Pearson Edexcel

Additional Assessment Materials Summer 2021

Pearson Edexcel GCSE in Biology (1BI0) Foundation

Resource Set Topic 4: Natural Selection and Genetic Modification

Questions

(Public release version)

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Additional Assessment Materials, Summer 2021

General guidance to Additional Assessment Materials for use in 2021

Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an **optional** part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

7 (a) The human population is increasing, so more food needs to be produced.

Farmers use fertilisers to increase the yield of wheat.

A farmer wants to find out the optimum concentration of fertiliser to use on his wheat plants.

He has a stock solution of concentrated fertiliser which is stated as 100%.
He dilutes the stock solution to make 5%, 10%, 15% and 20% solutions.

He makes 100 cm^3 of each solution.

(i) Describe how the farmer prepares 100 cm^3 of the 20% solution.

(2)

- 80 cm^3 of water
- 20 cm^3 of 100% fertiliser
- added together

(ii) The farmer has 60 wheat plants.
Each plant is 20 mm in height.

Devise a plan to find the optimum percentage solution of fertiliser for the growth of these wheat plants.

(3)

- divide wheat plants into equal sized groups
- add different fertiliser solution to each group
- measure height of plants after a period of time & calculate mean increase
- optimum fertiliser concentration is the weakest solution that allows for maximum average growth

(iii) The farmer improves this plan by controlling all the variables.

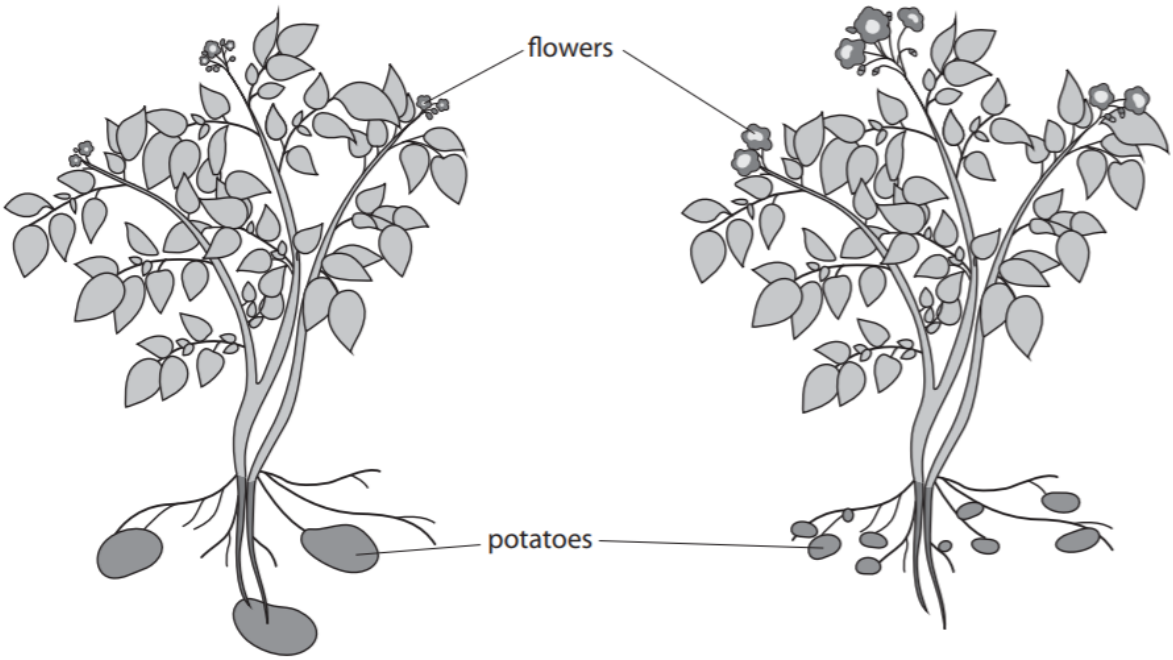
State **one** variable that the farmer should control when growing these wheat plants.

(1)

type of wheat plants

9.

*(b) Figure 14 shows two varieties of potato plant.



Variety A

- large potatoes
- few potatoes
- slow growing plant

Variety B

- small potatoes
- many potatoes
- fast growing plant

Figure 14

New varieties of potato plant can be produced by selective breeding.

Explain how selective breeding of the two varieties of potato plants can produce new potato plants that are all faster growing and produce many, large potatoes.

(6)

- select variety A as it has large potatoes
- select variety B as fast growing and produces many potatoes
- crossbreed A with B
- transfer pollen from A to B
- grow new plants
- select offspring with desired characteristics
- repeat process over many generations
- until all offspring show desired characteristics

4.

(d) Some crop plants have been genetically engineered to produce toxic chemicals in their leaves.

Explain **one** advantage of producing these genetically modified crop plants.

(2)

- all crop plants consist of desired characteristics
- more yield so brings more profit to famers
- more food resources to people

9.

*(c) Figure 15 shows three stone tools found in different layers of rock.

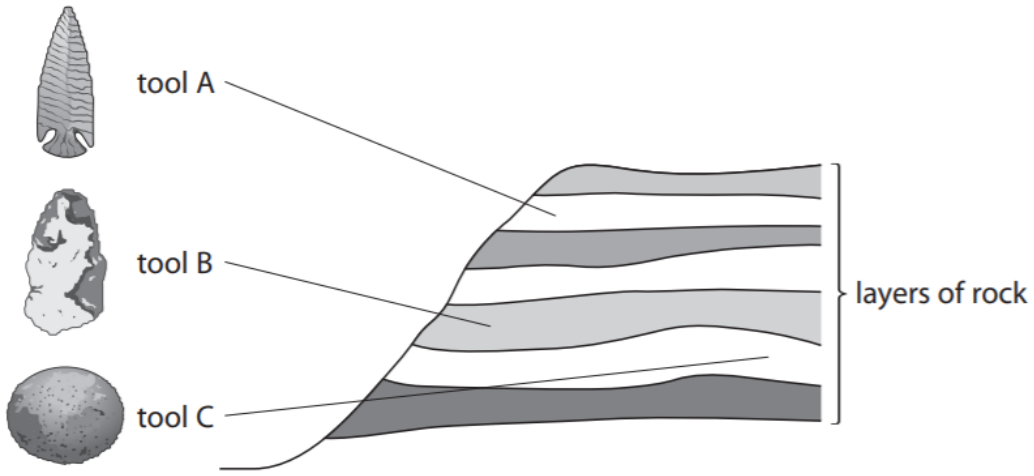


Figure 15

Explain how information from Figure 15 provides evidence for human evolution.

(6)

- bottom layer of rock represents the oldest days where tool C is found
- tool C is basic and round so the time when humans least evolved
- second layer is where tool B is found
- tool B is more refined, showing that humans have evolved as taking advantage of its shape
- first layer where tool A found
- tool A is the best refined weapon used by humans as they know exact form required for hunting thus most evolved
- going up the layer more recent it is as sediments & old unused tools build up first

3 (a) Figure 5 shows the area of land used to grow genetically modified (GM) crops worldwide from 2005 to 2014.

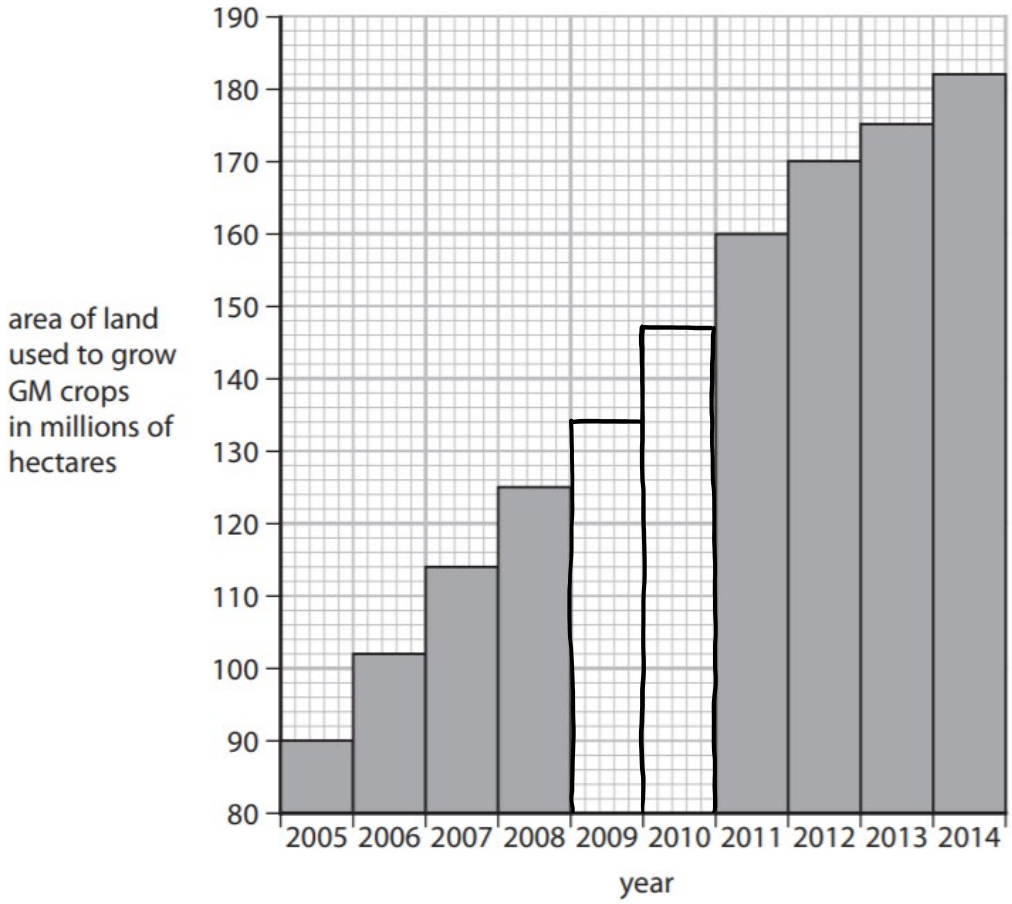


Figure 5

(i) In 2009, the area of land used was 134 million hectares and in 2010 the area of land was 147 million hectares.

Complete Figure 5 by drawing bars to show the area of land used in 2009 and 2010.

(2)

(ii) Describe the trend shown by the data in Figure 5.

(2)

- area of land used to grow GM crops in millions of hectares increases constantly every year from 2005 to 2014
- 92 increase in 9 years

(b) GM crops often produce a larger yield than non-GM crops.

Give **one** reason why this could reduce the destruction of forests.

(1)

- GM crops give better yields & grow faster
- no need for deforestation to make more farm lands to plant more crop seeds

(c) The ladybird is a predator.

Aphids are insect pests.

Figure 6 shows a ladybird feeding on aphids.

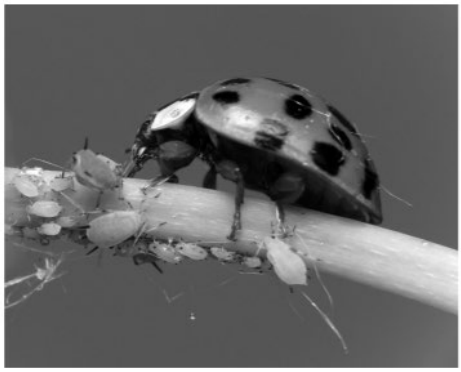


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Figure 6

(i) Using ladybirds to control insect pests is an example of

(1)

- ☐ **A** chemical control
- ☐ **B** enzyme technology
- ☒ **C** biological control
- ☐ **D** tissue culture

(ii) Explain **one** advantage of using predators to control insect pests.

(2)

- natural process
- reduces amount of insect pests so advantageous to farmers as help crops grow
- strengthens food chain by allowing predators to hunt

(d) Some crop plants are genetically modified to make them resistant to attack by insect pests.

State **one** disadvantage of genetically modified crop plants.

(1)

will all be susceptible to a type of pathogen so will all be killed and none will survive

5 (a) Farmers selectively breed chickens to produce larger chickens.

Figure 9 shows how the size of chickens has changed over time.

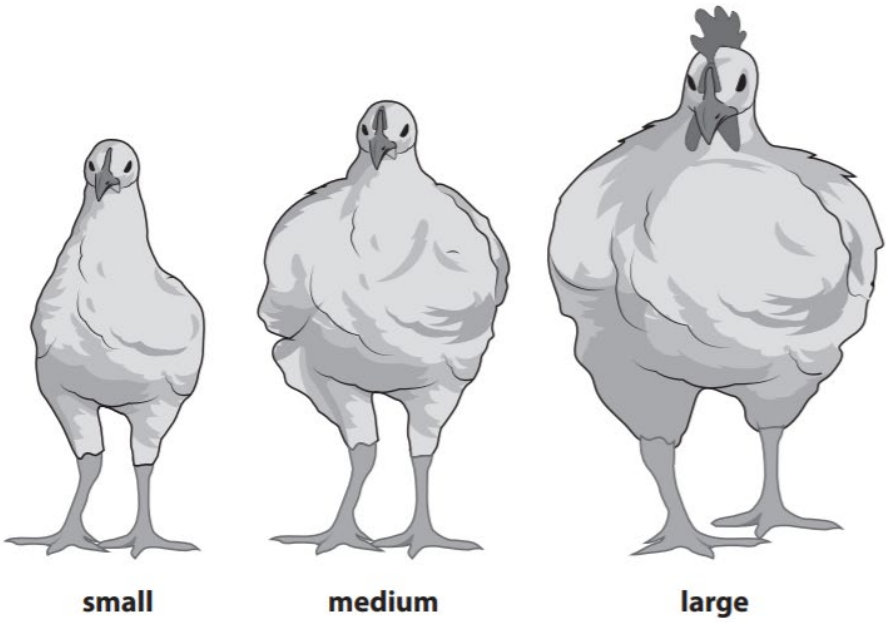

Figure 9

(i) Explain how farmers have used selective breeding to produce larger chickens.

(3)

- select chickens which are largest in size
- crossbreed them together
- grow new chicken offspring
- select offspring with desired characteristics
- repeat process over many generations
- until all offspring show desired characteristics

(ii) Describe **one** benefit and **one** risk of selectively breeding chickens.

(2)

benefit can have chickens of greater size so greater yield

risk will all be susceptible to a type of pathogen so will all be killed and none will survive

TOTAL = 34 MARKS