

Y9 Homework Answer booklet:

9B1 task 1

Section 1:

1. Magnesium oxide
2. it is the atomic number
3. Force = Pressure / Area
4. using arrows
5. mitochondria
6. the process of moving air into and out of the lungs.

Section 2

1. Absorption
2. Any 3 from:
 - Huge surface area through which nutrients can be absorbed
 - Villi increase the surface area
 - Each villus has many capillaries into which nutrients diffuse
 - The walls of the villi are one cell thick to allow for efficient diffusion
 - The cells lining the villi have microvilli to increase the surface area still further.

Section 3

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|---|------|
| (i) | A description to include any two from the following: <ul style="list-style-type: none">• increases from 0 to 120s (1)• levelled off by / from 120s (1)• credit correct manipulation of data for numbers from 0 to 120s (1) | Accept: increases from 0 to any time between 100 and 120s Accept starts to level off after 90s | (2) |

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|--------------------|------|
| (ii) | <p>An explanation linking:</p> <ul style="list-style-type: none"> • amylase / enzymes / maltase /carbohydase (1) • have digested starch / carbohydrates (in the bread) (1) | | (2) |

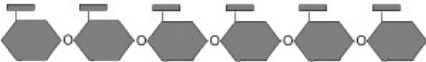
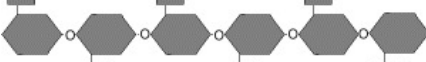
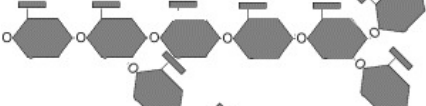
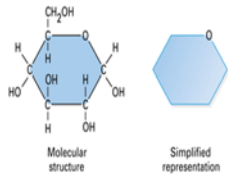
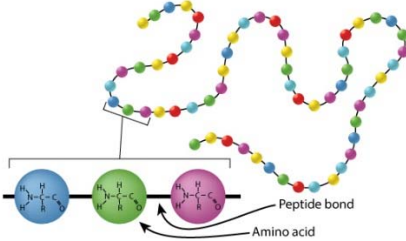
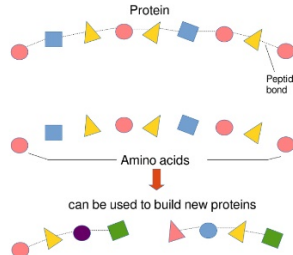
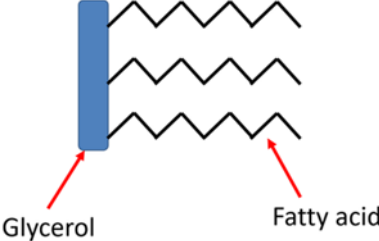
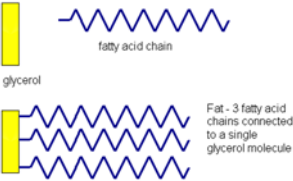
| Question Number | Answer | Acceptable answers | Mark |
|-----------------|--|--|------|
| (iii) | <p>The tube / tights have:</p> <p>larger holes / allow solid particles through / no muscles in the sides / no blood vessels in the sides / no villi / have a smaller surface area (1)</p> | <p>Accept: ORA for the intestines</p> <p>Accept: the small intestine has other enzymes present</p> <p>Ignore: references to size / length / strength / and flexibility</p> | (1) |

9B1 task 2

Section 1

1. A complete set of chromosomes – full set of DNA
2. $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$
3. Liquids becoming gases
4. A new substance has formed.
5. Force = mass x acceleration
6. Conduction, convection, radiation

Section 2

| Large food molecule or substrate | diagram | Name of Enzyme that breaks it down | Small food molecule or product | diagram |
|----------------------------------|---|------------------------------------|--------------------------------|---|
| Carbohydrate (starch) | <p>Starch</p>  <p>Cellulose</p>  <p>Glycogen</p>  | Carbohydrase (amylase) | Simple sugar | <p>Glucose</p>  <p>Molecular structure Simplified representation</p> |
| Protein |  <p>Peptide bond Amino acid</p> | Protease | Amino acid | <p>Chain formation of amino acids in proteins</p>  <p>Protein Peptide bond Amino acids can be used to build new proteins</p> |
| Fat (Lipid) |  <p>Glycerol Fatty acid</p> | Lipase | Fatty acids and glycerol |  <p>glycerol fatty acid chain Fat - 3 fatty acid chains connected to a single glycerol molecule</p> |

Section 3

1. • fatty acid(s) (1) • glycerol (1)
2. $(1.5 \times 1.5) = 2.25$
 $90 / 2.25 = 40$

9B2 Homework task 1

Due Date:

Section 1: Review of prior knowledge

1.

| | |
|--|--|
| What are the characteristic processes of life? | Movement, respiration, sensitivity, nutrition, excretion, reproduction, growth |
|--|--|

2.

| | |
|--|-------|
| What are all living and previously living organisms made of? | Cells |
|--|-------|

3.

| | |
|----------------------|--|
| What is respiration? | A cellular process that releases energy from food and oxygen |
|----------------------|--|

4.

| | |
|--|-----------|
| How do molecules move through cytoplasm? | Diffusion |
|--|-----------|

5.

| | |
|--|----------------------|
| Place the following in size order- molecule, cell and atom | Atom- molecule- cell |
|--|----------------------|

6.

| | |
|--|---|
| How can we describe the cell membrane? | As a semi-permeable membrane (some molecule are able to diffuse through it) |
|--|---|

Section 2: Refreshing current knowledge

Q2.

(a) any **two** from

- heart
- lungs
- windpipe or trachea
- oesophagus or gullet

*accept 'blood vessels' or 'arteries' or 'veins'
do **not** accept 'bronchiole'*

2 (L3)

(b) any **one** from

- so the lungs can expand **or** get bigger

- so we can breathe
- so we can take in air **or** oxygen
accept 'so the pressure drops'
references to growth are insufficient

1 (L4)

Section 3: Application of knowledge

Q1.

- (b) so the earthworms' body temperature would change to 20°C

1

- (c) (i) 56 or 55 or 54

if incorrect answer given accept 60 - 5 for 1 mark

or 60 - 6 for 1 mark

or 60 - 4 for 1 mark

2

- (ii) one-tenth of answer to (c)(i) eg 5.5

1

(at 10°C / lower temperature):

lower rate of respiration

allow chemical reactions slower or enzymes less active

ignore breathing

do not allow anaerobic

1

worms less active / worms release less energy / worms use less energy

1

Section 1: Review of prior knowledge

1.

| | |
|---|--|
| What are the key features of diffusion? | <ul style="list-style-type: none"> • All particles are in constant motion • Diffusion involves the movement of particles • It results from the random motion/collision of particles |
|---|--|

2.

| | |
|--|--|
| What happens when a gas reaches equilibrium? | The particles continue to move but the net movement results in an equal amount of particles on each side of the membrane |
|--|--|

3.

| | |
|--|--|
| What is the relationship between surface area of a membrane and the rate of diffusion? | As surface area increases the rate of diffusion increases too. |
|--|--|

4.

| | |
|---|--|
| How are the alveoli adapted to maximise rates of diffusion? | Alveoli are adapted to provide a very large surface area for diffusion |
|---|--|

5.

| | |
|---|--|
| What is the composition of inhaled air? | 78% nitrogen, 21% oxygen, 0.04% carbon dioxide (as well as water vapour, other gases and particulates) |
|---|--|

6.

| | |
|---|---|
| What is the composition of exhaled air? | 78% nitrogen, 17% oxygen, 4% carbon dioxide |
|---|---|

Section 2: Refreshing current knowledge**Q2.**

(a) respire

| | | |
|--|------------------|---|
| oxygen / glucose glucose / oxygen | } each once only | 2 |
| blood | | 1 |
| carbon dioxide / heat heat / carbon dioxide | } each once only | 2 |

[6]

Section 3: Application of knowledge

Q1.

(a) (i) 1000 1 (L6)

(ii) any **three** from

- she was using her muscles more
accept 'she was using her muscles'
- she needed more energy
- her rate of respiration increased
accept 'more respiration'
- more oxygen was used up
accept 'more oxygen was needed'
- more carbon dioxide was produced
accept 'there was more carbon dioxide to remove'
accept for the first two marking points 'her muscles need more energy'

3 (L7)

(b) (i) it became faster 1 (L6)

(ii) any **one** from

- the breaths are closer together
accept 'the waves are closer together'
- there are more breaths in 10 s
accept 'there are more waves in 10 s'
accept 'there are three breaths in the first ten seconds and five in the next ten seconds'

1 (L7)

Section 1: Review of prior knowledge

1. Photosynthesis
2. Fossil fuels

3. O₂
CO₂
H₂O
4. They only have one electron on their outermost shell, which makes them very unstable and very reactive with other substances

5. a moment
6. The point around which something turns

Section 2: Refreshing current knowledge

- (i) variation.
if more than one box is ticked, award no mark **1 (L4)**
- (ii) information passed from the mother in an egg.
if more than one box is ticked, award no mark **1 (L4)**

Section 3: Application of knowledge

- M6.** (a) (i) • genes **or** DNA **or** chromosomes **1 (L7)**
- in gametes **or** sex cells **or** eggs or sperm
accept 'at fertilisation'
'in the nucleus' is insufficient **1**
- (ii) • they have genes **or** DNA **or** chromosomes from both parents
accept 'they have genetic information from both parents'
accept 'from eggs and sperm' **1 (L7)**
- (b) • they have the same genetic information or the genes or DNA **or**

chromosomes

accept 'they are from the same egg and same sperm'

accept 'the fertilised egg or zygote split in two'

accept 'they are from the same fertilised egg

'from the same egg' or 'from the same sperm' is insufficient

accept references to the egg dividing if the answer makes

clear that this is after

fertilisation eg 'the egg divides after it has joined with a sperm

'the egg divides in the uterus' is insufficient

1 (L7)

(c) any **one** from

- eye colour is inherited or controlled by genes
- eye colour is not affected by environmental factors

1 (L7)

any **one** from

- weight and skin colour are affected by environmental factors
- weight is affected by diet **or** exercise and skin colour by the Sun

accept 'weight and skin colour are not just controlled by genes'

answer must refer to both weight and skin colour

'weight and skin colour are not controlled by genes' is insufficient

1

[6]

Section 1: Review of prior knowledge

1. Sedimentary, igneous and metamorphic rock
2. Nitrogen 78%, oxygen 21%, 1% other gases (argon, carbon dioxide and water vapour).
3. A protein made in cells to help a chemical reaction to happen.
4. A living thing too small to see without a microscope
5. NEWTON METER
6. Nm

Section 2

- 1) a= nucleus b= chromosome c= gene d= DNA
- 2) 2 phosphate-sugar strands joined together like a ladder, a twisted ladder, double helix, contains of 4 bases
- 3) adenine + thymine cytosine + guanine
- 4) hydrogen bonds

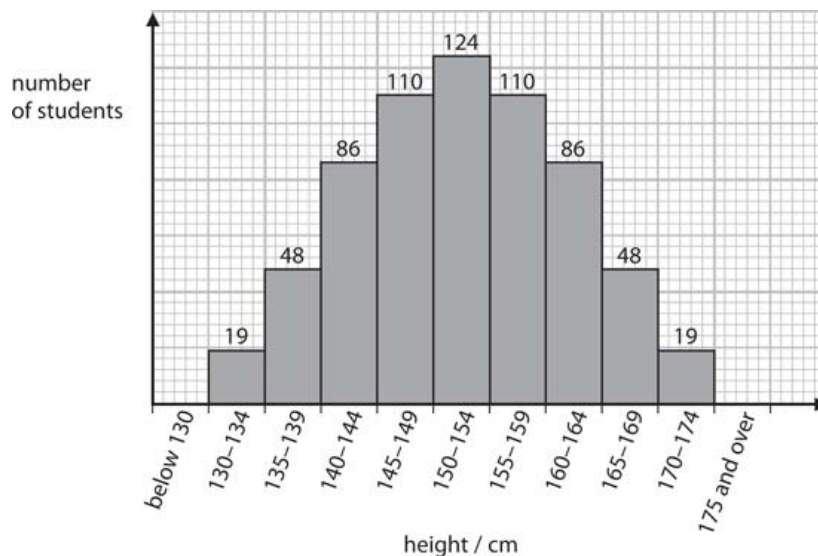
Section 3

What is continuous variation? Give examples

A characteristic that changes gradually over a range of values shows continuous variation. Examples of such characteristics are height, hand span and weight.

What is discontinuous variation? Give examples

This is when differences in a characteristic between individuals can only be put into different categories/A characteristic of any species with only a limited number of possible values. For example, a person's blood group, sex and eye colour.



(i) Complete the sentence by putting a cross (☒) in the box next to your answer.
The range in heights of the students is due to

(1)

- A environmental influences only
- B genetic influences only
- C environmental and genetic influences
- D neither environmental nor genetic influences

(ii) Describe the variation in height of these students, as shown in the graph.

(3)

- There is a complete range of measurements from one extreme to the other.
- No one is less than 130cm or more than 175cm tall
- Most students are between 150 and 154 cm tall
- This shape of graph is typical of a feature with continuous variation called a 'normal distribution'

9B3 Homework task 3

Due Date:

Section 1: Review of prior knowledge

1. the process by which oxygen and carbon dioxide move between the bloodstream and the lungs. It is an example of diffusion.
2. mitochondria
3. Boiling then condensing to collect a pure liquid
4. An insoluble solid and a solution or liquid.
5. It is shared between components
6. Navigation

Section 2: Refreshing current knowledge

| mitosis only | meiosis only | both mitosis and meiosis |
|--------------|--------------|--------------------------|
| | * ✓ | |
| * ✓ | | |
| | | * ✓ |
| | * ✓ | |

*if more than one box is ticked in any row,
award no mark for that row*

Section 3: Application of knowledge

- 1) A female with the genotype **ee** has attached earlobes and a male with the genotype **Ee** has detached earlobes.
(ii) Complete the Punnett square to show the gametes and genotypes of the offspring for this female and male.

| | | | |
|--------------|---|----------------|-----------|
| | | female gametes | |
| | | e | e |
| male gametes | E | <u>Ee</u> | <u>Ee</u> |
| | e | <u>ee</u> | <u>ee</u> |

(2)

(iii) State the probability of the offspring having **detached** earlobes.

(1)

.....50%.....

(iv) What is the percentage probability of a mother with the dominant genotype EE and a father with the recessive genotype ee producing a child with **attached** earlobes?

| | | | |
|--------------|---|----------------|-----------|
| | | female gametes | |
| | | E | E |
| male gametes | e | <u>Ee</u> | <u>Ee</u> |
| | e | <u>Ee</u> | <u>Ee</u> |

Put a cross () in the box next to your answer.

(1)

- A** 0%
- B** 25%
- C** 75%
- D** 100%

2.

| Answer | Acceptable answers |
|--|---|
| <p><u>Stage 1</u></p> <ul style="list-style-type: none"> · to break open cells/release cell contents / release DNA /dissolve proteins (1) <p><u>Stage 3</u></p> <ul style="list-style-type: none"> · to precipitate DNA from the solution/to separate DNA (from other components)/ (1) | <p>Accept break down cell membrane / cell wall</p> <p>Accept to make DNA visible</p> <p>ignore refs to freezing the DNA</p> |

9C1 task 1

Section 1

1. The total quantity or weight of organisms in a given area.
2. Iodine solution
3. Carbon dioxide
4. Sulphur dioxide
5. Due to a net flow of energy away from the object
6. Liquids and gases

Section 2

A How does the diagram show that air is a mixture? It contains different types of molecules.

B How many different substances are shown in the diagram? 5

C How many of them are not molecules? 1

D How many oxygen molecules are shown? 6

E Name the three elements shown. Oxygen, nitrogen and helium.

F How many different compounds are shown? 2

G Name them. Water and carbon dioxide.

H How many different molecules are there? 4

I Name them Water, Carbon dioxide, Oxygen, Nitrogen

Section 3

| Question Number | Answer | Acceptable answers | Mark |
|-----------------|---|------------------------|------------|
| (a) | 2.8.1 | any separation allowed | (1) |
| Question Number | Answer | Acceptable answers | Mark |
| (b) | An explanation linking two of the following points <ul style="list-style-type: none"> • both have two electrons (1) • in outer shell (1) • (therefore) in group 2 (1) | | (2) |
| Question Number | Answer | Acceptable answers | Mark |
| (c) | C | | (1) |
| Question Number | Answer | Acceptable answers | Mark |
| (d) | D | | (1) |
| | | | |
| | | | |

9C2 task 1

Section 1

1. Non-communicable
2. Metric prefixes and standard form
3. A molecule is a group of atoms that have been chemically joined together.

4.

| |
|------------------|
| O ₂ |
| CO ₂ |
| H ₂ O |
| |

5. It will accelerate

6. It will either be at rest or moving at a constant speed.

Section 2

1) What is causing the temperature of a pan of cold water on the hob to rise?

The thermal energy from the hob.

2) Why doesn't a pan of boiling water get any hotter?

All the energy is being used to evaporate the water.

3) On a sunny day, my drink with ice in stays at 0°C until all the ice has melted. Why?

All the thermal energy is going in to melting the ice rather than heating the liquid.

Section 3

| Question number | Answer | Mark |
|-----------------|---|------|
| (i) | solid (1) condensation (1) distillate (1) | (3) |

| Question number | Answer | Mark |
|-----------------|--|------|
| (ii) | An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification - application of understanding (1 mark): (use a) thermometer (1) the temperature is {the boiling point of water / 100°C} (1) | (2) |

9P1 task 1

Section 1

1. Respiration (energy), to make new cells, to repair themselves
2. Bacteria
3. Group 7
4. 2
5. A force that opposes the motion of one surface against another.
6. Force = pressure / area

Section 2

When a car is travelling at a constant speed, the forces on it are balanced. The forwards force from the engine is exactly balanced by the forces of air resistance and friction.

Balanced forces do not change the speed of something. A car with balanced forces on it will carry on moving at the same speed.

unbalanced forces make objects speed up or slow down.

Moving objects do not need forces to keep moving. A space probe orbiting the Sun has no forces of friction to slow it down. It will carry on orbiting the Sun.

balanced balanced do do not engine forces forces friction friction orbiting
resistance speed speed up unbalanced unbalanced

Section 3

| Question number | Answer | Additional guidance | Mark |
|-----------------|---|---|------|
| (i) | substitution (1) 40×1.7 evaluation (1) 68 Nm (1) | award full marks for correct answer without working independent mark do not accept J (joules) | (3) |

| Question number | Answer | Additional guidance | Mark |
|-----------------|--|--|------|
| (ii) | substitution (1) $68 = W \times 1.3$ rearrangement (1) $\frac{68}{1.3}$ evaluation (1) 52 (N) | award full marks for correct answer without working substitution and rearrangement in either order ecf moment from 4(c)(i) 52.3 (N) | (3) |

9P2 task 1

Section 1

1. Ventilation is the movement of gases into and out of the lungs. Respiration is the way we release energy in cells
2. Diffusion is the movement of a substance from an area of high concentration to an area of low concentration. Diffusion happens in liquids and gases because their particles move randomly from place to place
3. Hydrogen
4. During a chemical reaction the atoms in the molecules rearrange to form new molecules, with new properties.
5. Longitudinal, can travel through solids, liquids, and gases but not a vacuum.
6. Transverse, can travel through solids, liquids, gases and a vacuum.

Section 2

Calculate the force needed to accelerate a 22 kg cheetah at 15 m/s^2 .

$$22 \times 15 = 330\text{N}$$

Calculate the force needed to accelerate a 15 kg gazelle at 10 m/s^2 .

$$15 \times 10 = 150\text{N}$$

Section 3

| Question Number | Answer | Mark |
|-----------------|--|------|
| (i) | <p>all three correct (2) one or two correct (1)</p> <p>part</p> <p>description of the motion</p> <p>P the car is standing still</p> <p>Q the car is accelerating</p> <p>R the car is decelerating</p> <p>S the car is travelling at constant speed</p> | (2) |

| Question Number | Answer | Additional guidance | Mark |
|-----------------|---|--|------|
| (ii) | Q and S Q (1) (and) S (1) OR S (1) (and) Q (1) | in either order maximum of 1 mark if 3 letters given no marks if 4 or more letters given | (2) |

| Question Number | Answer | Additional guidance | Mark |
|-----------------|--|---|------|
| (iii) | substitution (1) (distance =) 30×100 evaluation (1) 3000 (m) | for 1 st mp accept 100×30 OR $(30 \times 50) \times 2$ award full marks for the correct answer without working allow 1 mark for EITHER 30×50 OR 30×150 OR 30×250 | (2) |