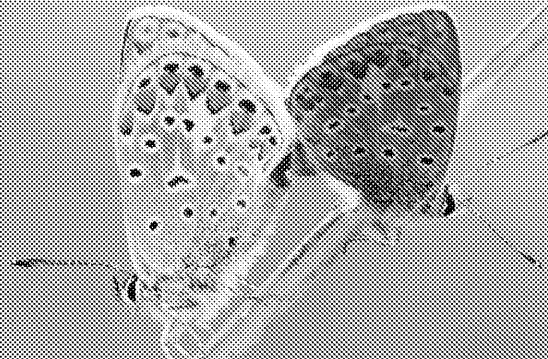




# Multiple-Choice Practice Questions

for GCSE (9–1) OCR Combined  
Science A (Biology) Topics B4–B6

Paper 2: Foundation

Paper 8: Higher

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# Teacher's Introduction

The OCR Gateway Combined Science A specification (J250) remains a popular choice for many schools and, in common with the assessment model chosen for all of OCR's Gateway subjects, has multiple-choice questions at the beginning of each exam paper.

## Remember!

Always check the exam board website for new information, including changes to the specification and sample assessment material.

While multiple-choice questions may be easy to mark for both teachers and examiners, students may find answering multiple-choice questions difficult if they (a) have not learnt and understood the topic, (b) do not fully read all answer stems, and (c) have not had sufficient opportunity to practise due to the limited number of suitable questions to use from past papers. Exam candidates may also think that they may be able to guess the correct answer or narrow it down to a couple of suitable answers, and this can lead to poor exam technique and preparation. The intention of this resource is to bridge the gap between the lack of sufficient multiple-choice questions currently available and the need to provide useful examples to prepare and train candidates and help them to gain marks in their GCSE exams.

OCR Gateway 9–1 Combined Science A (J250) has multiple-choice questions in both of its Biology exams: Papers 1 and 2 (Foundation tier) and Papers 7 and 8 (Higher tier). Papers 1 and 7 cover topics B1–3 and CS7 (practical skills), while Papers 2 and 8 cover topics B4–6 and CS7, with assumed knowledge of topics B1–3. The questions in this resource provide examples to allow learners to not only practise answering multiple-choice questions and check their answers, but also to understand why their answers may be correct or incorrect. This can correct misconceptions, identify gaps in students' knowledge and understanding, and highlight where their answer may just have been a lucky guess! **The questions in this pack are from topics B4, B5 and B6 – with related practical topics from CS7 – making it suitable preparation for Papers 2 and 8. Higher Tier questions are clearly marked.**

The format of the resource is two banks of multiple-choice questions covering the specification content. In Bank A, solutions include commentary explaining why each answer is either correct or incorrect. A bank of additional questions (without commentary) is provided in Bank B for further student practice.

## How to use this resource

In addition to the traditional use of multiple-choice questions in summative assessment, students could be given the questions in topic order to complete after revision, either simply to answer or to write a reason/justification for their final answer and why each answer stem is either correct or incorrect. The commentary for Bank A can help students to check their answers and reasoning, while the additional questions in Bank B could be used to check for progress and improvement after revision and practice. This will maximise the learning opportunities provided by this resource which is suitable for all candidates. It will stretch and challenge higher tier candidates and is easy to use by foundation tier candidates.

May 2023

## Topic 1: B4 Community-level

1 What is the definition of an ecosystem? 5 Which statement is correct?

- A** All of the living organisms and non-living, physical conditions in an area. ☐
- B** The variety of all the different species living in an area. ☐
- C** The organisms in an area. ☐
- D** The total number of organisms of each species in an area. ☐

2 Identify the correct statement:

- A** Predators are consumers while prey are producers. ☐
- B** Decomposers gain energy from dead material but can also make their own food when needed. ☐
- C** Plants and algae are producers because they make their own food through photosynthesis. ☐
- D** Fungi are producers because they make nutrients available for other organisms. ☐

- A** Krill  
**B** Krill  
**C** Phytoplankton  
**D** Chemosynthetic bacteria

3 Which of these statements describes biotic factors?

- A** The amount of rainfall and temperature in an ecosystem. ☐
- B** The physical factors in an ecosystem. ☐
- C** The non-living factors in an ecosystem. ☐
- D** The living factors in an ecosystem. ☐

- 6** Interdependence does this:  
**A** Herbivores eat plants.  
**B** Herbivores eat herbivores.  
**C** Herbivores eat omnivores.  
**D** The same omnivore eats both plants and herbivores.

4 Examples of abiotic factors that can affect plants are:

- A** Human activities such as habitat destruction. ☐
- B** The number of insects available for pollination. ☐
- C** The temperature and light intensity. ☐
- D** The number of primary consumers. ☐

- 7** Which of these is a biotic factor?  
**A** Temperature  
**B** Climate  
**C** Predators  
**D** Snow

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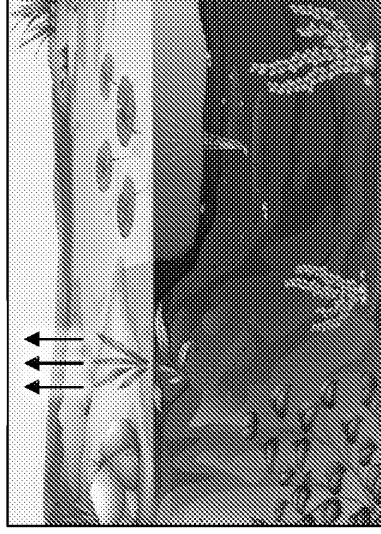


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- 8 An example of a predator–prey relationship is:
- A Birds and earthworms. ☐
  - B Humans and their gut bacteria. ☐
  - C Oxpecker birds and buffaloes. ☐
  - D Nitrogen-fixing bacteria and pea plants. ☐

- 9 Why is it important that carbon is cycled?
- A It is needed to make carbohydrates, fats, proteins and DNA. ☐
  - B Mammals inhale carbon dioxide. ☐
  - C Plants need carbon dioxide for respiration. ☐
  - D Combustion removes carbon dioxide from the atmosphere. ☐

10



During the water cycle, water moves through plants from the soil to the atmosphere (shown by the arrows). What is the name of this process?

- A Perspiration. ☐
- B Evaporation. ☐
- C Transpiration. ☐
- D Run-off. ☐

11 What do

- A Oxygen
- B Carbon
- C Oxygen
- D Nitrogen

12 Carbon

- A Respiration
- B Photosynthesis
- C Bacterial
- D Decomposition

13 What is

- A Egg
- B Egg
- C Egg
- D The

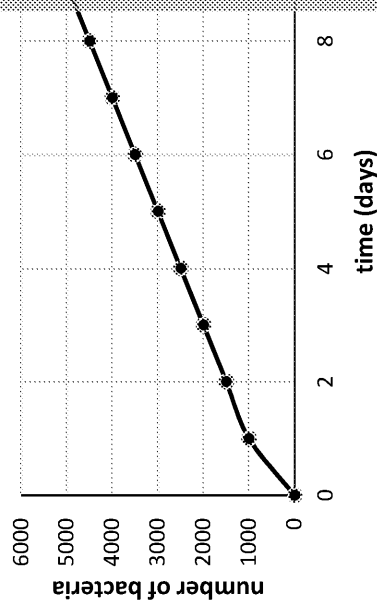
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- 14** How do decomposers gain the nutrients that they need to survive?
- A** They increase the surface area of the dead and decaying substances.
  - B** They have a large surface area to volume ratio.
  - C** They release enzymes to break down substances into substances that they can absorb.
  - D** They absorb the substances and then break them down using enzymes.

- 15** An apple of mass 25 g was left to decay for 14 days. By day 14, the mass of the apple had been reduced to 15 g. What is the rate of decay for the apple?
- A** 140 g/day
  - B** 0.7 g/day
  - C** 1.4 g/day
  - D** 0.1 g/day

**16**



- What is the rate of increase in the number of bacteria between day 4 and day 5 shown in the graph above?
- A** 571 bacteria per day.
  - B** 500 bacteria per day.
  - C**  $2 \times 10^{-3}$  bacteria per day.
  - D**  $1.82 \times 10^{-3}$  bacteria per day.

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# Topic 2: B5 Genes, inheritance

## B5.1 Inheritance

- 17 Which of these is an example of continuous variation?
- A A person's height. ☐
  - B A person's gender. ☐
  - C A person's eye colour. ☐
  - D A person's blood group. ☐

- 18 What is meant by the term 'phenotype'?
- A Whether an allele for a characteristic is dominant or recessive. ☐
  - B The different forms of a gene that exist for a characteristic. ☐
  - C The observable characteristics of an organism. ☐
  - D The combination of alleles present in an organism. ☐

- 19 Which statement about asexual reproduction is correct?
- A It requires two parents. ☐
  - B It produces new organisms that are genetically identical to the parent. ☐
  - C It produces new organisms that are genetically different from the parent. ☐
  - D It requires gametes. ☐

- 20 Which of these is an advantage of sexual reproduction?
- A Only one parent is needed. ☐
  - B The variation that is produced leads to adaptation in a species. ☐
  - C Reproduction is faster and many offspring are produced. ☐
  - D Only animals can do it. ☐

- 21 Which statement about a diploid cell is correct?
- A It contains the full chromosome number. ☐
  - B It contains half the chromosome number. ☐
  - C It is, for example, an egg cell. ☐
  - D It is a gamete. ☐

- 23 Gametes
- A Mitochondria ☐
  - B Messenger RNA ☐
  - C Haploid ☐
  - D Sex chromosomes ☐

24

- The diagram shows
- A Mitochondria ☐
  - B Messenger RNA ☐
  - C Haploid ☐
  - D Sex chromosomes ☐

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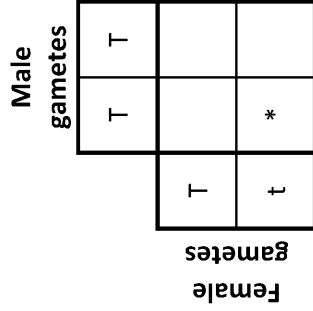
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- 25 Which of these statements is correct for a homozygous organism?
- A It has different versions (alleles) of a gene for a characteristic.
  - B It has only one allele of a gene.
  - C It has two copies of the same allele.
  - D It has a dominant allele and a recessive allele.

- 26 If the ability to roll your tongue is denoted by the symbol T, which of these statements is true?
- A You need to inherit a T allele to be able to roll your tongue.
  - B A person whose genotype is Tt will be unable to roll their tongue.
  - C The characteristic is said to be recessive.
  - D You need to inherit T alleles from both parents to be able to roll your tongue.

- 27 Which letters complete the missing box in the genetic diagram shown by the asterisk (\*) ?



- A TT
- B Tt
- C tt
- D T<sup>t</sup>

- ☐
- ☐
- ☐
- ☐

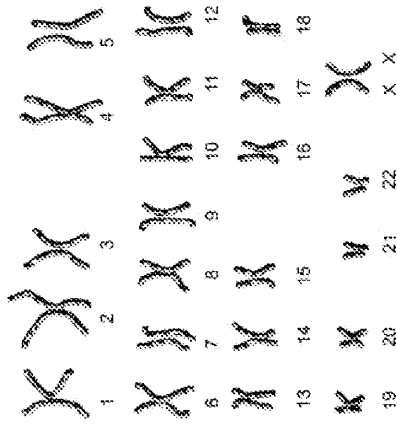
- 28 In the given diagram, the eyes and hair colour of the brown-eyed woman are

- A 50%
- B 4:0
- C 3:1
- D 1:3

- 29 Which of the following is a heterozygous genotype?
- A A bb
  - B A dd
  - C A cc
  - D A lll

- 30 Which of the following is a heterozygous genotype?
- A Mm
  - B Mm
  - C Mm
  - D Mm

- 31 Individuals with the following genotypes are heterozygous for the trait.
- A Hh
  - B Hh
  - C Hh
  - D Hh



Which of these statements is true about human males?

**A** They have one chromosome fewer than females.  
**B** They have two Y chromosomes.  
**C** They have two X chromosomes.  
**D** They have an X chromosome and a Y chromosome.

**33** A woman has given birth to four boys (separately). What is the probability of her next child being a boy?

**A** 100 %  
**B** 3 %  
**C** 50 %  
**D** 20 %

**34** A student read an article that said that there is one gene for each feature or characteristic, e.g. eye colour, hair colour and fingerprint. Why is this not true?

**A** Most visible features are the result of interaction of many genes, not just one.  
**B** There are no genes that determine eye colour.  
**C** Your eye colour is determined by your genes and the environment.  
**D** Hair colour can change as a person ages.

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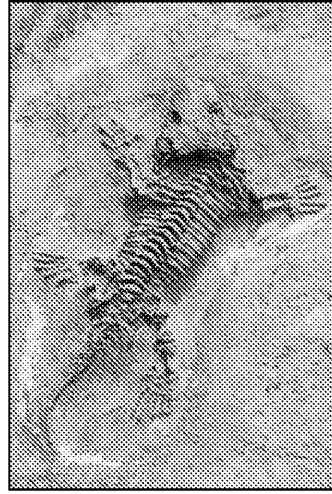


## B5.2 Natural selection and evolution

- 35** Evolution is defined as:
- A** The gradual change in a species over time. ☐
  - B** The deliberate breeding of plants or animals with certain desired characteristics. ☐
  - C** No longer happening and has finished. ☐
  - D** The same as natural selection. ☐

- 36** Which of these is an example of natural selection?
- A** The development of antibiotic-resistant bacteria. ☐
  - B** Increasing milk yields in certain breeds of cattle. ☐
  - C** Increase in life expectancy in the developing world. ☐
  - D** The reduction in children catching infectious diseases such as measles. ☐

**37**



Which of these statements explains why the fossil record provides evidence for evolution?

- A** Simple organisms tend to be found in older rocks and complex organisms tend to be found in younger rocks, suggesting that organisms develop in complexity. ☐
- B** Fossils are rare, so when they are found they provide reliable evidence. ☐
- C** It contradicts certain religious beliefs of some people. ☐
- D** A wide range of different plant and animal fossils have been found. ☐

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- 38** Which re in class
- A** King
  - B** Sp
  - C** King
  - D** King

- 39** Which e
- A** Gr in D
  - B** The
  - C** The
  - D** The

- 40** Identify
- A** Art into
  - B** Art
  - C** Art obs
  - D** Art DN

- 41** The def
- A** The of
  - B** Gr in D
  - C** Gr
  - D** The

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Darwin suggested that the Galápagos finches had different beak shapes. Which of these statements explains why?

- A** Mutations had altered their sizes and shapes.
- B** They had evolved to better exploit the food available.
- C** The finches with sharper beaks were able to fight more successfully.
- D** Random variation had occurred.

**43** Which row describes the correct sequence of events explaining how new species may be formed?

1. The populations adapt to different environmental conditions through natural selection.
2. Two populations of a species may become separated into two populations with different environmental conditions.
3. Differences between the two populations mean that they are unable to breed successfully with each other.
4. Two new species are the result.

**A** 1, 2, 3, 4

**B** 2, 1, 3, 4

**C** 2, 1, 4, 3

**D** 4, 3, 2, 1

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## Topic 3: B6 Global challenge

### B6.1 Monitoring and maintaining the environment

- 44 Which of these statements describes sampling?
- A Removal of plants or animals from an ecosystem. ☐
  - B Taking observations or measurements from a small area which is representative of a larger area. ☐
  - C Taking observations or measurements from a large area so measurements from a small area can be used. ☐
  - D Using keys to identify species in an ecosystem. ☐
- 45 Invertebrates may be sampled using which of the following?
- A Pooters, sweep nets, pitfall traps. ☐
  - B Quadrats, pooters, sweep nets, pitfall traps. ☐
  - C The capture-recapture method. ☐
  - D Branched or numbered identification keys. ☐
- 46 Why is random sampling used in investigations?
- A To prevent bias. ☐
  - B So that samples are taken at least 10 times. ☐
  - C To allow the type and number of organisms to be counted. ☐
  - D To count organisms that touch a line. ☐
- 47 Identify the median age of these people:
- 57 years, 57 years, 23 years, 24 years, 45 years,  
33 years, 52 years, 26 years, 32 years
- A 23 years. ☐
  - B 57 years. ☐
  - C 33 years. ☐
  - D 39 years. ☐
- 48 Identify
- A 66. ☐
  - B 66. ☐
  - C 66. ☐
  - D 66. ☐
- 49 This formula
- Using the
- 1<sup>st</sup> sample
- 2<sup>nd</sup> sample
- The population
- A 56 ☐
  - B 77 ☐
  - C 8 ☐
  - D 29 ☐
- 50 Why was
- A To ☐
  - B To ☐
  - C To ☐
  - D To ☐

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- 51** What is meant by the following statement?  
'The number of daisies < the number of dandelions.'
- A** The number of daisies is less than the number of dandelions. ☐
- B** The number of daisies is very much bigger than the number of dandelions. ☐
- C** The number of daisies is very much less than the number of dandelions. ☐
- D** The number of daisies is approximately equal to the number of dandelions. ☐
- 
- 52** Which of these describes what biodiversity means?
- A** The effects of deforestation. ☐
- B** All the living organisms in an area. ☐
- C** The range of living organisms present in an area. ☐
- D** The place in which organisms live. ☐
- 
- 53** Which of these are examples of human activity that can lead to a loss of habitat?
- A** Deforestation, use of pesticides and pollution. ☐
- B** Genetic engineering, removal of hedgerows and hunting. ☐
- C** Banning herbicide use and reducing light pollution. ☐
- D** Selective breeding, IVF and use of genetically modified organisms. ☐
- 
- 54** Which of these are techniques that can be used to prevent biodiversity loss?
- A** Ecotourism, acceptance of climate change, fundraising activities. ☐
- B** Deforestation, legal protection, captive breeding in zoos. ☐
- C** Genetic engineering, education and use of seed banks. ☐
- D** Conservation, selective breeding and use of seed banks. ☐
- 
- 55** The main aim of ecotourism is to:
- A** Let tourists see animals in natural surroundings. ☐
- B** Ensure that tourism does not have a harmful impact on the environment. ☐
- C** Bring money to poor people in developing countries. ☐
- D** Regulate the international trade in wild plants and animals. ☐

- 56** Which of the following is a type of pollution?
- A** Light ☐
- B** Noise ☐
- C** Internet ☐
- D** Air ☐
- 
- 57** A scientist is observing a pollutant in a river.
- A** The pollutant is a gas. ☐
- B** The pollutant is a liquid. ☐
- C** The pollutant is a solid. ☐
- D** The pollutant is a gas, liquid or solid. ☐

## B6.2 Feeding the human race

**58** Selective breeding involves several steps outlined below:

Step 1 – Select the offspring that show the best example of the characteristic and breed them together.

Step 2 – Choose the desired characteristic.

Step 3 – Repeat the steps over many generations.

Step 4 – Breed the parents together that show the desired characteristic

The correct sequence of steps is:

- A** 1, 2, 3, 4 ☐
- B** 4, 3, 2, 1 ☐
- C** 2, 4, 1, 3 ☐
- D** 2, 4, 3, 1 ☐

**59** Selective breeding has a number of disadvantages. Which of these is a disadvantage?

- A** The gene pool may be increased too much. ☐
- B** The gene pool may be reduced too much. ☐
- C** The gene pool may include new alleles. ☐
- D** Odd-looking plants and animals may be produced. ☐

**60** Which of these statements describes genetic engineering?

- A** Choosing which genes an organism has. ☐
- B** Switching off unwanted genes so they don't interfere. ☐
- C** Altering the genetic material in an organism to produce an organism's desired characteristics. ☐
- D** Selective breeding but with the involvement of scientists. ☐

**61** Bacteria may be genetically engineered to produce insulin. Why is this an example of genetic engineering?

- A** Bacteria don't naturally produce human insulin, so a gene is introduced. ☐
- B** The insulin bacteria produce is not normally human insulin. ☐
- C** The gene for producing insulin is switched on and off as required. ☐
- D** Bacteria that produce insulin are no longer harmful to humans. ☐

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**62** HT only

Certain  
What are

- A** Res
- B** Re
- C** Res
- D** Pla

**63** HT only

When 's  
produce  
pairing

- A**
- B**
- C**
- D**

**64** HT only

A gene fr  
enginee

- A** To
- B** To
- C** To
- D** To

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**65 HT only**

Vectors are used to genetically modify plants or animals. Which are examples of vectors?

- A** Viruses and restriction enzymes.
- B** Bacteria and restriction enzymes.
- C** Insects such as mosquitoes, and bacteria and viruses.
- D** Plasmids, bacteria and viruses.

**66**

What is the definition of biotechnology?

- A** Using machinery to increase agricultural yields.
- B** Scientists designing better crops.
- C** Using biological processes or living organisms to manufacture products.
- D** Science interfering with nature.

**67**

What is a GM crop?

- A** A genetically manipulated crop that has had undesirable characteristics removed.
- B** A genetically managed crop that has been selectively bred for desired characteristics.
- C** A genetically modelled crop that has been designed by scientists to produce maximum yields.
- D** A genetically modified crop that has had genes from other organisms transferred into it.

**68**

Which of these are benefits of gene technology in agriculture and which are risks?

- 1** crops that produce chemicals that kill pests
- 2** crops that can take in and store vast quantities of carbon dioxide to reduce the effects of climate change
- 3** possible health problems of GM foods
- 4** cross pollination of non-GM crops allowing new genes into GM crops
- A** Risks: 1 and 2; benefits: 3 and 4.
- B** Benefits: 1 and 2; risks: 3 and 4.
- C** Benefits: 1, 2 and 3; risks: 4.
- D** Benefits: 1, 2 and 4; risks: 3.

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### B6.3 Monitoring and maintaining

- 69** What is the definition of disease?
- A** Cell division out of control. ☐
- B** An unexpected change in DNA base sequence. ☐
- C** A condition caused by any part of a living organism not functioning properly. ☐
- D** A lack of complete physical, mental and social well-being. ☐

- 70** Which of these are examples of diseases caused by fungi?
- A** Flu and tobacco mosaic virus. ☐
- B** Athlete's foot and mildew. ☐
- C** Malaria and TB. ☐
- D** TB and a sore throat. ☐

- 71** What is another term for contagious diseases?
- A** Inherited diseases. ☐
- B** Lifestyle diseases. ☐
- C** Non-communicable diseases. ☐
- D** Communicable diseases. ☐

- 72** What is the definition of a pathogen?
- A** A bacterium that causes disease. ☐
- B** A microorganism that causes disease. ☐
- C** A vector that causes disease. ☐
- D** A gene that causes disease. ☐

- 74** How many people are expected to be prevented from dying by 2015?
- A** 3.9 million ☐
- B** 7.0 million ☐
- C** 70 million ☐
- D** 39 million ☐

- 75** Identify the disease that is not caused by a virus.
- A** HIV ☐
- B** HIV ☐
- C** HIV ☐
- D** HIV ☐

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76 Which of these is a symptom of crown gall disease?

- A Mottled or discoloured leaves. ☐
- B White powdery spots. ☐
- C Large tumour-like growths. ☐
- D Cracked, flaking and itching skin. ☐

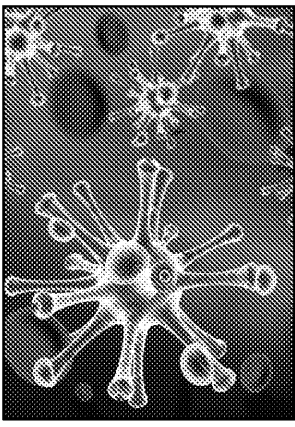
77 What are antigens?

- A Microorganisms that cause disease. ☐
- B Proteins on the surface of pathogens. ☐
- C Vectors that transfer pathogens from plant to plant. ☐
- D Examples of plant chemical defences. ☐

78 What do platelets do to help defend against disease?

- A They engulf microorganisms. ☐
- B They release chemicals that destroy bacteria. ☐
- C They help blood to clot and stop you losing too much blood. ☐
- D They help to seal a cut and prevent microorganisms from entering. ☐

79



Which type of cell are phagocytes an example of?

- A Platelets.
- B White blood cells.
- C Lymphocytes.
- D Lysozymes.

- ☐
- ☐
- ☐
- ☐

80 Identify

- A Phagocytes
- B Phagocytosis
- C Phagocytosis
- D Lymphocytes

81 Which mechanism

| Row |
|-----|
| A   |
| B   |
| C   |
| D   |

- A
- B
- C
- D

82 What is

- A A type of cell
- B An enzyme
- C An antibody
- D A virus

83 If you are

- A You are the same
- B You are the same
- C You are the same
- D You are the same

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- 84** How do antiseptics work?
- A** They destroy viruses by preventing them from replicating. ☐
- B** They have no effect on viruses or fungi. ☐
- C** They kill or neutralise pathogens without harming human tissue. ☐
- D** They selectively kill bacteria but have no effect on viruses. ☐
- 
- 85** Calculate the area of the zone of inhibition from a circle of radius 2 cm:
- A** 12.57 cm<sup>2</sup> ☐
- B** 6.28 cm<sup>2</sup> ☐
- C** 3.14 cm<sup>2</sup> ☐
- D** 1.57 cm<sup>2</sup> ☐
- 
- 86** What does the term 'aseptic' mean?
- A** Without risk to human life. ☐
- B** Without microorganisms. ☐
- C** Prevents growth. ☐
- D** Disinfected. ☐
- 
- 87** Which of these explains what is meant by preclinical testing of new drugs?
- A** Laboratory testing of new drugs. ☐
- B** Testing new drugs on people but not in hospitals. ☐
- C** Testing new drugs on people in hospitals. ☐
- D** Testing new drugs in healthy volunteers. ☐
- 
- 88** What is a placebo?
- A** An unwanted effect of a drug. ☐
- B** A substance with no active ingredient. ☐
- C** An alternative name for a double-blind trial. ☐
- D** A method to reduce the number of animals used to test drugs. ☐
- 
- 89** What happens during a double-blind test of new drugs?
- A** Patients receive double the dose of the new drug. ☐
- B** Nobody tested receives the new drug. ☐
- C** Neither the doctors nor the patients know who has received the drug. ☐
- D** Only the doctors know who has received the drug. ☐
- 
- 90** A die is thrown 100 times. The results are shown in the table below.
- | Number on die | Frequency |
|---------------|-----------|
| 1             | 15        |
| 2             | 10        |
| 3             | 12        |
| 4             | 8         |
| 5             | 10        |
| 6             | 15        |
- What is the probability of throwing a 3 or a 6?
- A** 0.1 ☐
- B** 0.2 ☐
- C** 0.3 ☐
- D** 0.4 ☐
- 
- 91** Which of the following is a primary function of the liver?
- A** To produce insulin ☐
- B** To produce bile ☐
- C** To produce adrenaline ☐
- D** To produce testosterone ☐
- 
- 92** What is the function of the hypothalamus?
- A** To control the body's temperature ☐
- B** To control the body's water balance ☐
- C** To control the body's blood sugar levels ☐
- D** To control the body's heart rate ☐
- 
- 93** What is the function of the pituitary gland?
- A** To produce growth hormone ☐
- B** To produce insulin ☐
- C** To produce adrenaline ☐
- D** To produce testosterone ☐
- 
- 94** A survey was conducted to find out the most popular sport in a school. The results are shown in the table below.
- | Sport        | Number of pupils |
|--------------|------------------|
| Football     | 15               |
| Basketball   | 10               |
| Table Tennis | 12               |
| Badminton    | 8                |
| Swimming     | 10               |
| Other        | 15               |
- What is the probability of a pupil choosing Football or Swimming?
- A** 0.1 ☐
- B** 0.2 ☐
- C** 0.3 ☐
- D** 0.4 ☐

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- 95** Immunosuppressant drugs are given to patients to prevent the donor organ they receive from being rejected. Which of these is a risk of using immunosuppressant drugs?
- A** The person's blood group may change. ☐
  - B** The person's immune system may be weakened. ☐
  - C** The person may become infertile. ☐
  - D** The donor organ may undergo mutations to its DNA and produce non-functioning enzymes. ☐
- 96** Why may embryonic stem cells be used to treat medical conditions?
- A** They can differentiate into almost any cell type. ☐
  - B** They are not found in adults. ☐
  - C** They are sterile and have not been exposed to disease. ☐
  - D** There are millions of them available. ☐
- 97** Which of these are potential benefits and problems of using gene technology?
- 1.** Gaining a better understanding of inherited diseases and being able to correct defective genes. ☐
  - 2.** A healthy allele may not be inserted into every cell. ☐
  - 3.** A healthy allele may join chromosomes in the wrong place and not work. ☐
  - 4.** Understanding how genes interact and vary in people so that medicines better suited to each individual may be developed. ☐
  - A** Benefits: 1 and 2; problems: 3 and 4. ☐
  - B** Benefits: 3 and 4; problems: 1 and 2. ☐
  - C** Benefits: 1 and 4; problems: 2 and 3. ☐
  - D** Benefits: 2 and 3; problems: 1 and 4. ☐
- 98** Cancer is a disease that occurs as a result of changes in cells leading to uncontrolled growth and division. Why is this a problem?
- A** Cells should not be growing and dividing. ☐
  - B** Cancer is a communicable disease and can spread from person to person. ☐
  - C** Tumours can develop with cancerous cells breaking off and spreading around the body. ☐
  - D** Cancer cannot be cured. ☐
- 99** Which of these is a risk of using immunosuppressant drugs?
- 1.** ☐
  - 2.** ☐
  - 3.** ☐
  - 4.** ☐
  - A** ☐
  - B** ☐
  - C** ☐
  - D** ☐
- 100** Which of these is a risk of using immunosuppressant drugs?
- A** ☐
  - B** ☐
  - C** ☐
  - D** ☐

## CS7 Practical skills

### Practical activity group B2 – Sampling

- 101** A tomato plant grew 1.3 m in 12 weeks. What is its average rate of growth?
- A** 0.108 cm/week ☐
- B** 10.83 cm/week ☐
- C** 9.23 cm/week ☐
- D** 0.092 cm/week ☐

- 102** A researcher wanted to calculate the average rate of growth of the tomato plant per day, rather than per week. What was the answer they got?
- A** 1.55 cm/day ☐
- B** 0.15 mm/day ☐
- C** 10.83 cm/day ☐
- D** 0.65 cm/day ☐

- 103** A scientist sampled the number of larvae in a river along with measurements of water pH, dissolved oxygen concentration and nitrate concentration. What was/were the biotic factor(s)?
- A** The pH and number of larvae. ☐
- B** The number of larvae. ☐
- C** The pH. ☐
- D** The oxygen and nitrate concentrations. ☐

- 104** At one location, the numbers of larvae sampled were 4, 5, 7, 5, 2, 6 and 6. What is the mean number of larvae for that site?
- A** 35 ☐
- B** 5.5 ☐
- C** 5 ☐
- D** 33 ☐

- 105** A girl measured the distribution of plants in a field.
- A** A line graph ☐
- B** A bar chart ☐
- C** A box plot ☐
- D** A scatter plot ☐

- 106** 13 students were asked to estimate the percentage of the population that were vegetarians.
- A** 41% ☐
- B** 59% ☐
- C** 19% ☐
- D** 0.4% ☐

- 107** What is the mean of the following data?
- A** One ☐
- B** One ☐
- C** Three ☐
- D** Three ☐

- 108** A gardener measured the number of plants in his lawn in total.
- A** 60 ☐
- B** 120 ☐
- C** 30 ☐
- D** 90 ☐

- 109** If a graph is plotted, what is the shape of the graph?
- A** A parabola ☐
- B** A straight line ☐
- C** No shape ☐
- D** A circle ☐

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Practical activity group B5 – Microbiology

110 A student measured the area of the zone of inhibition produced following exposure of bacteria to different antibiotic solutions.

What are suitable units for this measurement?

- A  $\text{mm}^3$  ☐
- B  $\text{mm}$  ☐
- C  $\text{mm}^2$  ☐
- D  $\text{mm}^{-2}$  ☐

111 A scientist wanted to grow bacteria in a Petri dish and used an aseptic technique to prepare a culture.

Why did he turn off the Bunsen burner before using ethanol?

- A He did not want to risk an explosion. ☐
- B He did not want to risk the ethanol igniting / catching fire. ☐
- C He liked to keep a tidy and clear work space on the bench. ☐
- D He did not want the bacteria to get too hot and die. ☐

- A Serial dilution ☐
- B Serial dilution ☐
- C Serial dilution ☐
- D No dilution ☐

113 A scientist exposed a culture of bacteria to an antibiotic for 3 minutes.

- A 28 mm ☐
- B 9 mm ☐
- C 19 mm ☐
- D 7 mm ☐

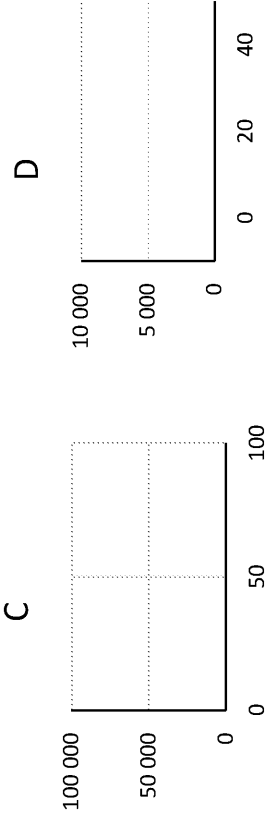
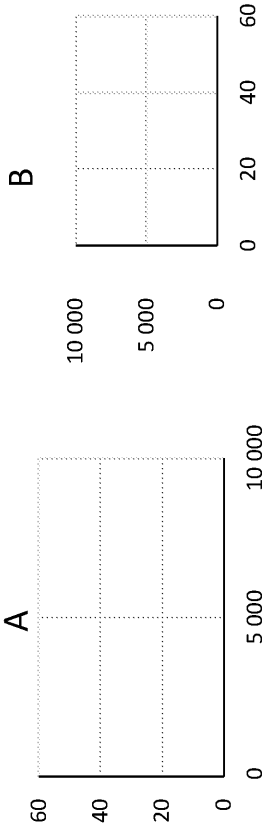
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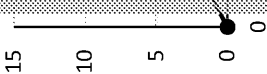
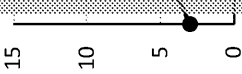
114 Which graph shows the most appropriate scales for the axes for the data in the table below?

| Time (min) | Number of bacteria |
|------------|--------------------|
| 0          | 10                 |
| 20         | 100                |
| 40         | 1000               |
| 60         | 10 000             |



- A ☐
- B ☐
- C ☐
- D ☐

115 A straight line would be



- A
- B
- C
- D

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# Answers to Multiple-choice Questions

## Topic 1: B4 Community-level systems

| Question 1 |   |                                                                                                                                                 |
|------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------|
| A          | ✓ | Correct definition.                                                                                                                             |
| B          | ✗ | Definition of biodiversity.                                                                                                                     |
| C          | ✗ | Definition of community.                                                                                                                        |
| D          | ✗ | Definition of population.                                                                                                                       |
| Question 2 |   |                                                                                                                                                 |
| A          | ✗ | Incorrect understanding of producers.                                                                                                           |
| B          | ✗ | Decomposers are not producers because they <u>cannot</u> make their own                                                                         |
| C          | ✓ | Correct understanding of producers.                                                                                                             |
| D          | ✗ | Fungi are not producers – only plants and algae are – but fungi can be                                                                          |
| Question 3 |   |                                                                                                                                                 |
| A          | ✗ | Rainfall and temperature are abiotic factors.                                                                                                   |
| B          | ✗ | Physical factors are abiotic factors.                                                                                                           |
| C          | ✗ | Non-living factors are abiotic factors.                                                                                                         |
| D          | ✓ | Living factors are biotic factors.                                                                                                              |
| Question 4 |   |                                                                                                                                                 |
| A          | ✗ | This would be a biotic factor as humans are involved.                                                                                           |
| B          | ✗ | This would be a biotic factor as insects are involved.                                                                                          |
| C          | ✓ | True.                                                                                                                                           |
| D          | ✗ | This would be a biotic factor as animals are involved.                                                                                          |
| Question 5 |   |                                                                                                                                                 |
| A          | ✗ | Seals are tertiary consumers.                                                                                                                   |
| B          | ✓ | Correct.                                                                                                                                        |
| C          | ✗ | Phytoplankton are producers.                                                                                                                    |
| D          | ✗ | Chinstrap penguins are not primary consumers.                                                                                                   |
| Question 6 |   |                                                                                                                                                 |
| A          | ✗ | Incorrect understanding of the term.                                                                                                            |
| B          | ✓ | Correct definition.                                                                                                                             |
| C          | ✗ | Incorrect understanding of the term.                                                                                                            |
| D          | ✗ | Parasitism is when a species relies on another species for food, but the parasite don't mutually rely on each other as is the case with interde |
| Question 7 |   |                                                                                                                                                 |
| A          | ✗ | This is a parasitic relationship.                                                                                                               |
| B          | ✓ | Correct.                                                                                                                                        |
| C          | ✗ | This is a predator-prey relationship.                                                                                                           |
| D          | ✗ | This is a predator-prey relationship.                                                                                                           |
| Question 8 |   |                                                                                                                                                 |
| A          | ✓ | Correct example.                                                                                                                                |
| B          | ✗ | Example of mutualism.                                                                                                                           |
| C          | ✗ | Example of mutualism.                                                                                                                           |
| D          | ✗ | Example of mutualism.                                                                                                                           |

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| Question 9  |   |                                                                                                                                             |
|-------------|---|---------------------------------------------------------------------------------------------------------------------------------------------|
| A           | ✓ | Correct.                                                                                                                                    |
| B           | ✗ | Mammals exhale carbon dioxide.                                                                                                              |
| C           | ✗ | Plants need carbon dioxide for photosynthesis.                                                                                              |
| D           | ✗ | Combustion releases carbon dioxide into the atmosphere.                                                                                     |
| Question 10 |   |                                                                                                                                             |
| A           | ✗ | Perspiration is sweating.                                                                                                                   |
| B           | ✗ | Evaporation is the process through which water vapour moves from                                                                            |
| C           | ✓ | Correct.                                                                                                                                    |
| D           | ✗ | Run-off refers to water moving from the land into rivers.                                                                                   |
| Question 11 |   |                                                                                                                                             |
| A           | ✗ | Nitrogen gas is inert and does not take part in the reactions describe                                                                      |
| B           | ✗ | Nitrogen gas is inert and does not take part in the reactions describe                                                                      |
| C           | ✓ | Correct.                                                                                                                                    |
| D           | ✗ | Water cycling is not shown in this diagram.                                                                                                 |
| Question 12 |   |                                                                                                                                             |
| A           | ✗ | Respiration releases carbon dioxide.                                                                                                        |
| B           | ✓ | Correct.                                                                                                                                    |
| C           | ✗ | Confused with some nitrogen-fixing bacteria.                                                                                                |
| D           | ✗ | Decomposition releases carbon dioxide through respiration by deco                                                                           |
| Question 13 |   |                                                                                                                                             |
| A           | ✓ | Correct.                                                                                                                                    |
| B           | ✗ | The terms are the other way round.                                                                                                          |
| C           | ✗ | Digestion is how nutrients are obtained from food.                                                                                          |
| D           | ✗ | There is a difference between the two.                                                                                                      |
| Question 14 |   |                                                                                                                                             |
| A           | ✗ | Detritivores (e.g. earthworms and woodlice) do this but this does no<br>up / absorb the nutrients they need as the question is about decomp |
| B           | ✗ | Not relevant to the reason required by this question.                                                                                       |
| C           | ✓ | Correct understanding.                                                                                                                      |
| D           | ✗ | Incorrect understanding. They do it the other way round.                                                                                    |
| Question 15 |   |                                                                                                                                             |
| A           | ✗ | Incorrect operation ( $10 \times 14$ ).                                                                                                     |
| B           | ✓ | Correct ( $10 \div 14$ ).                                                                                                                   |
| C           | ✗ | Numerator and denominator are inverted.                                                                                                     |
| D           | ✗ | Incorrect denominator: you could use $1 \div \text{time taken}$ (but not chang                                                              |
| Question 16 |   |                                                                                                                                             |
| A           | ✗ | $4000 \div 7$ days (should be 4)                                                                                                            |
| B           | ✓ | Correct. $(4000 - 2000) \div (7 - 3)$ ; $2000 \div 4$                                                                                       |
| C           | ✗ | $9 \div 4500$ , but this is the wrong number of days and the fraction is inv                                                                |
| D           | ✗ | This is $10 \div 5500$ , which is the number after 10 days.                                                                                 |

## Topic 2: B5 Genes, inheritance and selection

### B5.1 Inheritance

#### Question 17

|   |   |                                                       |
|---|---|-------------------------------------------------------|
| A | ✓ | Correct.                                              |
| B | ✗ | Gender is an example of discontinuous variation.      |
| C | ✗ | Eye colour is an example of discontinuous variation.  |
| D | ✗ | Blood group is an example of discontinuous variation. |

#### Question 18

|   |   |                                                                                             |
|---|---|---------------------------------------------------------------------------------------------|
| A | ✗ | The dominant/recessive allele combinations contribute to the phenotypic outward appearance. |
| B | ✗ | This is the definition of an allele.                                                        |
| C | ✓ | Correct.                                                                                    |
| D | ✗ | Genotype is the combination of alleles present in an organism.                              |

#### Question 19

|   |   |                                                                                                                |
|---|---|----------------------------------------------------------------------------------------------------------------|
| A | ✗ | Only one parent is needed for asexual reproduction, as genetically identical clones are produced by mitosis.   |
| B | ✓ | Correct.                                                                                                       |
| C | ✗ | They are genetically identical.                                                                                |
| D | ✗ | Sexual reproduction requires gametes. Asexual reproduction does not. Identical clones are produced by mitosis. |

#### Question 20

|   |   |                                                   |
|---|---|---------------------------------------------------|
| A | ✗ | Two parents are required for sexual reproduction. |
| B | ✓ | Correct.                                          |
| C | ✗ | Applies to asexual reproduction.                  |
| D | ✗ | Incorrect as some plants also reproduce this way. |

#### Question 21

|   |   |                                                |
|---|---|------------------------------------------------|
| A | ✓ | Correct.                                       |
| B | ✗ | Diploid cells have the full chromosome number. |
| C | ✗ | Egg cells are gametes and they are haploid.    |
| D | ✗ | Gametes are haploid.                           |

#### Question 22

|   |   |                          |
|---|---|--------------------------|
| A | ✗ | Definition of genotype.  |
| B | ✗ | Definition of an allele. |
| C | ✗ | Definition of phenotype. |
| D | ✓ | Correct.                 |

#### Question 23

|   |   |                                                |
|---|---|------------------------------------------------|
| A | ✗ | Mitosis produces body cells (and not gametes). |
| B | ✓ | Correct.                                       |
| C | ✗ | Gametes are haploid cells.                     |
| D | ✗ | Gametes are required for sexual reproduction.  |

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| Question 24 |   |                                                                                                          |
|-------------|---|----------------------------------------------------------------------------------------------------------|
| A           | ✗ | Mitosis produces diploid cells.                                                                          |
| B           | ✓ | Correct.                                                                                                 |
| C           | ✗ | Meiosis produces haploid cells.                                                                          |
| D           | ✗ | Meiosis produces haploid cells and mitosis produces diploid cells.                                       |
| Question 25 |   |                                                                                                          |
| A           | ✗ | It would be heterozygous.                                                                                |
| B           | ✗ | It must have two alleles for each gene.                                                                  |
| C           | ✓ | Correct.                                                                                                 |
| D           | ✗ | It would be heterozygous.                                                                                |
| Question 26 |   |                                                                                                          |
| A           | ✓ | Correct.                                                                                                 |
| B           | ✗ | The person could roll their tongue because T is dominant and not                                         |
| C           | ✗ | Dominant alleles are shown by capital letters.                                                           |
| D           | ✗ | See B above.                                                                                             |
| Question 27 |   |                                                                                                          |
| A           | ✗ | Incorrect.                                                                                               |
| B           | ✓ | Correct.                                                                                                 |
| C           | ✗ | Incorrect.                                                                                               |
| D           | ✗ | The superscript notation is incorrect for this example.                                                  |
| Question 28 |   |                                                                                                          |
| A           | ✗ | This would be the ratio of homozygous individuals to heterozygous and BB would both be brown-eyed.       |
| B           | ✗ | The outcome bb would be blue-eyed.                                                                       |
| C           | ✓ | Correct.                                                                                                 |
| D           | ✗ | This would be the ratio of blue-eyed to brown-eyed offspring.                                            |
| Question 29 |   |                                                                                                          |
| A           | ✗ | Mutations are not always harmful.                                                                        |
| B           | ✗ | Definition of an allele.                                                                                 |
| C           | ✓ | Correct.                                                                                                 |
| D           | ✗ | Mutations aren't always expressed in the phenotype.                                                      |
| Question 30 |   |                                                                                                          |
| A           | ✓ | Correct. Mutations can also be beneficial, e.g. the mutation causing does provide resistance to malaria. |
| B           | ✗ | Some mutations may be neutral or beneficial.                                                             |
| C           | ✗ | Some mutations may cause cancer, but most do not.                                                        |
| D           | ✗ | Some may be harmful and detrimental to survival.                                                         |
| Question 31 |   |                                                                                                          |
| A           | ✓ | Correct.                                                                                                 |
| B           | ✗ | Heterozygous: the genotype would be TT.                                                                  |
| C           | ✗ | Heterozygous: the genotype would be tt.                                                                  |
| D           | ✗ | The term is restricted to situations involving inherited diseases.                                       |

### Question 32

|   |   |                                                      |
|---|---|------------------------------------------------------|
| A | ✗ | They have the same number of chromosomes as females. |
| B | ✗ | Neither males nor females have two Y chromosomes.    |
| C | ✗ | Females have two X chromosomes.                      |
| D | ✓ | Correct.                                             |

### Question 33

|   |   |                                                  |
|---|---|--------------------------------------------------|
| A | ✗ | Previous children do not affect the probability. |
| B | ✗ | Previous children do not affect the probability. |
| C | ✓ | Correct.                                         |
| D | ✗ | Previous children do not affect the probability. |

### Question 34

|   |   |                                                                                                                                      |
|---|---|--------------------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct.                                                                                                                             |
| B | ✗ | There are genes that determine eye colour.                                                                                           |
| C | ✗ | The environment does not affect expression of your genetically inherited traits.                                                     |
| D | ✗ | This may be true, but it is related to other factors such as varying levels of gene expression rather than the interaction of genes. |

## B5.2 Natural selection and evolution

### Question 35

|   |   |                                                                                                                           |
|---|---|---------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct.                                                                                                                  |
| B | ✗ | This describes selective breeding.                                                                                        |
| C | ✗ | This answer is not relevant to the statement. Adaptation to surrounding environment changes / biotic interactions change. |
| D | ✗ | Evolution is the result of natural selection.                                                                             |

### Question 36

|   |   |                                                                                                                                                                 |
|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct.                                                                                                                                                        |
| B | ✗ | This would be a result of selective breeding because humans would increase milk yields, whereas natural selection would rely on spontaneous survival advantage. |
| C | ✗ | This could be the result of better health, nutrition and education.                                                                                             |
| D | ✗ | This would be the result of immunity produced as a result of vaccination.                                                                                       |

### Question 37

|   |   |                                                                                                                                         |
|---|---|-----------------------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct.                                                                                                                                |
| B | ✗ | Irrelevant to the context of the question and also illogical.                                                                           |
| C | ✗ | Irrelevant to the context of the question.                                                                                              |
| D | ✗ | This statement is correct, but doesn't provide any new information to know that there is a huge diversity of living organisms on Earth. |

### Question 38

|   |   |                                                                                                 |
|---|---|-------------------------------------------------------------------------------------------------|
| A | ✗ | Genus and species are in the wrong place.                                                       |
| B | ✗ | This begins with the smallest group (species) and should begin with the largest group (domain). |
| C | ✓ | Correct.                                                                                        |
| D | ✗ | Family, order and genus are in the wrong place.                                                 |

**Question 39**

|   |   |                                     |
|---|---|-------------------------------------|
| A | ✓ | Correct.                            |
| B | ✗ | This is phylogeny.                  |
| C | ✗ | This is the binomial naming system. |
| D | ✗ | This is evolution.                  |

**Question 40**

|   |   |                                                                    |
|---|---|--------------------------------------------------------------------|
| A | ✗ | Misunderstanding of the differences between natural classification |
| B | ✗ | Misunderstanding of the differences between natural classification |
| C | ✓ | Correct.                                                           |
| D | ✗ | This method supports natural classification.                       |

**Question 41**

|   |   |                                           |
|---|---|-------------------------------------------|
| A | ✓ | Correct.                                  |
| B | ✗ | This is the definition of classification. |
| C | ✗ | This is artificial classification.        |
| D | ✗ | This is the binomial naming system.       |

**Question 42**

|   |   |                                                                                 |
|---|---|---------------------------------------------------------------------------------|
| A | ✗ | Darwin was not aware of DNA structure and the concept of mutation.              |
| B | ✓ | Correct.                                                                        |
| C | ✗ | Darwin made the link between food type and beak size and shape.                 |
| D | ✗ | Darwin proposed a theory to account for it rather than it being an observation. |

**Question 43**

|   |   |                                                                               |
|---|---|-------------------------------------------------------------------------------|
| A | ✗ | The populations need to become separated first.                               |
| B | ✓ | Correct.                                                                      |
| C | ✗ | Differences preventing interbreeding will result in new species being formed. |
| D | ✗ | The populations need to become separated first.                               |

**Topic 3: B6 Global Challenges****B6.1 Monitoring and maintaining the environment****Question 44**

|   |   |                                                                                                                          |
|---|---|--------------------------------------------------------------------------------------------------------------------------|
| A | ✗ | Sampling involves making observations and measurements of the plants and animals; there is often no need to remove them. |
| B | ✓ | Correct.                                                                                                                 |
| C | ✗ | Misunderstanding of the principle of sampling from a small area to represent the whole.                                  |
| D | ✗ | This is about identification.                                                                                            |

**Question 45**

|   |   |                                                                                                                                  |
|---|---|----------------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct.                                                                                                                         |
| B | ✗ | Quadrats are not suitable for invertebrates. They are better suited to plants.                                                   |
| C | ✗ | Misunderstanding: this is to estimate population size but this method for invertebrates could be captured in order to mark them. |
| D | ✗ | Misunderstanding: this is about identification and using keys does not involve capturing organisms.                              |

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| Question 46 |   |                                                                         |
|-------------|---|-------------------------------------------------------------------------|
| A           | ✓ | Correct. Random sampling prevents bias and makes a sample more          |
| B           | ✗ | This is about repeated measurement, and is not specific to random       |
| C           | ✗ | This is too specific, and is not relevant to all examples of experiment |
| D           | ✗ | This statement describes transects.                                     |
| Question 47 |   |                                                                         |
| A           | ✗ | This is the lowest value.                                               |
| B           | ✗ | This is the modal value, and the highest value.                         |
| C           | ✓ | Correct.                                                                |
| D           | ✗ | This is the mean.                                                       |
| Question 48 |   |                                                                         |
| A           | ✗ | This is the mean.                                                       |
| B           | ✓ | Correct.                                                                |
| C           | ✗ | This value occurs twice but it is not the most frequent value.          |
| D           | ✗ | This is the lowest value.                                               |
| Question 49 |   |                                                                         |
| A           | ✗ | Incorrect $(21 \times 8) \div 3$ .                                      |
| B           | ✓ | Correct $(21 \times 11) \div 3$ .                                       |
| C           | ✗ | Incorrect $(21 \times 3) \div 8$ .                                      |
| D           | ✗ | Incorrect $(21 \times 11) \div 8$ .                                     |
| Question 50 |   |                                                                         |
| A           | ✗ | Misunderstanding of the method, as a transect involves recording the    |
| B           | ✗ | Misunderstanding of the method. This is about estimating population     |
| C           | ✗ | Misunderstanding of the method. This is about estimating population     |
| D           | ✓ | Correct.                                                                |
| Question 51 |   |                                                                         |
| A           | ✗ | << means very much less than.                                           |
| B           | ✗ | >> means very much greater than.                                        |
| C           | ✓ | Correct.                                                                |
| D           | ✗ | ~ shows 'approximately equal to'.                                       |
| Question 52 |   |                                                                         |
| A           | ✗ | Insufficient detail. This is how biodiversity may be lost.              |
| B           | ✗ | This is the definition of a community.                                  |
| C           | ✓ | Correct.                                                                |
| D           | ✗ | This is the definition of a habitat.                                    |
| Question 53 |   |                                                                         |
| A           | ✓ | Correct.                                                                |
| B           | ✗ | Incorrect due to genetic engineering.                                   |
| C           | ✗ | These actions could help to conserve a habitat and would not lead to    |
| D           | ✗ | Incorrect due to IVF and GMOs.                                          |

**Question 54**

|   |   |                                       |
|---|---|---------------------------------------|
| A | ✗ | Incorrect due to climate change.      |
| B | ✗ | Incorrect due to deforestation.       |
| C | ✗ | Incorrect due to genetic engineering. |
| D | ✓ | Correct.                              |

**Question 55**

|   |   |                                                            |
|---|---|------------------------------------------------------------|
| A | ✗ | Incorrect, but this may happen as a benefit of ecotourism. |
| B | ✓ | Correct.                                                   |
| C | ✗ | Incorrect, but this may happen as a benefit of ecotourism. |
| D | ✗ | This is the subject of international treaties.             |

**Question 56**

|   |   |                                                                             |
|---|---|-----------------------------------------------------------------------------|
| A | ✓ | Correct. This is a challenge, but it means lions could escape from hunters. |
| B | ✗ | This is a challenge for protecting lions.                                   |
| C | ✗ | This is a challenge for protecting lions.                                   |
| D | ✗ | This is a challenge for protecting lions.                                   |

**Question 57**

|   |   |                                   |
|---|---|-----------------------------------|
| A | ✓ | Correct.                          |
| B | ✗ | This is the independent variable. |
| C | ✗ | This was not measured.            |
| D | ✗ | This was not measured.            |

**B6.2 Feeding the human race****Question 58**

|   |   |                                                             |
|---|---|-------------------------------------------------------------|
| A | ✗ | The desired characteristic needs to be chosen first.        |
| B | ✗ | The desired characteristic needs to be chosen first.        |
| C | ✓ | Correct.                                                    |
| D | ✗ | Repeating the steps over many generations is the last step. |

**Question 59**

|   |   |                                                             |
|---|---|-------------------------------------------------------------|
| A | ✗ | The gene pool may be reduced.                               |
| B | ✓ | Correct.                                                    |
| C | ✗ | The gene pool and its available alleles would be reduced.   |
| D | ✗ | Sometimes the goal is to produce differently shaped plants. |

**Question 60**

|   |   |                                                                                                      |
|---|---|------------------------------------------------------------------------------------------------------|
| A | ✗ | The answer lacks sufficient detail and the idea that genetic material is passed on is not mentioned. |
| B | ✗ | Genes are not switched on or off in the process.                                                     |
| C | ✓ | Correct.                                                                                             |
| D | ✗ | The process does not involve selective breeding.                                                     |

**Question 61**

|   |   |                                                                                                                                                                                     |
|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct.                                                                                                                                                                            |
| B | ✗ | Bacteria do not produce insulin.                                                                                                                                                    |
| C | ✗ | Genes are not switched on or off in the process.                                                                                                                                    |
| D | ✗ | The answer doesn't relate to the statement. Bacteria may or may not be involved in genetic engineering, but this isn't <b>why</b> the process is an example of genetic engineering. |

| Question 62 |   |                                                                                                                                                                         |
|-------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A           | ✗ | The terms are restriction enzymes and ligase enzymes.                                                                                                                   |
| B           | ✗ | The terms are restriction enzymes and ligase enzymes.                                                                                                                   |
| C           | ✓ | Correct.                                                                                                                                                                |
| D           | ✗ | The terms are restriction and ligase enzymes.                                                                                                                           |
| Question 63 |   |                                                                                                                                                                         |
| A           | ✗ | Uracil (U) is not found in DNA but rather RNA.                                                                                                                          |
| B           | ✓ | Correct.                                                                                                                                                                |
| C           | ✗ | A pairs with T.                                                                                                                                                         |
| D           | ✗ | A pairs with T.                                                                                                                                                         |
| Question 64 |   |                                                                                                                                                                         |
| A           | ✓ | Correct.                                                                                                                                                                |
| B           | ✗ | As this process is done in a laboratory, antibiotics which would kill the                                                                                               |
| C           | ✗ | As this process is done in a laboratory, there are many ways of killing bacteria. Adding antibiotic resistance would likely make bacteria harder to kill.               |
| D           | ✗ | These terms are vague and do not adequately explain the idea behind                                                                                                     |
| Question 65 |   |                                                                                                                                                                         |
| A           | ✗ | Incorrect as restriction enzymes are not vectors.                                                                                                                       |
| B           | ✗ | Incorrect as restriction enzymes are not vectors.                                                                                                                       |
| C           | ✗ | Incorrect context as mosquitoes are vectors for malaria because they transmit the parasite that causes malaria. However, this question relates to genetic modification. |
| D           | ✓ | Correct.                                                                                                                                                                |
| Question 66 |   |                                                                                                                                                                         |
| A           | ✗ | This is more closely related to intensive farming.                                                                                                                      |
| B           | ✗ | This is more closely related to selective breeding.                                                                                                                     |
| C           | ✓ | Correct.                                                                                                                                                                |
| D           | ✗ | This is an opinion that some people may have rather than a definite                                                                                                     |
| Question 67 |   |                                                                                                                                                                         |
| A           | ✗ | 'modified' not 'manipulated'                                                                                                                                            |
| B           | ✗ | 'modified' not 'managed'                                                                                                                                                |
| C           | ✗ | 'modified' not 'modelled'                                                                                                                                               |
| D           | ✓ | Correct.                                                                                                                                                                |
| Question 68 |   |                                                                                                                                                                         |
| A           | ✗ | Benefits and risks are the wrong way round.                                                                                                                             |
| B           | ✓ | Correct.                                                                                                                                                                |
| C           | ✗ | 3 is a risk.                                                                                                                                                            |
| D           | ✗ | 4 is a risk.                                                                                                                                                            |

## B6.3 Monitoring and maintaining health

| Question 69 |   |                                                                           |
|-------------|---|---------------------------------------------------------------------------|
| A           | ✗ | This is the definition of cancer.                                         |
| B           | ✗ | This is the definition of mutation.                                       |
| C           | ✓ | Correct.                                                                  |
| D           | ✗ | This is the definition of ill health.                                     |
| Question 70 |   |                                                                           |
| A           | ✗ | Flu is caused by a virus and tobacco mosaic virus disease is caused by    |
| B           | ✓ | Correct.                                                                  |
| C           | ✗ | TB is caused by a bacterium and malaria is also not caused by a fungus    |
| D           | ✗ | Both are caused by bacteria.                                              |
| Question 71 |   |                                                                           |
| A           | ✗ | Incorrect because inherited diseases cannot be caught from another person |
| B           | ✗ | Incorrect because lifestyle diseases affect an individual and cannot be   |
| C           | ✗ | Misunderstanding of the term as non-communicable diseases cannot be       |
| D           | ✓ | Correct.                                                                  |
| Question 72 |   |                                                                           |
| A           | ✗ | Viruses may also cause disease.                                           |
| B           | ✓ | Correct.                                                                  |
| C           | ✗ | Vectors in genetic engineering should not cause disease.                  |
| D           | ✗ | Genes cannot cause disease; rather, they are sections of DNA. A mutation  |
| Question 73 |   |                                                                           |
| A           | ✗ | Incorrect ( $7919 \times 500\,000$ ).                                     |
| B           | ✗ | Incorrect ( $14 \times 500\,000$ but it is 14 per 100 000).               |
| C           | ✓ | Correct ( $500\,000/100\,000 = 5 \times 14.00$ ).                         |
| D           | ✗ | Incorrect ( $7919 \times 5$ ).                                            |
| Question 74 |   |                                                                           |
| A           | ✗ | Clean water alone would not be effective.                                 |
| B           | ✗ | The question is about crops and not livestock.                            |
| C           | ✓ | Correct.                                                                  |
| D           | ✗ | Vaccination refers to animals rather than plants.                         |
| Question 75 |   |                                                                           |
| A           | ✓ | Correct.                                                                  |
| B           | ✗ | AIDS is not a virus.                                                      |
| C           | ✗ | HIV is a virus that may be passed on by other non-sexual methods.         |
| D           | ✗ | AIDS is not caused by bacteria.                                           |
| Question 76 |   |                                                                           |
| A           | ✗ | These are signs of tobacco mosaic virus.                                  |
| B           | ✗ | These are signs of powdery mildew (fungus).                               |
| C           | ✓ | Correct.                                                                  |
| D           | ✗ | These are signs of athlete's foot.                                        |

| Question 77 |   |                                                                                                                                         |
|-------------|---|-----------------------------------------------------------------------------------------------------------------------------------------|
| A           | ✗ | These are pathogens.                                                                                                                    |
| B           | ✓ | Correct.                                                                                                                                |
| C           | ✗ | These are vectors of plant disease.                                                                                                     |
| D           | ✗ | Antigens are not examples of plant chemical defences. Chemical defences include insecticides made by plants that can kill insect pests. |
| Question 78 |   |                                                                                                                                         |
| A           | ✗ | Platelets do not do this, phagocytes do.                                                                                                |
| B           | ✗ | Platelets do not do this. Lymphocytes can release antitoxins or antibodies to destroy bacteria.                                         |
| C           | ✗ | Incorrect because preventing blood loss does not defend against disease, blood clotting does.                                           |
| D           | ✓ | Correct.                                                                                                                                |
| Question 79 |   |                                                                                                                                         |
| A           | ✗ | Misunderstanding. Platelets are cell fragments that help blood to clot.                                                                 |
| B           | ✓ | Correct.                                                                                                                                |
| C           | ✗ | Lymphocytes are another type of white blood cell.                                                                                       |
| D           | ✗ | These are enzymes in tears.                                                                                                             |
| Question 80 |   |                                                                                                                                         |
| A           | ✗ | Misunderstanding of the role of phagocytes (which engulf pathogens, release antitoxins or antibodies).                                  |
| B           | ✗ | Misunderstanding of the role of phagocytes. Anticoagulants stop blood clotting.                                                         |
| C           | ✓ | Correct.                                                                                                                                |
| D           | ✗ | Misunderstanding of the role of lymphocytes and phagocytes (the white blood cells).                                                     |
| Question 81 |   |                                                                                                                                         |
| A           | ✗ | This is a <u>specific</u> mechanism.                                                                                                    |
| B           | ✓ | Correct.                                                                                                                                |
| C           | ✗ | Platelets help blood to clot.                                                                                                           |
| D           | ✗ | This row is true, but it is not related to the question.                                                                                |
| Question 82 |   |                                                                                                                                         |
| A           | ✗ | Vaccines are used to prevent disease occurring, not to cure it.                                                                         |
| B           | ✗ | Antibodies are made by the body.                                                                                                        |
| C           | ✗ | Vaccination is not connected with monoclonal antibodies.                                                                                |
| D           | ✓ | Correct.                                                                                                                                |
| Question 83 |   |                                                                                                                                         |
| A           | ✗ | Platelets help blood to clot and are not involved in the immune response.                                                               |
| B           | ✓ | Correct.                                                                                                                                |
| C           | ✗ | Your body will make the correct antibody not antigen.                                                                                   |
| D           | ✗ | Your body will make the correct antibody not phagocyte.                                                                                 |
| Question 84 |   |                                                                                                                                         |
| A           | ✗ | This describes antiviral drugs.                                                                                                         |
| B           | ✗ | Both would be affected.                                                                                                                 |
| C           | ✓ | Correct.                                                                                                                                |
| D           | ✗ | This describes antibiotics.                                                                                                             |

| Question 85 |   |                                                                       |
|-------------|---|-----------------------------------------------------------------------|
| A           | ✓ | Correct use of $\pi r^2$                                              |
| B           | ✗ | $\pi r$                                                               |
| C           | ✗ | $\pi r \div 2$                                                        |
| D           | ✗ | $\pi \div 2$                                                          |
| Question 86 |   |                                                                       |
| A           | ✗ | It is not about risk to humans.                                       |
| B           | ✓ | Correct.                                                              |
| C           | ✗ | It is not about preventing growth of microorganisms.                  |
| D           | ✗ | The idea is not to get rid of microorganisms but to prevent them from |
| Question 87 |   |                                                                       |
| A           | ✓ | Correct.                                                              |
| B           | ✗ | Confused by the term preclinical. This stage might happen during cl   |
| C           | ✗ | Confused by the term preclinical. This stage might happen during cl   |
| D           | ✗ | Incorrect as people are not used.                                     |
| Question 88 |   |                                                                       |
| A           | ✗ | This is a side effect.                                                |
| B           | ✓ | Correct.                                                              |
| C           | ✗ | There is no alternative name.                                         |
| D           | ✗ | The idea is of reduction, refinement and replacement.                 |
| Question 89 |   |                                                                       |
| A           | ✗ | It is not about dosage.                                               |
| B           | ✗ | This would not be a proper trial as the drug would not be tested for  |
| C           | ✓ | Correct.                                                              |
| D           | ✗ | This would be a single-blind test rather than a double-blind test.    |
| Question 90 |   |                                                                       |
| A           | ✓ | Correct.                                                              |
| B           | ✗ | Smoking is the main risk factor.                                      |
| C           | ✗ | Alcohol is the main risk factor.                                      |
| D           | ✗ | Smoking is the main risk factor.                                      |
| Question 91 |   |                                                                       |
| A           | ✗ | This is the main risk factor in lung disease.                         |
| B           | ✗ | This is the main risk factor in liver disease.                        |
| C           | ✗ | This is the main risk factor in developing high blood pressure leadin |
| D           | ✓ | Correct.                                                              |
| Question 92 |   |                                                                       |
| A           | ✓ | Correct.                                                              |
| B           | ✗ | Anticoagulants stop blood clotting.                                   |
| C           | ✗ | Beta blockers reduce high blood pressure.                             |
| D           | ✗ | Nitrates widen blood vessels to increase blood flow.                  |

| Question 93  |   |                                                                                                   |
|--------------|---|---------------------------------------------------------------------------------------------------|
| A            | ✗ | Statins reduce blood cholesterol.                                                                 |
| B            | ✗ | Anticoagulants stop blood clotting.                                                               |
| C            | ✓ | Correct.                                                                                          |
| D            | ✗ | Nitrates widen blood vessels to increase blood flow.                                              |
| Question 94  |   |                                                                                                   |
| A            | ✗ | A valve is not replaced in this procedure.                                                        |
| B            | ✓ | Correct.                                                                                          |
| C            | ✗ | This is a method for examining joints.                                                            |
| D            | ✗ | This method uses other vessels which are transplanted to allow blood flow to the coronary artery. |
| Question 95  |   |                                                                                                   |
| A            | ✗ | These drugs will not affect blood group.                                                          |
| B            | ✓ | Correct.                                                                                          |
| C            | ✗ | These drugs will not affect fertility.                                                            |
| D            | ✗ | These drugs will not cause mutations.                                                             |
| Question 96  |   |                                                                                                   |
| A            | ✓ | Correct.                                                                                          |
| B            | ✗ | True but not the reason.                                                                          |
| C            | ✗ | Too simplistic                                                                                    |
| D            | ✗ | Too vague.                                                                                        |
| Question 97  |   |                                                                                                   |
| A            | ✗ | 2 is a problem, and 4 is a benefit.                                                               |
| B            | ✗ | 3 is a problem, and 1 is a benefit.                                                               |
| C            | ✓ | Correct.                                                                                          |
| D            | ✗ | The benefits and problems are the wrong way round.                                                |
| Question 98  |   |                                                                                                   |
| A            | ✗ | Cells do grow and divide when required to.                                                        |
| B            | ✗ | Cancer is non-communicable.                                                                       |
| C            | ✓ | Correct.                                                                                          |
| D            | ✗ | Some cancers can be cured.                                                                        |
| Question 99  |   |                                                                                                   |
| A            | ✗ | The risks and benefits are the wrong way round.                                                   |
| B            | ✓ | Correct.                                                                                          |
| C            | ✗ | 1 is a risk, and 4 is a benefit.                                                                  |
| D            | ✗ | 2 is a risk, and 3 is a benefit.                                                                  |
| Question 100 |   |                                                                                                   |
| A            | ✗ | This is an advantage.                                                                             |
| B            | ✗ | This is an advantage.                                                                             |
| C            | ✗ | This is an advantage.                                                                             |
| D            | ✓ | Correct.                                                                                          |

## CS7 Practical skills

### Practical activity group B2 – Sampling techniques

#### Question 101

|   |   |                                                                           |
|---|---|---------------------------------------------------------------------------|
| A | ✗ | $1.3 \text{ m} \div 12 \text{ weeks} = 0.108 \text{ m/week}$ not cm/week. |
| B | ✓ | Correct. $130 \text{ cm} \div 12 \text{ weeks}$ .                         |
| C | ✗ | $12 \text{ weeks} \div 1.3 = 9.23 \text{ weeks/m}$ .                      |
| D | ✗ | $12 \text{ weeks} \div 130 \text{ cm} = 0.092 \text{ weeks/cm}$ .         |

#### Question 102

|   |   |                                                                                     |
|---|---|-------------------------------------------------------------------------------------|
| A | ✓ | Correct. $130 \text{ cm} \div 84 \text{ days}$ (7 days per week $\times$ 12 weeks). |
| B | ✗ | $1.3 \text{ m} \div 84 \text{ days} = 0.15 \text{ m/day}$ not mm.                   |
| C | ✗ | $130 \text{ cm} \div 12 \text{ weeks} = 10.83 \text{ cm/week}$ not /day.            |
| D | ✗ | $84 \text{ days} \div 130 \text{ cm} = 0.65 \text{ days/cm}$ not cm/day.            |

#### Question 103

|   |   |                                         |
|---|---|-----------------------------------------|
| A | ✗ | pH is an abiotic (non-living) factor.   |
| B | ✓ | Correct.                                |
| C | ✗ | pH is an abiotic (non-living) factor.   |
| D | ✗ | These are abiotic (non-living) factors. |

#### Question 104

|   |   |                                                                                                                        |
|---|---|------------------------------------------------------------------------------------------------------------------------|
| A | ✗ | This is the sum of the numbers, not the average ( $4 + 5 + 7 + 5 + 2 + 6$ ).                                           |
| B | ✗ | This is the average if 2 has been excluded ( $33 \div 6$ ). Outliers cannot be and none is given in the question stem. |
| C | ✓ | Correct. ( $35 \div 7 = 5$ ).                                                                                          |
| D | ✗ | This is the sum of the numbers excluding 2.                                                                            |

#### Question 105

|   |   |                                                                                                                                                                                              |
|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | ✗ | Although height is a continuous variable, she is measuring the frequency of a particular value (quantitative data) so a line graph is inappropriate and the way round.                       |
| B | ✗ | Although height is a continuous variable, she is measuring the frequency of a particular value which is discontinuous/quantitative data, so a line graph is inappropriate and the way round. |
| C | ✓ | Correct.                                                                                                                                                                                     |
| D | ✗ | The axes are the wrong way round.                                                                                                                                                            |

#### Question 106

|   |   |                                                                                               |
|---|---|-----------------------------------------------------------------------------------------------|
| A | ✗ | This is the percentage of tongue rollers ( $13/32 \times 100 \%$ ) rather than their tongues. |
| B | ✓ | Correct. Class of $32 - 13$ who can roll = 19 who cannot. $19/32 \times 100 \%$               |
| C | ✗ | $32 - 13 = 19$ students who cannot roll their tongues.                                        |
| D | ✗ | $13/32 = 0.406$ (forgot to then multiply by 100 to make it a percentage)                      |

#### Question 107

|   |   |                                    |
|---|---|------------------------------------|
| A | ✗ | This is discrete or discontinuous. |
| B | ✗ | This is continuous.                |
| C | ✓ | Correct.                           |
| D | ✗ | This is a dependent variable.      |

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**Question 108**

|   |   |                                                                                                          |
|---|---|----------------------------------------------------------------------------------------------------------|
| A | ✗ | If two are in 1 m <sup>2</sup> then for 60 m <sup>2</sup> he should find 120 ( $2 \times 60$ ).          |
| B | ✓ | Correct. If two are in 1 m <sup>2</sup> then for 60 m <sup>2</sup> he should find 120 ( $2 \times 60$ ). |
| C | ✗ | This is $60 \div 2 = 30$ .                                                                               |
| D | ✗ | If two are in 1 m <sup>2</sup> then for 60 m <sup>2</sup> he should find 120 ( $2 \times 60$ ).          |

**Question 109**

|   |   |                                                                               |
|---|---|-------------------------------------------------------------------------------|
| A | ✗ | For this to be true, as one variable increases, the other must also increase. |
| B | ✓ | Correct.                                                                      |
| C | ✗ | There clearly is a correlation.                                               |
| D | ✗ | Misunderstanding of the term and idea of correlation versus causation.        |

**Practical activity group B5 – Microbiological techniques****Question 110**

|   |   |                                                                                     |
|---|---|-------------------------------------------------------------------------------------|
| A | ✗ | These are units of volume not area.                                                 |
| B | ✗ | These are units of length not area.                                                 |
| C | ✓ | Correct.                                                                            |
| D | ✗ | Incorrect in this context of measuring the area rather than the number of bacteria. |

**Question 111**

|   |   |                                                      |
|---|---|------------------------------------------------------|
| A | ✗ | Ethanol is not explosive.                            |
| B | ✓ | Correct.                                             |
| C | ✗ | This answer does not specifically relate to ethanol. |
| D | ✗ | Too vague.                                           |

**Question 112**

|   |   |                                                                                                                               |
|---|---|-------------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct.                                                                                                                      |
| B | ✗ | This does not show a doubling in the y-value for each increase in the x-value that exponential growth in bacteria would show. |
| C | ✗ | This does not show a doubling in the y-value for each increase in the x-value that exponential growth in bacteria would show. |
| D | ✗ | Incorrect as Series 1 does show exponential growth.                                                                           |

**Question 113**

|   |   |                                                                                                                                          |
|---|---|------------------------------------------------------------------------------------------------------------------------------------------|
| A | ✓ | Correct. $\pi \times 3^2 = 28.3 = 28$ .                                                                                                  |
| B | ✗ | $3\pi = 9.4$ . Misunderstanding of the equation to be used to calculate the area of a circle.                                            |
| C | ✗ | $6\pi = 18.8 = 19$ . Misunderstanding of the equation to be used to calculate the area of a circle.                                      |
| D | ✗ | The radius was 3 mm so there is no need to divide it by 2 as you would for a diameter. $(3 \div 2 = 1.5, 1.5^2 \times \pi = 7.07 = 7)$ . |

**Question 114**

|   |   |                                                                                |
|---|---|--------------------------------------------------------------------------------|
| A | ✗ | The axis ranges are the wrong way round. The x-axis only needs to go up to 60. |
| B | ✓ | Correct.                                                                       |
| C | ✗ | The x-axis only needs to go up to 60.                                          |
| D | ✗ | The x-axis needs to go up to 60.                                               |

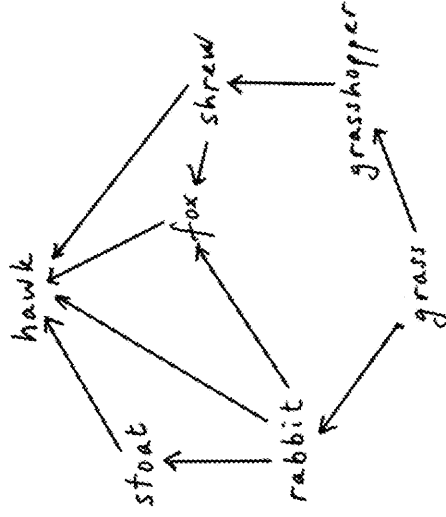
**Question 115**

|   |   |             |
|---|---|-------------|
| A | ✗ | $y = x + 3$ |
| B | ✓ | Correct.    |
| C | ✗ | $y = 2x$    |
| D | ✗ | $y = 100x$  |

## Topic 1: B4 Community-level

- 1 Which statement gives the different levels of organisation from the largest to the smallest?
- ☐ A Ecosystem – community – population – species.  
☐ B Ecosystem – community – species – population.  
☐ C Species – community – population – ecosystem.  
☐ D Species – population – community – ecosystem.
- 2 What is the definition of a population?
- ☐ A All of the living organisms and physical conditions in an area.  
☐ B The range of all the different species living in an area.  
☐ C The organisms in an area.  
☐ D The total number of one species in an area.

- 3 The diagram shows a food web:



Which organism in the diagram is both a secondary consumer and a quaternary consumer?

- ☐ A Shrew.  
☐ B Stoat.  
☐ C Fox.  
☐ D Hawk.

- 4 In the food web, which organism is the producer?
- ☐ A Grass.  
☐ B Fox.  
☐ C Hawk.  
☐ D Ant.  
☐ E Onion.
- 5 What are the abiotic factors in an ecosystem?
- ☐ A Living organisms.  
☐ B Physical conditions.  
☐ C The number of organisms.  
☐ D The number of species.

- 6 Which of the following is a biotic factor?
- ☐ A Oxygen.  
☐ B Soil.  
☐ C Temperature.  
☐ D Wind.

- 7 Which of the following is a tertiary consumer?
- ☐ A The producer.  
☐ B The primary consumer.  
☐ C The secondary consumer.  
☐ D The quaternary consumer.

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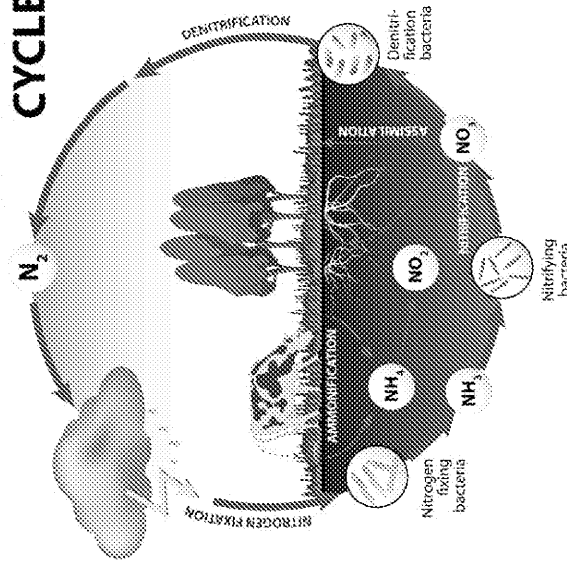


- 8 Which example best describes an example of interdependence?
- A Plants need animals for a source of carbon dioxide and for seed dispersal; animals need plants for food and a source of oxygen.
  - B Plants need sunlight for photosynthesis; without sunlight there would be no plants.
  - C Plants produce oxygen during photosynthesis but use oxygen or respiration.
  - D As temperature increases the rate of decay by microorganisms increases up to the point where enzymes become denatured.

10

9

## NITROGEN CYCLE



The diagram shows the nitrogen cycle. Which bacteria, shown in the diagram, are helpful to plants, allowing them to directly obtain the nitrates they need by assimilation?

- A Nitrogen-fixing bacteria.
- B Nitrifying bacteria.
- C Denitrification bacteria.
- D Ammonification bacteria.

Water m  
correct  
A Run  
B Eva  
C Pres  
D Pen

11

Looking  
atmosph  
A Cor  
B Cor  
C Cor  
D Cor

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**12** Some organisms break down dead material for decomposers to digest. Which of these are examples of decomposers?

- A** Earthworms and woodlice. ☐
- B** Bacteria and viruses. ☐
- C** Bacteria and fungi. ☐
- D** Fungi and viruses. ☐

**13** Male kittens can be expected to grow from a birth mass of 200 g to 3.5 kg during their first 48 weeks of life.

Assuming that growth occurs at a steady rate, what is their rate of growth?

- A** 72.92 g/week ☐
- B** 68.75 g/week ☐
- C** 13.71 g/week ☐
- D** 14.55 g/week ☐

**14** Some bacteria are aerobic decomposers that require oxygen for respiration. Other bacteria are anaerobic decomposers.

Assuming that there are equal numbers of these types of bacteria, which of these statements is true?

- A** A lack of oxygen will slow or prevent some decay. ☐
- B** A lack of oxygen will slow or prevent all decay. ☐
- C** A lack of oxygen will have no overall effect on decay. ☐
- D** Enzymes work best under aerobic conditions. ☐

**15** This graph shows the rate of biogas production over time.



What is the rate of biogas production at 2 hours?

What is the rate of biogas production at 4 hours?

- A** 1.0 ☐
- B** 5.0 ☐
- C** 4.5 ☐
- D** 18 ☐

What is the rate of biogas production at 6 hours?

What is the rate of biogas production at 8 hours?

- A** 1.0 ☐
- B** 5.0 ☐
- C** 4.5 ☐
- D** 18 ☐



What is the rate of biogas production at 2 hours?

What is the rate of biogas production at 4 hours?

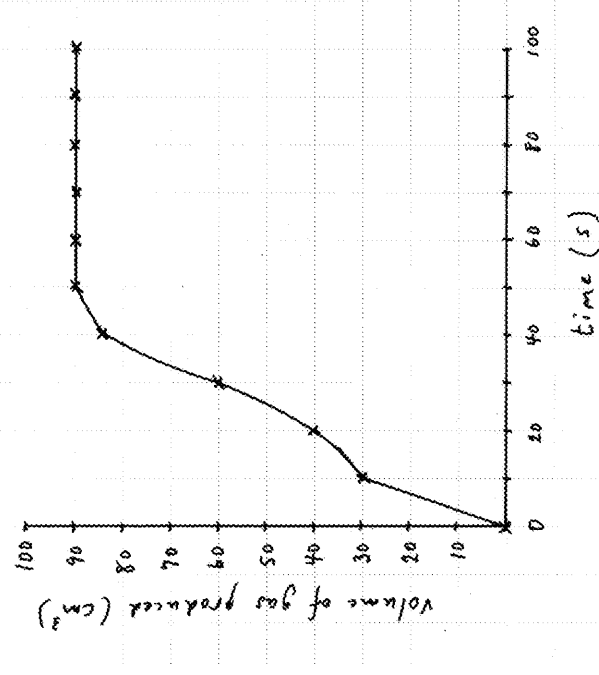
- A** 4 ☐
- B** 3 ☐
- C** 2 ☐
- D** 1 ☐

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- 17 This graph shows the volume of carbon dioxide gas produced at different times during an experiment.



The rate of gas production in the first 10 seconds is:

- A  $2 \text{ cm}^3/\text{s}$   
 B  $40 \text{ cm}^3/\text{s}$   
 C  $0.5 \text{ cm}^3/\text{s}$   
 D  $3 \text{ cm}^3/\text{s}$

☐ ☐ ☐ ☐

- 18 An ecologist measured the abundance of four different species of plants in a field. She measured the abundance of each species at four different times. Which of the following factors are likely to affect the abundance of the plants?
- A Shade  
 B Soil  
 C Shape  
 D Size

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## Topic 2: B5 Genes, inheritance

### B5.1 Inheritance

19 An example of discontinuous variation is a person's:

- A Height. ☐
- B Hair length. ☐
- C Eye colour. ☐
- D Weight. ☐

23

20 What is an allele defined as?

- A An organism's genetic make-up. ☐
- B An organism's outward appearance. ☐
- C A particular form of a gene. ☐
- D A gene. ☐

Which of

- A Chromosomes
- B Ribosomes
- C Secretory cells
- D Proteins

21 Although we can easily describe a person's phenotype, we cannot know their genotype by looking at them. Why?

- A We do not know which alleles they possess. ☐
- B Their genotype may change over time. ☐
- C Recessive alleles can mask the effects of dominant alleles. ☐
- D They may be homozygous dominant. ☐

24

22 What is the definition of a gene?

- A The entire genetic material of an organism. ☐
- B A short section of DNA. ☐
- C The chromosome responsible for a characteristic. ☐
- D The circular DNA in bacteria. ☐

What does

- A Chromosomes
- B Genes
- C Form
- D Two

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- 25 Which of these statements is true for sexual reproduction?
- A It requires less energy than asexual reproduction.
  - B It produces large numbers of identical offspring quickly.
  - C It produces variation in the offspring.
  - D It produces gametes by mitosis.

☐  
☐  
☐  
☐

- 26 Which of the following statements is not true?
- A A haploid cell is a normal body cell.
  - B A haploid cell has half the chromosome number.
  - C A haploid cell is produced by meiosis.
  - D A haploid cell is a gamete.

☐  
☐  
☐  
☐

- 27 The diagram shows how gender is determined in mammals:
- Mother**  
XX

|   |   |   |
|---|---|---|
|   | X | X |
| X |   |   |
| Y | * |   |

**Father**  
XY
- Which letters complete the missing box in the genetic diagram shown by the asterisk (\*)?
- A XX
  - B XY
  - C X<sup>y</sup>
  - D X<sup>2</sup>

☐  
☐  
☐  
☐

- 28 In the diagram above, what is the expected ratio of male to female offspring?
- A 3:1
  - B 1:3
  - C 1:1
  - D 1:2

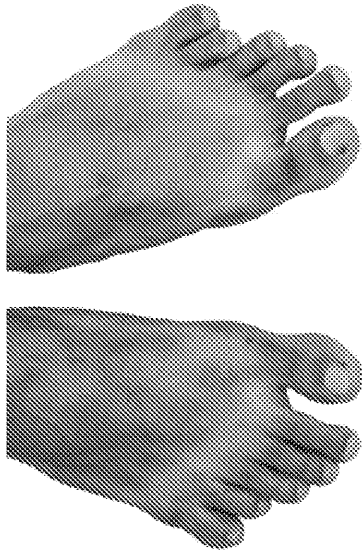
☐  
☐  
☐  
☐

- 29 What ha
- A Chr
  - B Chr
  - C Chr
  - D Dip

- 30

This dia  
represe  
people  
by a rec  
A He  
B Ho  
C Ho  
D Can

- 31 People  
respons  
can suff
- A HH
  - B HH
  - C Hh
  - D Hh



Polydactyly is a dominant disorder in which a person is born with extra fingers or toes. In this case what would sufferers would be?

- A** Homozygous recessive. ☐
- B** More likely to be male. ☐
- C** More likely to be female. ☐
- D** Heterozygous or homozygous dominant. ☐

'Most phenotypic features are the result of multiple genes rather than single gene inheritance.' Which of these examples does not support the statement above?

- A** Human hair colour and characteristics (e.g. if it's straight or curly). ☐
- B** The combination of a seed's characteristics, e.g. wrinkled or smooth skin and its colour. ☐
- C** The inheritance of a genetic disorder. ☐
- D** Human skin colour. ☐

- 34** A scientist compares the number of seeds in a pea pod. The results are as follows:
- | Seed Colour | Number of Pods |
|-------------|----------------|
| Yellow      | 34             |
| Green       | 26             |
- What would be the expected ratio of yellow to green seeds?
- A** 3:1
  - B** 1:3
  - C** 2:3
  - D** 3:2

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## B5.2 Natural selection and evolution

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 35 | Which row has the correct sequence of the stages of natural selection?<br><br>1. The organisms that are the best adapted to their environment survive and are able to reproduce.<br>2. Different organisms of the same species show variation.<br>3. This process is then repeated many times.<br>4. The offspring inherit genes from successful, well-adapted organisms.                                                                                                                                                                                            | 38 Identify Kingdom<br><b>A</b> Organisms that are best adapted to their environment survive and are able to reproduce.<br><b>B</b> Different organisms of the same species show variation.<br><b>C</b> This process is then repeated many times.<br><b>D</b> The offspring inherit genes from successful, well-adapted organisms.                                                                                                                                                                                                                                                                                                                                                                     |
| 36 | Which statements are true with regard to evidence for evolution from the fossil record?<br><br>1. Older rocks are found deeper than younger rocks.<br>2. The fossil record shows how organisms that lived in the past differ from those living today.<br>3. The fossil record shows us how long a species lived for.<br>4. The fossil record shows us when new species appeared.                                                                                                                                                                                     | 39 Why can we use the fossil record to evidence evolution?<br><b>A</b> It is the only evidence for evolution.<br><b>B</b> It shows how organisms have changed over time.<br><b>C</b> It shows how organisms have stayed the same over time.<br><b>D</b> It shows how organisms have disappeared over time.                                                                                                                                                                                                                                                                                                                                                                                             |
| 37 | Why is the development of antibiotic resistance by bacteria an example of natural selection?<br><br><b>A</b> It arises from a mutation but it has no survival advantage and the characteristics for resistance cannot be passed on.<br><b>B</b> Bacteria with a mutation have a survival advantage and can, therefore, pass on the characteristics for resistance to the next generation.<br><b>C</b> Bacteria reproduce quickly and the effects of antibiotic resistance are seen quickly.<br><b>D</b> Antibiotics have been overprescribed and not used correctly. | 40 These rows show the development of antibiotic resistance by bacteria. The first row shows the characteristics of the bacteria before the antibiotic was used. The second row shows the characteristics of the bacteria after the antibiotic was used. The third row shows the characteristics of the bacteria after the antibiotic was used for a longer period. The fourth row shows the characteristics of the bacteria after the antibiotic was used for a longer period. The fifth row shows the characteristics of the bacteria after the antibiotic was used for a longer period.<br><b>A</b> 1 and 2 only.<br><b>B</b> 1 and 2 only.<br><b>C</b> 1, 2 and 3 only.<br><b>D</b> 1, 2, 3 and 4. |

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# Topic 3: B6 Global challenge

## B6.1 Monitoring and maintaining the environment

- 41

A student decided to investigate whether there was any difference in the number of daisies in a trampled area and an untrampled area. A suitable method to use would involve which of these?

A

Quadrats.

☐

B

Pooters.

☐

C

Transects.

☐

D

Kick sampling.

☐
- 43

Which of the following is not a method of sampling?

1.

The quadrat method.

2.

The transect method.

3.

The pooter method.

4.

The kick sampling method.

A

1 and 2

B

3 and 4

C

1 and 3

D

2 and 4

- 42

The student obtained the following results:

| Measurement number | Number of daisies in the untrampled area | Number of daisies in the trampled area |
|--------------------|------------------------------------------|----------------------------------------|
| 1                  | 6                                        | 3                                      |
| 2                  | 7                                        | 2                                      |
| 3                  | 4                                        | 1                                      |
| 4                  | 6                                        | 2                                      |
| 5                  | 3                                        | 2                                      |
| 6                  | 5                                        | 3                                      |

- What is the mean number of daisies for the untrampled area?

A

6.0

☐

B

5.2

☐

C

5.1

☐

D

2.2

☐

- 44

If each quadrat is 60 m<sup>2</sup>, what is the total area of the trampled area?

A

312 m<sup>2</sup>

B

132 m<sup>2</sup>

C

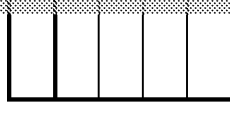
78 m<sup>2</sup>

D

18 m<sup>2</sup>

- 45

This is a bar chart showing the number of daisies in the trampled area for each measurement number.



- Which of the following is the most appropriate label for the y-axis?

A

Daisy count

B

Daisy number

C

Plant count

D

Clay count

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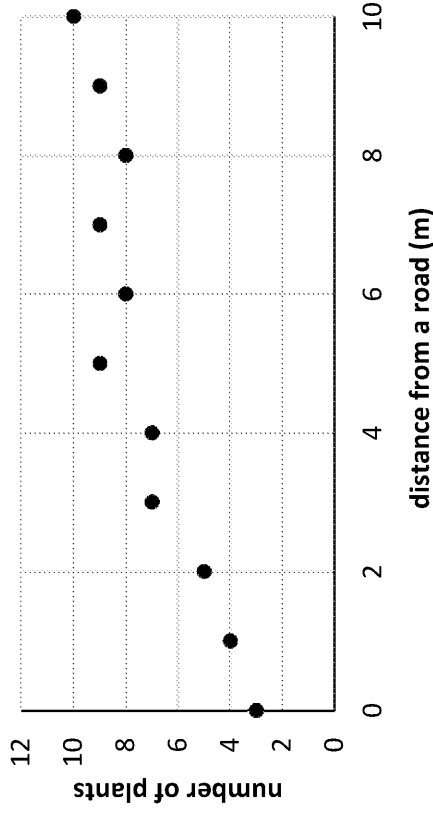


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- 46 This scatter diagram shows the relationship between distance from a road and how many plants were found there.



- 49 Which of the following is the best description of the relationship between distance from a road and number of plants?
- A There is no correlation.  
B There is a positive correlation.  
C There is a negative correlation.  
D There is a random distribution.

- 50 Which of the following is the best description of the relationship between distance from a road and number of plants?
- A There is no correlation.  
B There is a positive correlation.  
C There is a negative correlation.  
D There is a random distribution.

- 51 Which of the following is the best description of the relationship between distance from a road and number of plants?
- A There is no correlation.  
B There is a positive correlation.  
C There is a negative correlation.  
D There is a random distribution.

What does the data in this graph show?

- A No correlation. ☐  
B A positive correlation. ☐  
C A negative correlation. ☐  
D A random distribution. ☐

- 47 When using sampling techniques it is important that samples are obtained randomly. Why?

- A To provide a good average. ☐  
B To avoid biased results. ☐  
C To make sure there are enough results. ☐  
D To avoid disturbing the environment. ☐

- 48 The formula to estimate population size is:

$$\frac{\text{number in the 1st sample} \times \text{number in the 2nd sample}}{\text{number of recaptured marked individuals}}$$

If the population size is 310 and the number in the first sample is 170, and the number in the second sample is 250, what is the number of recaptured marked individuals?

- A 137 ☐  
B 80 ☐  
C 210 ☐  
D 243 ☐

## B6.2 Feeding the human race

- 52** Why is selective breeding different from natural selection?  
**A** It requires many generations before the effects are seen. ☐  
**B** People choose which animals or plants breed. ☐  
**C** It relies on natural variation. ☐  
**D** It increases biodiversity. ☐
- 53** To selectively breed for chickens that lay the eggs with the thickest shells, a farmer would start by choosing to breed the chickens that:  
**A** Are the largest and healthiest. ☐  
**B** Are the oldest and have survived the most winters. ☐  
**C** Produce the eggs with the thickest shells. ☐  
**D** Lay the most eggs. ☐
- 54** Which of these is an advantage of selective breeding?  
**A** The gene pool may be reduced. ☐  
**B** Genetically inherited health problems may increase. ☐  
**C** Rare breeds may disappear. ☐  
**D** Different breeds can be produced resulting in better-quality food and higher yields. ☐
- 55** What does genetic engineering involve?  
**A** Selective breeding of different species. ☐  
**B** Taking specific genes from one organism and introducing them into another. ☐  
**C** Mixing eggs and sperm, or ovules and pollen, from different species. ☐  
**D** Taking genes from bacteria. ☐
- 56** **HT only**  
 How is DNA cut?  
**A** Using a plasmid. ☐  
**B** Using a ligase enzyme. ☐  
**C** Using a restriction enzyme. ☐  
**D** Using sticky ends. ☐
- 57** **HT only**  
 Why are the following human achievements achieved?  
**A** To increase biodiversity. ☐  
**B** To increase the number of people. ☐  
**C** To increase the number of people. ☐  
**D** To increase the number of people. ☐
- 58** For a crop to be successful, it must be able to:  
**A** It must be able to grow in a wide range of conditions. ☐  
**B** It must be able to grow in a wide range of conditions. ☐  
**C** It must be able to grow in a wide range of conditions. ☐  
**D** It must be able to grow in a wide range of conditions. ☐
- 59** As the human population increases, the demand for food will increase. This will lead to:  
**A** A decrease in the number of people. ☐  
**B** An increase in the number of people. ☐  
**C** A decrease in the number of people. ☐  
**D** An increase in the number of people. ☐
- 60** Why is it important to have a variety of crops?  
**A** To increase the number of people. ☐  
**B** To increase the number of people. ☐  
**C** To increase the number of people. ☐  
**D** To increase the number of people. ☐
- 61** Some people are concerned about the use of genetic engineering. Which of the following is a concern?  
**A** We may lose some of our genetic diversity. ☐  
**B** We may lose some of our genetic diversity. ☐  
**C** We may lose some of our genetic diversity. ☐  
**D** We may lose some of our genetic diversity. ☐

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B6.3 Monitoring and maintaining

62 Which of these is an example of a communicable disease?

- A Cardiovascular disease.
- B Cancer.
- C Measles.
- D Obesity.

☐

☐

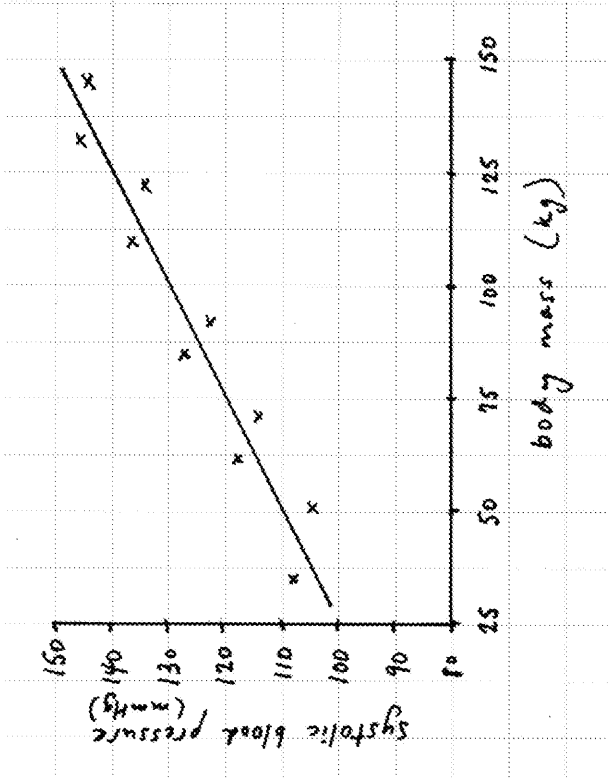
☐

☐

64 Human

- A Measles.
- B Varicella.
- C Pertussis.
- D Cerebral malaria.

63



A researcher plotted the graph above. What does this graph show?

- A That an increase in body mass causes an increase in blood pressure.
- B A positive correlation between body mass and blood pressure.
- C Blood pressure increases with age.
- D An increase in blood pressure results in obesity.

☐

☐

☐

☐

65 The total number of people in Wales who suffer from the following conditions. Which condition has the highest number of sufferers?

- A The number of people who suffer from heart disease.
- B The number of people who suffer from cancer.
- C The number of people who suffer from diabetes.
- D The number of people who suffer from asthma.

66 Sufferers of the following conditions. Which condition has the highest number of sufferers?

- A Tuberculosis.
- B Malaria.
- C Tetanus.
- D Salmonella.

67 Which of the following is not a communicable disease?

- A Flu.
- B Malaria.
- C Athlete's foot.
- D Crohn's disease.

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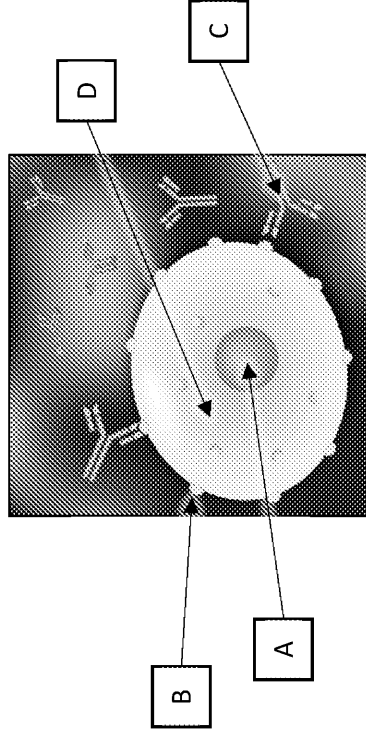


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|           |                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                     |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>68</b> | The spread of diseases caused by pathogens can be prevented or reduced by which of the following?<br>1. DNA testing.<br>2. Detecting the antigen that is causing the disease.<br>3. Visual identification of the disease.<br>4. Use of genetically modified organisms (e.g. plants that have been modified to have resistance against a particular disease). | <b>72</b> | What is the correct answer?<br><b>A</b> To prevent the spread of disease.<br><b>B</b> To prevent the spread of disease.<br><b>C</b> To prevent the spread of disease.<br><b>D</b> To prevent the spread of disease. |
| <b>69</b> | Identify the diseases that affect plants:<br>1. Tobacco mosaic virus<br>2. Crown gall<br>3. Barley powdery mildew<br>4. Gonorrhoea                                                                                                                                                                                                                           | <b>73</b> | Which of the following are human diseases?<br>1. The common cold.<br>2. Malaria.<br>3. Strep throat.<br>4. Plantain.                                                                                                |
| <b>70</b> | White blood cells are part of which system?<br><b>A</b> Blood clotting system.<br><b>B</b> Immune system.<br><b>C</b> Oxygen transport system.<br><b>D</b> None of the above.                                                                                                                                                                                | <b>74</b> | When are white blood cells most active?<br><b>A</b> When the body is healthy.<br><b>B</b> When the body is infected.<br><b>C</b> When the body is stressed.<br><b>D</b> When the body is injured.                   |
| <b>71</b> | What is the main job of phagocytes?<br><b>A</b> To produce antibodies.<br><b>B</b> To produce antitoxins.<br><b>C</b> To engulf/ingest pathogens.<br><b>D</b> To help blood to clot.                                                                                                                                                                         |           |                                                                                                                                                                                                                     |

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Which letter represents an antibody?

- A   B   C   D**

- 76** Vaccinations work because the next time the pathogen enters the body:

- A** Lymphocytes quickly make specific antibodies against the pathogen.
- B** Hybridoma cells quickly make monoclonal antibodies.
- C** Further mutations of the virus are prevented.
- D** Lymphocytes quickly make more antigens.

- ## 77 What are antivirals?

- A** A type of antibiotic.
- B** Drugs that treat viral infections.
- C** Effective against fungal infections.
- D** Responsible for the emergence of antibiotic-resistant bacteria.

The graph shows that the number of people who are 10, and

- 1× 1× 1× 1×  
A B C D

**79** What is \_\_\_\_\_ and we \_\_\_\_\_

- |   |    |
|---|----|
| A | 99 |
| B | 51 |
| C | 51 |
| D | 00 |

**80** If the m  
produce

- |   |     |
|---|-----|
| A | 5.1 |
| B | 5.1 |
| C | 5.1 |
| D | 5.1 |

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- 81** A scientist calculated the area of the zone of inhibition to be  $12.57 \text{ cm}^2$ . This means that the diameter of the zone was:
- A** 2 cm ☐ **86** Which enzyme is involved in cardiovascular disease?  
**A** Alcohol dehydrogenase ☐
- B** 4 cm ☐ **B** Peroxisomal oxidase ☐
- C** 3.14 cm ☐ **C** Obsolete ☐
- D** 6.29 cm ☐ **D** Peroxisomal oxidase ☐

- 82** What do clinical trials involve?
- A** Laboratory testing of new drugs. ☐
- B** Testing new drugs on animals. ☐
- C** Testing new drugs in healthy volunteers and patients. ☐
- D** Measuring the area where no bacteria have grown. ☐

- 83** What does the placebo effect describe?
- A** Unwanted effects of a drug. ☐
- B** When people feel better because they think they will if they're taking something. ☐
- C** Testing drugs on animals. ☐
- D** The chance of having a disease. ☐

- 84** New drugs are tested to ensure they are safe and effective. The trials are arranged so that doctors and patients do not know whether they are in the test group or the control group. What is this method called?
- A** Preclinical testing. ☐
- B** Clinical trial. ☐
- C** Double-blind trial. ☐
- D** Random testing. ☐

- 85** What is the definition of a risk factor?
- A** The cause of a disease. ☐
- B** The delay before a healthy person shows signs of a disease. ☐
- C** A lifestyle or genetic influence that increases the chance of developing a disease. ☐
- D** The likelihood of developing side effects to a drug. ☐

- 87** Differences between the two groups in a clinical trial are the way

| Row |
|-----|
| A   |
| B   |
| C   |
| D   |

- A** ☐
- B** ☐
- C** ☐
- D** ☐

- 88** What is the most common cause of death in the UK?
- A** The heart ☐
- B** Cholesterol ☐
- C** The lungs ☐
- D** Obesity ☐

- 89** What is the most common cause of death in the UK?
- A** One of the most common causes of death in the UK is heart disease. ☐
- B** One of the most common causes of death in the UK is heart disease. ☐
- C** One of the most common causes of death in the UK is heart disease. ☐
- D** One of the most common causes of death in the UK is heart disease. ☐

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- 90

What are stem cells?

A

Specialised cells.

☐

B

Plant cells containing xylem and phloem tubes.

☐

C

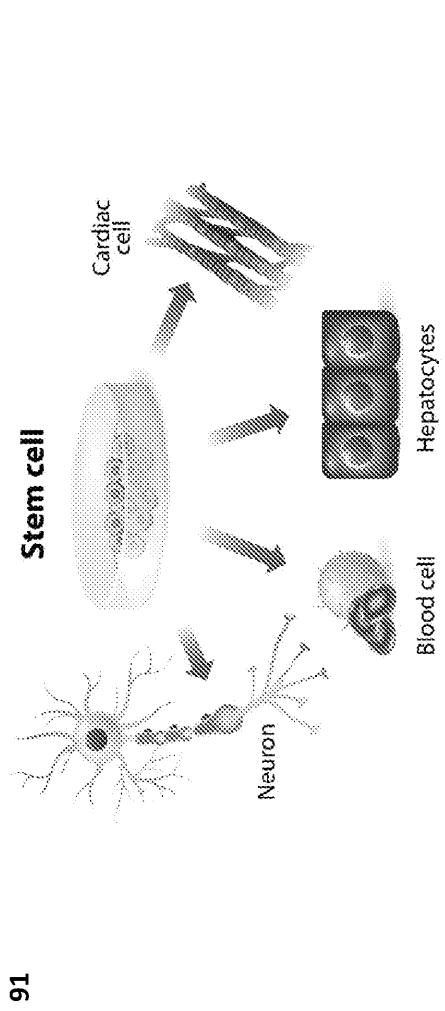
Unspecialised cells that can develop into specialised cells.

☐

D

Cells that are produced by cloning.

☐



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## CS7 Practical skills

### Practical activity group B2 – Sampling

- 94 A scientist counted the number of dandelions in a 1 m<sup>2</sup> quadrat. The mean was 11. In a field that is 500 m<sup>2</sup> in area, what is the estimated number of dandelions in the field?
- A 45 ☐
- B 55 ☐
- C 5500 ☐
- D 550 ☐

- 95 A scientist used the capture-recapture method to estimate the population size of woodlice using the formula

$$\frac{\text{number in the 1}^{st} \text{ sample} \times \text{number in the 2}^{nd} \text{ sample}}{\text{number of recaptured marked individuals}}$$

He counted seven in the first sample and six in the second sample, of which four had already been marked.

What is the population size estimated to be?

- A 10 ☐
- B 11 ☐
- C 5 ☐
- D 3 ☐

- 96 On what does the method used in Question 95 depend on?

- A No woodlice dying. ☐
- B Using the same quadrat. ☐
- C Use of a clear mark that reduces woodlice survival. ☐
- D Obtaining a good kick sample. ☐

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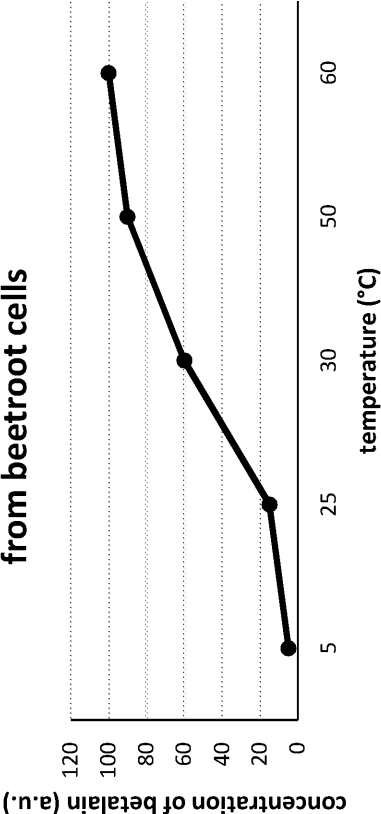


**100** An A Level student investigated the effect of temperature on the concentration of betalain that leaked from beetroot cells, and plotted this graph from the results:

| Temperature (°C) | Concentration of betalain (arbitrary units) |
|------------------|---------------------------------------------|
| 5                | 5                                           |
| 25               | 15                                          |
| 30               | 60                                          |
| 50               | 90                                          |
| 60               | 100                                         |

What is wrong with this graph?

**Effect of temperature on betalain leakage from beetroot cells**



- A** The axes are plotted the wrong way round.  
**B** They forgot to plot the values at 0 °C.  
**C** The x-axis does not have a linear scale.  
**D** The y-axis has a linear scale.
- ☐ ☐ ☐ ☐

**101** The student asked his friends for reasons why the results might be incorrect. Which of the following is a valid reason?  
**A** The student did not use a standard solution.  
**B** The student did not use a standard solution.  
**C** The student did not use a standard solution.  
**D** The student did not use a standard solution.

**102** A scientist is investigating the effect of temperature on the rate of photosynthesis in a plant. The scientist has plotted a graph of the rate of photosynthesis against temperature. The graph shows a curve that starts at (5, 5), rises to (25, 15), then more steeply to (30, 60), and finally levels off to (50, 90) and (60, 100). What is the rate of photosynthesis at 30 °C?  
**A** 75  
**B** 25  
**C** 0  
**D** 10

**103** A scientist is investigating the effect of temperature on the rate of photosynthesis in a plant. The scientist has plotted a graph of the rate of photosynthesis against temperature. The graph shows a curve that starts at (5, 5), rises to (25, 15), then more steeply to (30, 60), and finally levels off to (50, 90) and (60, 100). What is the rate of photosynthesis at 30 °C?  
**A** -36  
**B** +36  
**C** -0.36  
**D** -20

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## Practical activity group B5 – Microbiology

- 104** A student measured the diameter of the clear zone around discs of antibiotics in cm, and calculated the area of the clear zone in cm<sup>2</sup>. She wanted to compare her data with that of her friend, who had measured her results in mm<sup>2</sup>. To convert from cm<sup>2</sup> to mm<sup>2</sup> what should she do?
- A** ☐  $\times 1000$   
**B** ☐  $\div 1000$   
**C** ☐  $\times 100$   
**D** ☐  $\div 100$

- 105** A logarithmic scale on a graph allows:
- A** ☐ An exponential curve to be plotted.  
**B** ☐ All stages of bacterial growth to be plotted on one graph.  
**C** ☐ A large range of numbers to be plotted easily, from very small to very large.  
**D** ☐ A positive correlation to be identified easily.

- 106** The average length of a bacterium is 1  $\mu\text{m}$ . How many bacteria would fit across a circle of 1 mm diameter?
- A** ☐ 1000  
**B** ☐ 100  
**C** ☐ 10 000  
**D** ☐ 1 000 000

- 107** What do experiments to investigate the effectiveness of antibiotics using discs soaked in the antibiotic and placed on bacteria growing in an agar plate in a Petri dish depend on?
- A** ☐ Absorption of bacteria into the disc, removing them from the agar.  
**B** ☐ Diffusion of the antibiotic-killing bacteria and producing a clear zone.  
**C** ☐ Flattening of the bacteria by the antibiotic disc.  
**D** ☐ Competition between bacteria on the disc and bacteria in the Petri dish.

- 108** What is  $ax^2 + bx + c$ ?
- A** ☐  $ax^2$   
**B** ☐  $x + c$   
**C** ☐  $y =$   
**D** ☐  $y =$

- 109** The graph shows the decay by

- rate of decay (a.u.)

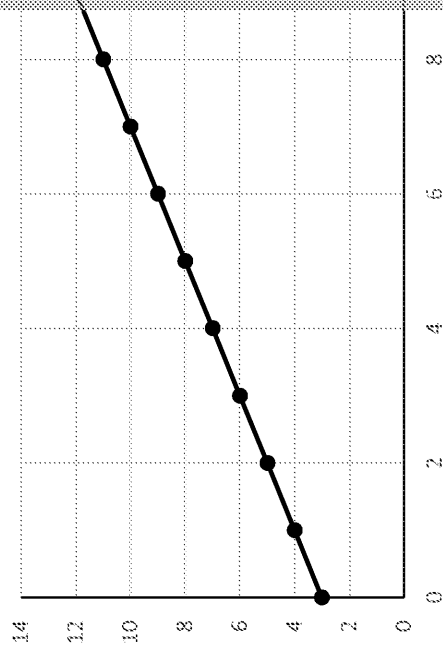
- Which curve shows the rate of decay?
- A** ☐ **D** ☐  
**B** ☐ **C** ☐

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**110** The graph below illustrates a linear relationship. What are the slope (gradient) and the intercept?



- A 10 and 3.
- B 1 and 3.
- C 3 and 10.
- D 2 and 10.

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# Answers to Multiple-choice Questions

|     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|
| 1.  | A | 23. | C | 45. | C | 67. | C |
| 2.  | D | 24. | B | 46. | B | 68. | B |
| 3.  | D | 25. | C | 47. | B | 69. | B |
| 4.  | B | 26. | A | 48. | A | 70. | A |
| 5.  | B | 27. | B | 49. | C | 71. | A |
| 6.  | C | 28. | C | 50. | B | 72. | A |
| 7.  | C | 29. | A | 51. | A | 73. | A |
| 8.  | A | 30. | B | 52. | B | 74. | A |
| 9.  | B | 31. | C | 53. | C | 75. | A |
| 10. | D | 32. | D | 54. | D | 76. | A |
| 11. | B | 33. | C | 55. | B | 77. | A |
| 12. | C | 34. | A | 56. | C | 78. | A |
| 13. | B | 35. | C | 57. | A | 79. | A |
| 14. | A | 36. | D | 58. | C | 80. | B |
| 15. | B | 37. | B | 59. | B | 81. | B |
| 16. | B | 38. | A | 60. | C | 82. | B |
| 17. | D | 39. | B | 61. | D | 83. | B |
| 18. | B | 40. | D | 62. | C | 84. | B |
| 19. | C | 41. | A | 63. | B | 85. | B |
| 20. | C | 42. | B | 64. | D | 86. | B |
| 21. | A | 43. | A | 65. | B | 87. | B |
| 22. | B | 44. | B | 66. | A | 88. | B |

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