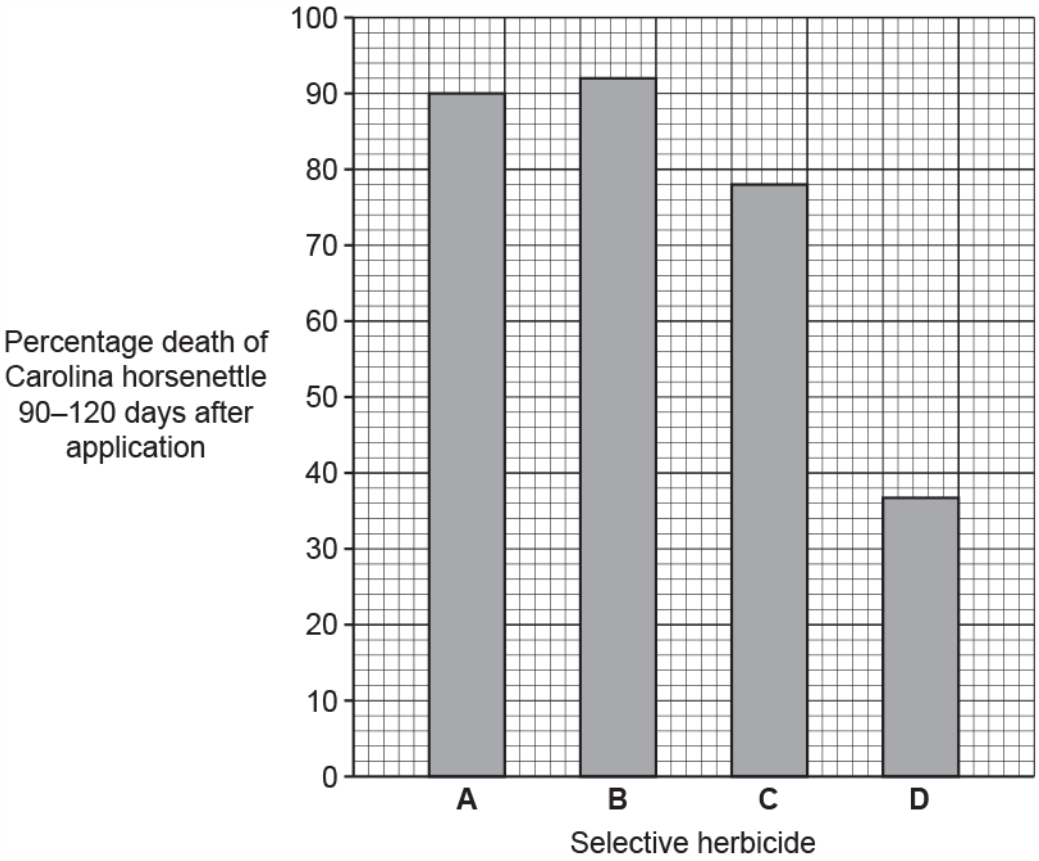


Fig. 20.1

Selective herbicide	A	B	C	D
Effect on Carolina horsenettle	prevents seeds and roots of plants growing	prevents seeds and roots of plants growing	prevents seeds and roots of plants growing	prevents shoot growth and fruiting but minimal damage to roots
What plants herbicide works on	Carolina horsenettle	Carolina horsenettle and several other broad-leaved plant	Carolina horsenettle	Carolina horsenettle and most other broad-leaved plant

		species		species
Cost of herbicide	medium	high	medium	low

Table 20.1

Carolina horsenettle is growing in a field with a crop and other broad-leaved weeds.
Evaluate the information on selective herbicides **A, B, C** and **D**.

Which selective herbicide would be best to use and when it should be applied?
Explain your decision.

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[4]

(b)

(i) Describe **one** effect that gibberellin hormones have on plants.

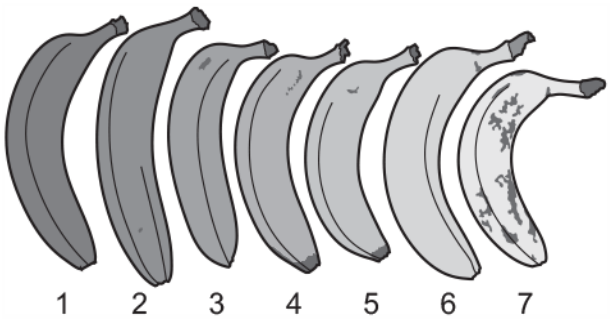
[1]

(ii) A student investigates ripening in bananas.

The student keeps bananas in different conditions. After 1 week he decides if each banana was **ripe** or **not ripe**.

The results were difficult to interpret so he planned to develop the experiment.

He found a picture that he thought he could use.



Explain how this could help develop his experiment.

[2]

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10 Large quantities of one type of antibody can be made by the process shown in **Fig. 20.2**.

These antibodies are called monoclonal antibodies.

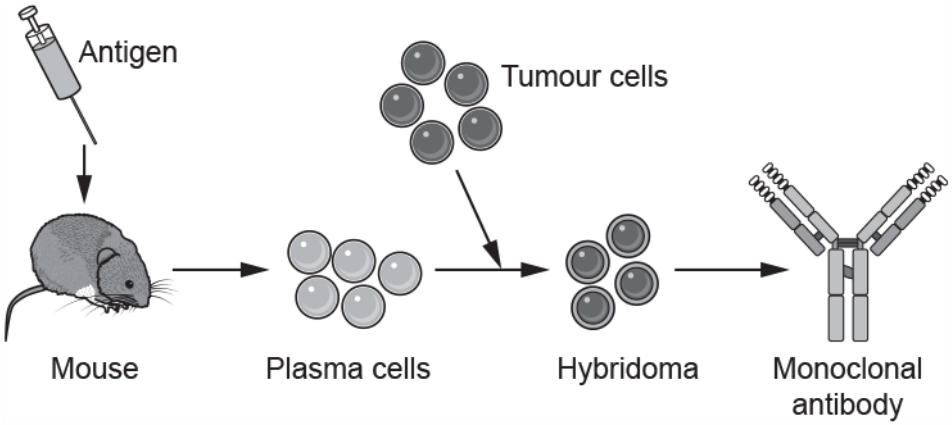


Fig. 20.2

Two scientists discovered a different method of making monoclonal antibodies.

They put genes that code for many different antibodies into viruses. The viruses then make the antibodies on their surfaces.

If an antigen attaches to an antibody, the scientists use the gene for this antibody to genetically engineer bacteria. The bacteria are then used to make large quantities of the antibody.

(i) Describe how scientists could use the antibody gene to genetically engineer bacteria to make many copies of the antibody.

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[4]

(ii) Many people would prefer to use antibodies made using bacteria and viruses, rather than the method shown in **Fig. 20.2.**

Suggest an explanation for this.

[2]

(iii) In 2018, the scientists were awarded the Nobel Prize for their work.

Explain why their work had to be peer reviewed before they were awarded the prize.

[2]

11(a) Scientists investigate antibiotic pollution in two different lakes.

They collect samples of water from the two lakes. The scientists then use aseptic techniques to investigate how resistant the bacteria in the water are to antibiotics. **Fig. 22.2** shows the apparatus they use.

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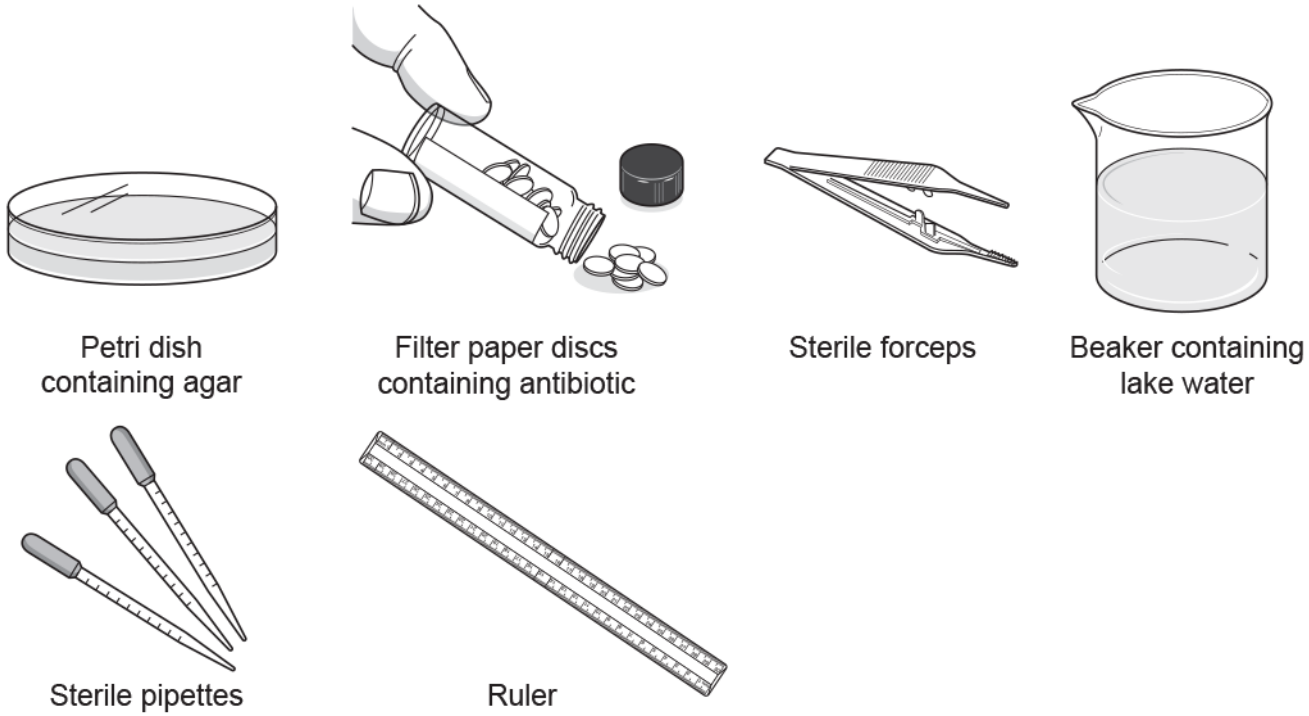


Fig. 22.2

Describe how the scientists could use **this** apparatus to **measure** how resistant the bacteria are to antibiotics.

---

[4]

(b) The scientists also counted how many species of bacteria were resistant to antibiotics and how many species of bacteria were killed by antibiotics.

The scientists found these results.

	Number of different species of bacteria	
	In Lake Bellandur	In Lake Jakkur
Resistant to antibiotics	53	35
Killed by antibiotics	28	37

Which lake has the **highest** levels of antibiotic pollution?

Tick (✓) **one** box.

Lake Bellandur ☐

Lake Jakkur ☐

Explain your answer.

---

[2]

12(a) Scientists investigate antibiotic pollution in two different lakes.

They collect samples of water from the two lakes. The scientists then use aseptic techniques to investigate how resistant the bacteria in the water are to antibiotics. **Fig. 16.2** shows the apparatus they use.

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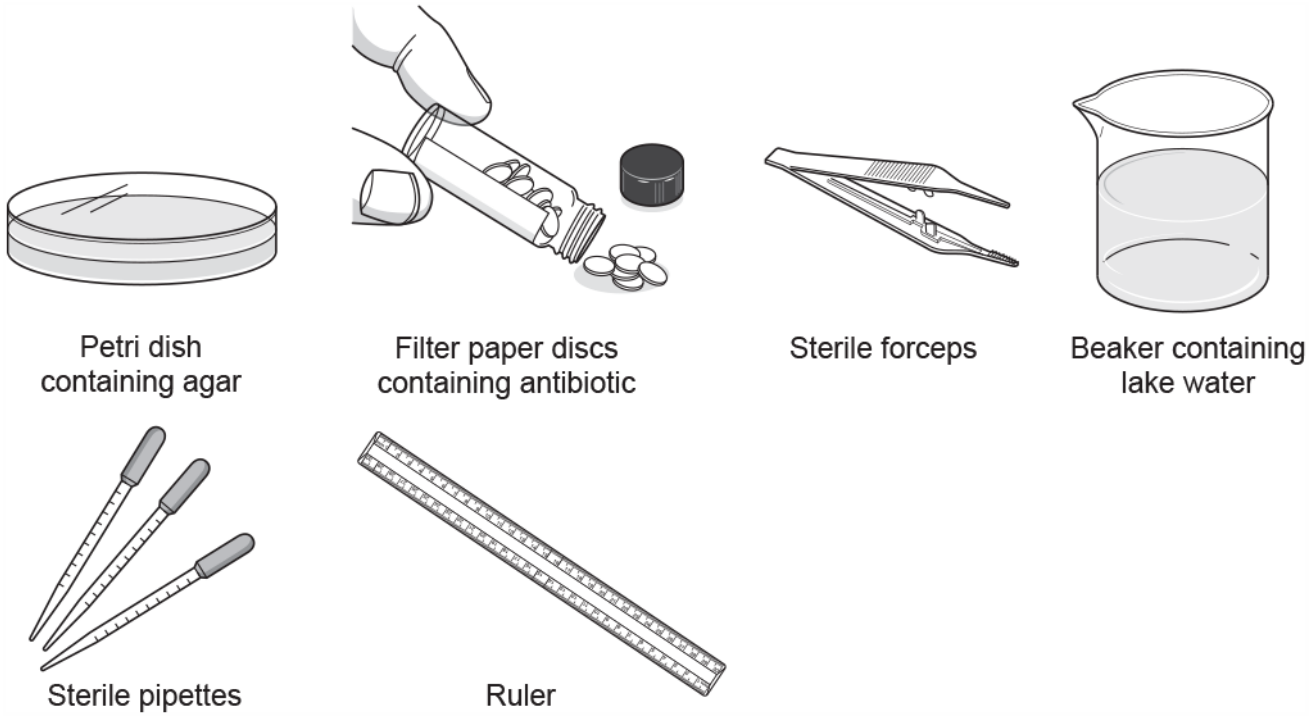


Fig. 16.2

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Lake Bellandur ☐

Lake Jakkur ☐

Explain your answer.

---

[2]

END OF QUESTION PAPER

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