

B1a answers

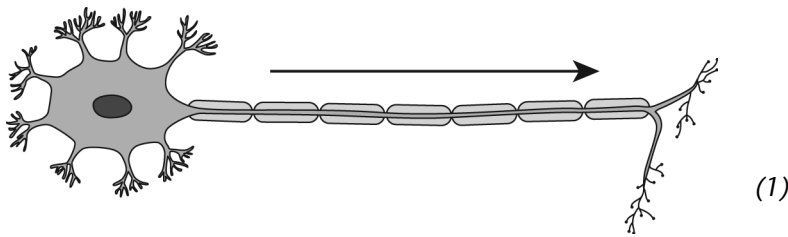
Remember:

Check which grade you are working at.

Page 4 Coordination

1 a i Motor (1)

ii



b As an electrical impulse (1)

Page 4 Receptors

2 a Temperature receptor in skin (1); muscle in arm / hand (1)

b Heat (1); electrical (1)

3 a i Heart (1)

ii Provide more oxygen to muscles (so you can run faster) (1)

b (Any 2:) Information travels more slowly using hormones; travels as chemical using hormones but electrical impulse in neurone; travels in blood using hormones but along cells using neurones; lasts longer using hormones than using neurones.

Page 5 Reflex actions

1 a i Transmitter substance /acetylcholine (1)

ii Transmitter substance / contents of X; released into cleft; diffuses across cleft; sets up impulse in the next neurone (2)

b i One (1)

ii (Any 1:) Each neurone can have many synapses with other neurones; the impulse can also pass on to other neurones when it gets to the end of the sensory neurone, for example to a neurone that carries the impulse up to the brain so that you can be aware of what is happening.

Page 5 In control

2 a To replace (sodium and chloride ions) lost in sweat (1); to maintain their concentration in the blood / so that cells can work effectively (1)

b Makes the liver take glucose from the blood (1); storing it as glycogen (1)

c i If there is no insulin, then there is nothing to make her liver store glucose (1); she has no stores from which her body can take glucose between meals (1)

ii (Any 2:) Glucose is needed for respiration, to provide energy to cells; if there is no glucose, cells can run out of energy; she will feel very tired, and may even go into a coma (because her brain cells have no energy supply)

B1a answers

Page 6 Reproductive hormones

- 1 a i** Pituitary (1)
 ii Ovary (1)
- b i** Arrow at day 14 (1)
 ii Days 1 to 5 (1)
 ii A is oestrogen (1); B is LH (1)

Page 6 Controlling fertility

- 2 a** The older the woman, the lower the success rate (1)
- b** (Any 2:) The success rate is too low; uses up money better spent on other health treatments; refer to possible problems for children of (very) elderly parents
- 3** (Any 2:) FSH stimulates eggs to mature; it is difficult to find the correct dose, as women don't all respond in the same way to this hormone; if the dose is too high, then more than one egg may mature at the same time; there could therefore be two or more eggs in the oviduct at the same time; if more than one is fertilised, then more than one zygote is produced, each of which may develop into an embryo

Page 7 Diet and energy

- 1 a i** The rate of chemical reactions in cells / the body (1)
 ii She uses up energy faster (1); so more of her food is used for releasing energy rather than being stored as fat (1)
 iii She could do more exercise (1)
- b i** Fat (1)
 ii The carbohydrate (in the form of glucose) is broken down in the process of respiration (1);
 glucose + oxygen → carbon dioxide + water, which releases energy for the cell to use (1)

Page 7 Obesity

- 2 a** In Russia, there are more obese women than obese men, in Canada, the percentages obese men and obese women are the same (1)
- b** If obesity was caused mostly by genes, you would expect approximately the same proportion of women and men to be obese, because they would have similar genes (1); the difference could be explained if men live a different lifestyle from women, for example doing more exercise and eating less (1)
- c** Obese people put more, stress / weight, on their joints (1); cause damage to the joint surface / wear away cartilage (1)

B1a answers

Page 8 Not enough food

- 1 a i** (Any 1:) Energy taken in depends on the total amount eaten; what matters is the balance between energy taken in and energy used; weight is lost only if energy taken in is less than energy used
- ii** (Any 2:) They will not be able to maintain this weight loss / weight will easily go back on again; they may feel ill / weak (after losing so much weight so quickly); they may have lost a lot of water
- iii** High fat levels in the diet can raise the level of cholesterol in the blood (1); which can increase the risk of developing heart disease (1)

Page 8 Cholesterol and salt

- 2 a C** (1)
- b** (Any 2:) The sample of people should have included the same age range; the sample should have been selected in the same way in both cities (for example at random, or the people visiting a doctor's surgery); there should have been a large number of people in each sample
- c** (Any 2:) If fat is reduced in the diet, this may lead to a lower blood cholesterol level; this will cause the liver to produce more cholesterol, so you won't be able to get the levels down much further; however, if the enzyme that makes cholesterol is not working, then the liver will not be able to respond to the low blood cholesterol levels, and they will stay low

Page 9 Drugs

- 1 a** You cannot manage without it (1); if you stop taking the drug you experience withdrawal symptoms (1)
- b i** More in 16-39 age group than in the 30-59 age group (1); 7.3 % of frequent nightclub visitors in 16-39 age group took cocaine, but only 1.4% in the 30-59 age group (1)
- ii** In both age groups, those who often visited night clubs regularly were more likely to take cocaine than those who only visited night clubs rarely (2)

Page 9 Trialling drugs

- 2 a A** (1)
- b** B, C, D and E (1)
- c** B (1)
- d** (Any 2:) The trials involve only a limited number of people; once many more people are taking the drug, rare side effects have more chance of showing up; the trials only go on for a limited time; the side effects may not show up until people have been taking the drug for a long time

B1a answers

Page 10 Illegal drugs

- 1 a** Syringe may be contaminated (1); with viruses (1)
- b** (Any 2:) May become addicted; because it changes the behaviour of synapses in the brain; suffer withdrawal symptoms if they stop taking it

Page 10 Alcohol

- 2 a** A (1)
- b** No, we only know how many were admitted to hospital (1); perhaps women take less of the drug than men / are less likely to be made ill by taking the drug (1)
- c** Liver cells are damaged as they try to break down alcohol (1)
- d** (Any 2:) Alcohol is a legal drug; the others are all illegal; alcohol alone caused more hospital admissions than all the others put together; 390 admissions compared with 230 admissions, i.e. 160 more

Page 11 Tobacco

- 1 a** (Any 2:) There is a time lag between smoking and getting; cancer early increase in deaths from lung cancer may not have been noticed; took a while for people to make a link between the two
- b** Some other factor could be causing both increases (1)
- c** Carbon monoxide combines with haemoglobin (1); this reduces the oxygen-carrying capacity of the blood the baby does not get so much oxygen (1); so its cells may not be able to respire as they should and release energy for growth (1)

Page 11 Pathogens

- 2 a** B (1)
- b** He realised that the ward with most deaths was visited by doctors; he suggested they were passing disease-causing substances between patients (1); he asked doctors to wash their hands (before and after touching patients) (1)
- c** (Any 2:) People are living closely together in a hospital, so it is easier for pathogens to get from one to another; people may go into hospital because they have an infectious disease, which could spread to other people; people in hospital may have weakened immune systems because they are ill, so they may not be likely to suffer from infections

B1a answers

Page 12 Body defences

- 1 a** Phagocytosis (1)
- b** It is destroyed / killed (1); digested by enzymes (1)
- 2 a** It was caused by a pathogen (a virus) which was carried in a person's body (1); who travelled from China / Vietnam / Singapore, to Canada / Switzerland (1)
- b** (Any 2:) An epidemic is an outbreak of an infectious disease in one area; a pandemic is a world-wide outbreak of a disease; almost all SARS cases were in a few countries close together, not widely spread around the world

Page 12 Drugs against diseases

- 3 a** C (1)
- b i** $47.9 - 38.1 = 9.8$ % fewer (1)
- ii** To reduce the risk of bacteria developing resistance (1); the more they are exposed to antibiotics, the more likely it is that a resistant strain will arise (1)

Page 13 Arms race

- 1** D (1)
- 2 a** (Any 2:) They have increased; slowly at first and then more rapidly; almost doubling every two years between 2000 and 2004
- b** (Any 2:) Mutations in bacteria happen randomly (they do not happen because of the antibiotic); causing some bacteria to have resistance to the antibiotic; these bacteria survive and reproduce even when the antibiotic is used; while the non-resistant ones die

Page 13 Vaccination

- 3 a** (Any 2:) No, because we cannot be sure the drop in cases was caused by the vaccination; some other factor might have caused them to fall; but there is a correlation between the use of the vaccine and the fall in the number of cases
- b** (Any 2:) Not everyone was vaccinated straight away; only 10–14 year olds vaccinated; as time went on a bigger proportion of people had immunity
- c** (Any 4:) Reference to antigens; white blood cells respond lymphocytes; secrete antibodies specific to, antigen / TB / bacterium; multiply; form memory cells; on next infection bacteria killed immediately on a bigger proportion of people had immunity (accept other well-argued suggestions).

B1b answers

Remember:

Check which grade you are working at.

Page 15 Hot and Cold

- 1 a 38 °C (1)
- b It loses heat to the cold, air / ground (1)
- c The cold blood from the feet is warmed by the warm blood in the artery as it flows upwards (1)
- 2 a Small body and large ears provides a larger surface area than large body and small ears less (1); surface area means less heat loss, so good in cold conditions / more surface area means more heat loss, so good in hot conditions (1)
- b Reference to camouflage (1)

Page 15 Adapt or die

- 3 Plants and animals are **adapted** for survival in their habitat. Some plants have **poisons** in their leaves, which harm insects that eat the leaves. Some plants have warning colours to deter **predators**. (3)
- 4 Competition for light (1); for water (1)

Page 16 Two ways to reproduce

1

1	2	3	4
D	A	C	B

(4)

- 2 (Any 2:) In asexual reproduction, there is only one parent; the offspring get all of their genes from this parent; in sexual reproduction, two gametes fuse together; the gametes may have different genes (even if they both come from the same parent) so the offspring can each have a different mixture of genes

Page 16 Genes and what they do

- 3 a In the nucleus of the cell, making up the chromosomes (1)
- b Each DNA molecule is made up of many different genes (1); the genes determine many of the characteristics of the cell, and of the organism (1)
- 4 a The male dog (1); because all of his chromosomes came from there (1)
- b i 39 (1)
- ii 78 (1)
- iii 78 (1)

B1b answers

Page 17 Cuttings

- 1 a** (Any 2:) They might have different genes; they might be growing in different kinds of soil; one might have more water than the other; one might have more light than the other
- b** Acorns are produced by sexual reproduction, so they are genetically different (1); cuttings only have genes from one parent, so they are genetically identical (1)
- 2 a** B (1)
- b** (Any 2:) All banana plants are genetically identical; as they cannot reproduce sexually, new combinations of genes cannot be produced; so all the plants will remain susceptible to the disease

Page 17 Clones

- 3 a** They are all formed from one zygote (1); so they all have the same genes / they are genetically identical (1)
- b** Many eggs could be obtained from one female of the rare species; and fertilised; each embryo could be split into many embryos; which could be put back into different females; or females of a different (but closely related) species; so you could get many more offspring from just one female parent

Page 18 Genetic engineering

- 1 a i** (Cheaper because:) He does not have to buy pesticides / he does not have to spend time or fuel spraying pesticides
- ii** (Cheaper because:) The farmer's costs in growing the maize are less / there will be no pesticides contaminating the maize
- b** They may think that eating GM foods is harmful to health (1); they may think that the GM maize might harm other organisms in the environment (1)
- 2** The bacteria contain the human gene for making insulin (1); the gene carries the, code / instructions, for making human insulin (1)

Page 18 Theories of evolution

- 3 a** C (1)
- b** (Any 2:) Only the ones with long necks reproduce; they pass on their genes to their offspring; all offspring contain the genes for long necks

B1b answers

Page 19 Natural selection

- 1 a** D (1)
b A (1)
c (Any 3:) Pale moths now better camouflaged / dark moths less well camouflaged; so more pale moths survive / fewer dark moths survive; pale moths more likely to breed / dark moths less likely to breed; more genes for pale wings passed on to offspring; so most moths in the population now pale
- 2** (Any 2:) A population on an island is isolated from the populations on the mainland; there may be different selection pressures on them / natural selection gives different features an advantages; so individuals with different characteristics are more likely to breed on the island and on the mainland; over time, different characteristics will evolve in the two places

Page 19 Fossils and evolution

- 3 a** From fossils (1)
b (Any 2:) Idea that they were adapted to their environment; more toes better for running on wet ground; climate became dryer; horses with fewer toes more likely to survive; and pass on their genes for fewer toes to their offspring; over time / many generations, all horses had only one toe
c (Any 2:) There may be other species that we have not yet found fossils of; which may have been the ancestors of the third type of horse; fossils do not tell us about ancestry

Page 20 Extinction

- 1** (Any 3:) Competition with the introduced crayfish / introduction of new competitor; compete for limited resources / not enough food for all; new disease may kill them; not enough new crayfish born to replace the ones that die
2 (Any 2:) Killed by humans; easy to kill because they could not fly; and because they were not afraid; other animals (rats, cats, dogs) introduced by humans killed the dodos; or were competitors of dodos (needing same food, same nesting sites); humans may have destroyed the dodo's habitat; so they could not find food / could not nest

Page 20 More people, more problems

- 3 a i** The right hand part beyond the current year
ii About 2 billion (1)
iii B (1)
b (Any 3:) More land is used for building houses; more land is used for agriculture or food production; more land is used for roads; more land is used for quarries or mines; more land is polluted
c (Any 2:) Improvements in diet; improvements in living conditions: clean water, good sewage disposal; improvements in health care: antibiotics, other medicines, pain-free surgery

B1b answers

Page 21 Land use

- 1 a C (1)
- b i No set-aside land in 1986 (1); increased to maximum in 2001 fell slightly to 2005 (1)
- ii Either grazing land or crop land both of which have reduced in area over this time period (1)
- iii (Any 2:) Biodiversity is the number of different species present – would increase; no herbicides or pesticides used on set-aside land; a variety of plants would grow there rather than just one if a crop was growing; provide more niches for different species of animals

Page 21 Pollution

- 2 a Concentration of DDT increases up the food chain (1); greatest concentration in the animals at the end of the chain (1)
- b (Any 2:) DDT persists for a long time; in the environment / in the bodies of animals; perhaps DDT is still being used in other countries

Page 22 Air pollution

- 1 a Coal-burning power stations(1)
- b Because bronchitis (1); trigger asthma attacks (but not actually cause asthma) (1)

Page 22 What causes acid rain?

- 2 a C (1)
- b They damage the lungs cause breathing problems / coughing / asthma attacks (1)
- c (Any 2:) The gases dissolve in water droplets; react to form acids; rain droplets containing acid fall to the ground when it rains
- d Kills trees by damaging their leaves / roots / washing away nutrients (1); kills fish by making water acidic / toxic chemicals washed in from soil (1)
- e (Any 2:) The limestone neutralises the acid; by reacting with it (to form salts and water); pH is raised
- f (Any 4:) Rises between 1970 and 1990; because there were more vehicles on the roads; falls sharply between 1990 and 2000; significant number of cars now fitted with catalytic converters; which change NO_x to nitrogen; continues to fall until 2005; more cars being fitted with catalytic converters; new designs for catalytic converters that work better

B1b answers

Page 23 Pollution indicators

- 1 a** (Any 2:) Use the animals as indicators; different animals can live in different oxygen concentrations; find out which animals are living in the water; match them to the oxygen concentration in which they are known to live
- b** (Any 2:) Rat-tailed maggots; they can survive in the lowest oxygen concentration; raw sewage reduces the oxygen concentration in the water
- c i** Haemoglobin picks up oxygen so they can get oxygen (1); out of the water even when the concentration is low (1)
- ii** Many other species are able to live in well-oxygenated water (1); bloodworms cannot compete with them for, space / food (1)

Page 23 Deforestation

- 2 a** Marbled cats and oriental short-clawed otters (1); they were present before logging, but there were none in the forest even two years after logging (1)
- b** (Any 2:) Their numbers fell immediately after logging but then increased; although not back to their former level; logging destroyed their habitat / they prefer to live amongst large trees; some returned and were able to live in the regenerating forest
- c** (Any 2:) These were more common after logging than before; their preferred habitat may be smaller trees; their competitors were not present in the forest after logging
- d** (Any 2:) We may find useful drugs in the rainforest plants; deforestation increases carbon dioxide in the air; because there is less photosynthesis; this could add to global warming

Page 24 The greenhouse effect – good or bad?

- 1 a** A (1)
- b** (Any 2:) Increase in world population; increase in energy use; more fossil fuels burned

Page 24 Sustainability – the way forward?

- 2 a i** (Any 2:) Making sure we do not use resources faster than they are being replaced; using the environment in such a way that we do not spoil it for the future; improving the quality of people's lives without damaging the chances of our survival in the future
- ii** (Any 2:) Less petrol used so less oil needs to be taken from the ground; less carbon dioxide released to the atmosphere (by the combustion of fuels); so less contribution to global warming
- b** Heat loss without insulation = $2 \times 10 = 20 \text{ W}$; heat loss with insulation = $0.3 \times 10 = 3 \text{ W}$; so 7 less W of heat energy are lost (2)