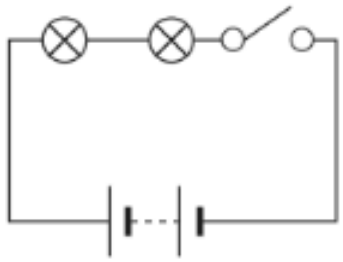
1 Angelique makes an electrical circuit.



(a) There are two lamps in the electrical circuit.

Name the type of circuit and name the **two other** components.

type of circuit .....

components .....

.....

[2]

(b) Angelique has a buzzer.

Draw the symbol for a buzzer.

[1]

(c) Angelique adds the buzzer to her electrical circuit.

Explain what happens to the brightness of the two lamps.

Complete the sentence.

The brightness of the two lamps .....

because .....

.....

[2]

2 There are three types of rock found on the Earth's surface.

(a) Two of these types of rock are igneous and sedimentary.

Name the **other** type of rock.

..... [1]

(b) Look at the information.

granite is specked black and white

gabbro is black with crystals

sandstone has layers made of grains of sand

schist has layers and crystals

Which rock is sedimentary?

..... [1]

3 Some diseases are caused by infection with different organisms.

(a) Influenza (flu) is caused by a virus.

Complete the sentences.

The influenza virus is passed from the first host to a second host.

The virus travels in the air when the first host .....

The second host knows they have the virus because they feel .....

.....

To stop themselves getting infected by the flu virus, the person .....

.....

[2]

(b) Food poisoning is an illness.

Food poisoning may be caused by eating food containing bacteria.

It is important to reduce the spread of bacteria.

Keeping uncooked food and cooked food separate reduces the spread of bacteria.

Describe **two other** ways to reduce the spread of bacteria.

1 .....

.....

2 .....

.....

[2]

(c) Humans have defence mechanisms to stop bacteria making them ill.

What is in the stomach to kill bacteria?

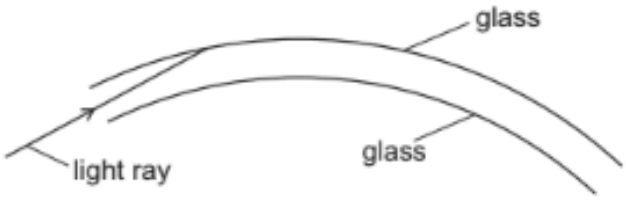
..... [1]

4 **(a)** Yuri has an optical fibre.

The surface of the optical fibre is made of glass.

This glass acts like a mirror.

Look at the diagram of the optical fibre.

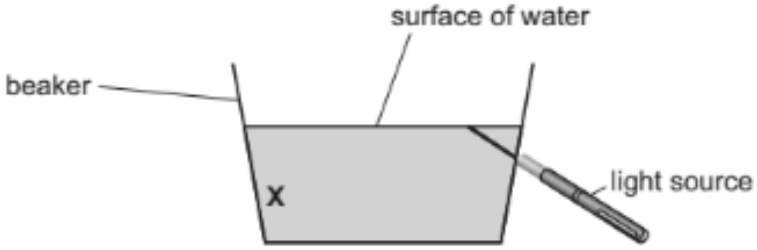


Complete the path of the light ray through the optical fibre. [1]

(b) Yuri also has a beaker of water.

The surface of water in the beaker acts like a mirror.

Look at the diagram.



Complete the path of the light ray from the light source to the **X** on the side of the beaker. [1]

(c) Name the process that happens when light hits a mirror.

..... [1]

(d) Water has mass and weight.

Describe the difference between mass and weight.

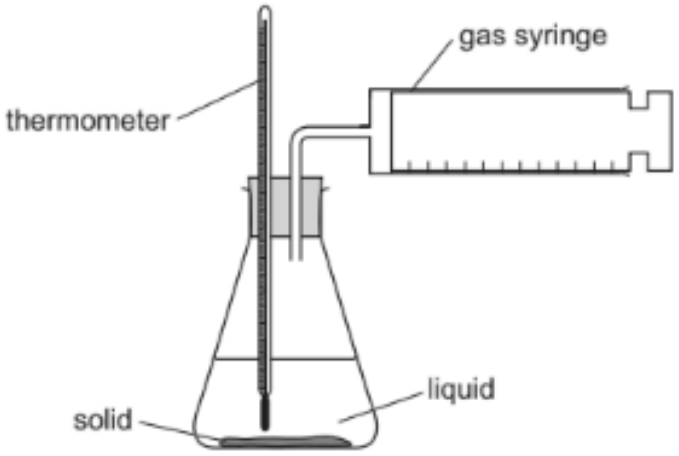
.....

.....

..... [2]

5 Blessy mixes different solids with a liquid.

She uses this equipment.



Here are her results.

solid	results
A	produces a gas which collects in the gas syringe
B	mixture increases in temperature
C	solid dissolves and the mixture gets colder
D	mixture changes colour
E	solid remains in the liquid and temperature stays the same

(a) How many of the solids have a chemical reaction with the liquid?

Circle the correct number.

1 **2** **3** **4** **5**

[1]

(b) Solid **A** produces a gas which collects in the gas syringe.

Blessy measures the mass of the gas syringe when it is empty.

Blessy measures the mass of the gas syringe when it is full of gas.

Complete the sentence.

The mass increases because the gas inside the syringe has .....

.....

[1]

(c) Blessy writes some notes about mixing solid **A** with a liquid.

The gas is carbon dioxide.

Solid **A** is copper carbonate.

The name of the liquid at the end is copper sulfate.

The only liquid in the flask at the start is dilute sulfuric acid.

Complete the sentences.

The **reactants** of this reaction are .....

.....

The **products** of this reaction are .....

.....

[2]

(d) Blessy uses four books to find some information about sulfuric acid.

She finds the same information in every book.

boiling point = 337 °C melting point = 10 °C

Explain why this information is **always** the same for sulfuric acid.

.....

..... [1]

(e) Substances have properties.

Complete the sentence.

Two different properties are electrical conductivity and .....

conductivity.

[1]

6 Oliver wants to find out if adding sand to soil helps beans grow.

In his investigation Oliver:

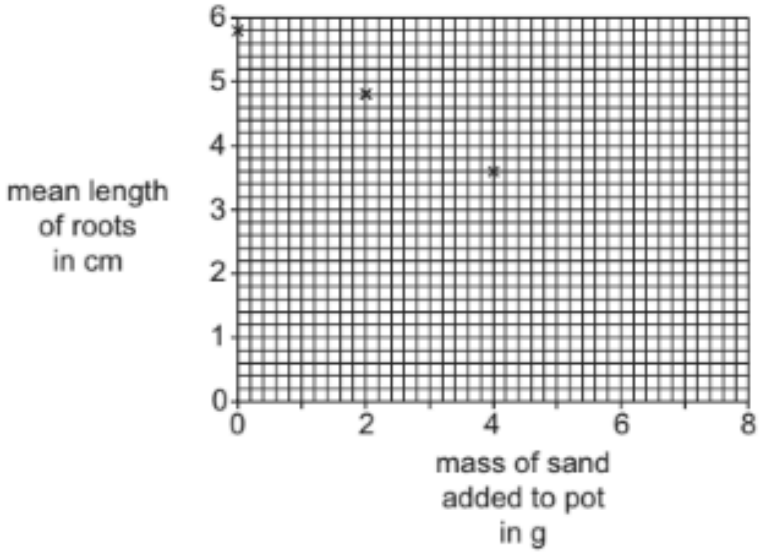
- adds a different mass of sand to the soil in five pots
- keeps the five pots in the same conditions
- adds 10 bean seeds to each pot of soil
- adds water to the pots each day
- measures the length of the bean roots after 25 days
- calculates the mean length of the roots for each pot.

Here are his results.

mass of sand added to pot in g	mean length of roots in cm
0	5.8
2	4.8
4	3.6
6	2.6
8	1.4

(a) Complete the graph by:

- plotting the last two points
- drawing a line of best fit.



[2]

(b) Write down a conclusion for his results.

.....

..... [1]

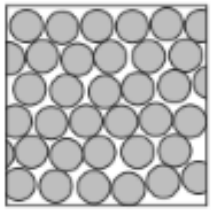
(c) Soils may be classified by the amount of sand and clay they contain.

Name **one other** substance used to classify soils.

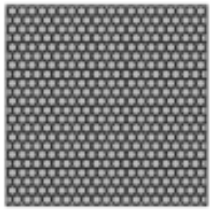
.....

..... [1]

(d) Look at the model of sand and clay particles.



sand



clay

Tick (✓) the boxes next to the **two** correct statements.

sand particles are larger than clay particles ☐

clay has larger air spaces between the particles than sand particles ☐

sand lets water move between the particles ☐

clay particles do **not** stick together ☐

[2]

7 Rajiv and Pierre measure their pulse rate before, during and after exercise.

(a) Before Rajiv and Pierre start exercising they consider the risks.

One risk is falling over when running, causing an injury to their ankles.

This risk is reduced by wearing running shoes.

Write down **one other** risk and how to reduce this risk.

risk .....

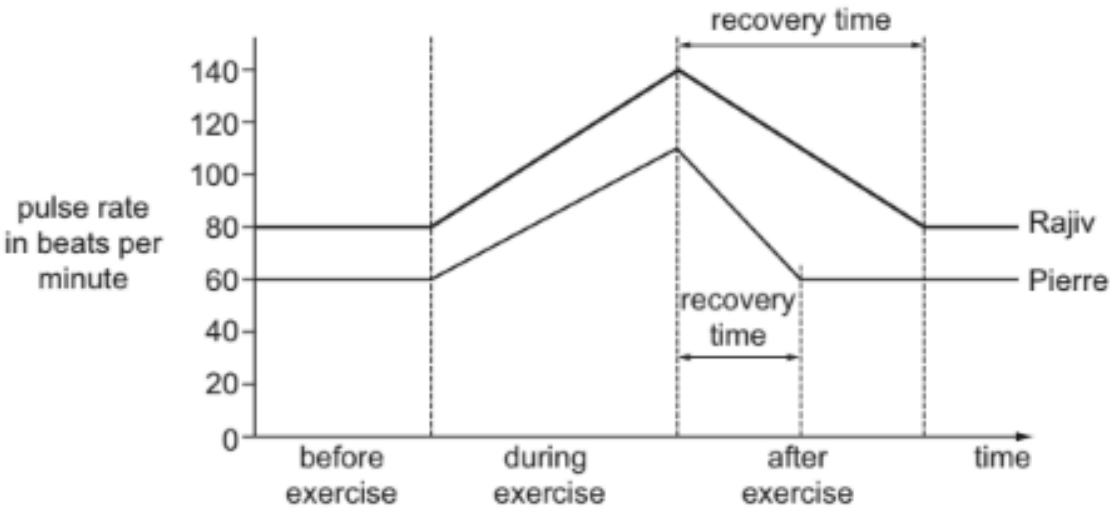
.....

how to reduce this risk .....

.....

[2]

(b) They present their results using a graph.



Write down **one similarity** and **one difference** in the pulse rates of Rajiv and Pierre.

similarity .....

.....

difference .....

.....

[2]

(c) Rajiv and Pierre also measure their **breathing** rate.

What happens to breathing rate during exercise?

Complete the sentence.

The breathing rate ..... during exercise because

.....

.....

[2]

8 Mia makes and eats an ice lolly.

Mia puts the orange juice in a freezer to make her ice lolly.

(a) Orange juice is mostly made of water.

Suggest the temperature at which orange juice in the ice lolly changes state.

..... °C

[1]

(b) Complete the sentences to explain what happens to the orange juice when Mia makes her ice lolly.

Orange juice changes from a ..... to a ..... .

This is a ..... change.

[2]

(c) Complete the sentences to explain what happens to the ice lolly when Mia eats her ice lolly.

When an ice lolly is placed in the mouth, it ..... .

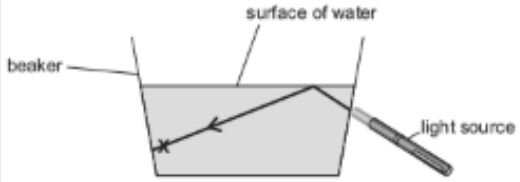
The ice lolly changes from a ..... to a ..... .

[2]

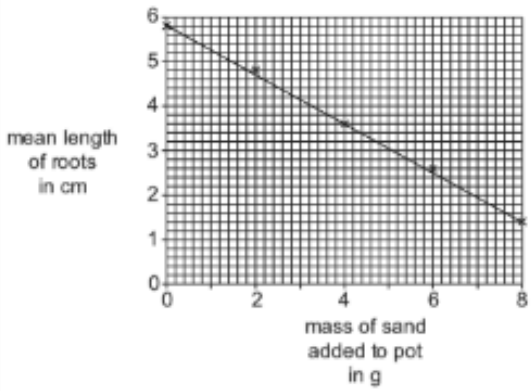
Question	Answer	Marks	Further Information
1(a)	(type of circuit) series (components) switch **or** open switch battery (of cells) **or** two cells	**2**	type of circuit correct = 1 mark **two** correct components named = 1 mark **Do not accept** closed switch
1(b)		**1**	
1(c)	(The brightness of the two lamps) decreases **or** is less bright. (because) more components in the (series) circuit with the same amount of power/current/push from the battery/cells.	**2**	each correct answer = 1 mark **Accept** (idea that) all the components share the same current

Question	Answer	Marks	Further Information
2(a)	metamorphic	**1**	
2(b)	sandstone	**1**	**Accept** answer circled on diagram, but answer line takes precedence

Question	Answer	Marks	Further Information
3(a)	 (The virus travels in the air when the first host) sneezes **or** coughs **or** talks **or** breathes. (The second host knows they have the virus because they feel) unwell **or** ill **or** sick. (To stop themselves getting infected by the flu virus the person) has a vaccination.	**2**	**all three** correct = 2 marks **one** or **two** correct = 1 mark **Accept** any method of transfer through the air, e.g. singing **Accept** any symptom of the flu virus, e.g. high temperature **Accept** any suitable idea of a vaccination, e.g. flu jab **Accept** any suitable method of **not** getting the virus, e.g. wear a face mask
3(b)	**any two from** wash hands **or** use soap wash plates **or** wash knives **or** wash utensils **or** wash chopping boards **or** wash cloths **or** wash sponges cook food properly keep food in a refrigerator **or** cover food **or** cool leftovers quickly do **not** eat food after the use by date	**2**	each correct answer = 1 mark **Accept** any suitable method to reduce the spread of bacteria **Ignore** keep cooked food and uncooked food separate if no marks awarded **accept** good hygiene for 1 mark
3(c)	acid	**1**	**Accept** hydrochloric acid

Question	Answer	Marks	Further Information
4(a)		1	**Note** reflections approximately correct by 'eye'
4(b)		1	**Accept** ray from light source reflecting on surface of water **and** then ending at the letter **X** = 1 mark
4(c)	reflection	1	
4(d)	mass is a measure of how much matter there is in an object **or** mass is measured in kilograms/kg weight is a measure of the size of the pull of gravity on the object **or** weight is a force **or** weight is measured in newtons/N	2	correct statement about mass = 1 mark correct statement about weight = 1 mark

Question	Answer	Marks	Further Information
5(a)	4	1	more than **one** answer circled = 0 marks **Accept** any indication of the correct answer, e.g. ticking or underlining, but circling takes precedence
5(b)	(The mass increases because the gas inside the syringe has) mass **or** particles **or** matter	1	**Ignore** weight **Ignore** increases
5(c)	(The reactants of this reaction are) copper carbonate **and** (dilute) sulfuric acid. (The products of this reaction are) carbon dioxide **and** copper sulfate.	2	**both** reactants needed any order = 1 mark **both** products needed any order = 1 mark **Accept** water if no marks awarded **accept** for 1 mark if the candidate has only written one reactant and one product
5(d)	(idea that) melting point or boiling point is a property (of a substance/sulfuric acid)	1	
5(e)	thermal	1	**Accept** heat

Question	Answer	Marks	Further Information
6(a)		2	last **two** plots = 1 mark **Accept** plots ±one small square tolerance straight line through the plotted points = 1 mark **Accept ecf** for straight line from *their* plotted points
6(b)	as the mass of sand increases, the mean length of roots decreases	1	**Accept ora** **Note** conclusion must describe the effect of changing the mass of sand on mean root length
6(c)	organic matter	1	**Accept** humus or named organic content, e.g. manure

Question	Answer		Marks	Further Information
6(d)	sand particles are larger than clay particles	✓	2	each correct tick = 1 mark **one** incorrect tick = maximum 1 mark **two** incorrect ticks = 0 marks
	clay has larger air spaces between the particles than sand particles			
	sand lets water move between the particles	✓		
	clay particles do **not** stick together			

Question	Answer	Marks	Further Information
7(a)	(risk) too much exercise may cause addiction (reduce) limit the amount of exercise **or** (risk) exercise may damage muscles (reduce) warm up before exercise **or** (risk) exercise may damage heart (reduce) check you are fit to exercise first **or** (risk) exercising on road (reduce) exercise away from cars/danger **or** (risk) problem breathing **or** asthma attack (reduce) carry an inhaler	2	risk = 1 mark linked reason about how to reduce the risk = 1 mark **Accept** any suitable risk and how to reduce the risk **Ignore** falling over

Question	Answer	Marks	Further Information
7(b)	(similarity) **any one from** pulse rates are the lowest before **or** after exercise pulse rates for each boy are the same before as after exercise **or** pulse rates go back to normal after exercise pulse rates both increase during exercise pulse rates both decrease after exercise both have a recovery time follow the same pattern (difference) **any one from** Rajiv always has a higher pulse rate than Pierre Rajiv's pulse rate is 20 (bpm) higher than Pierre's before exercise/after exercise **or** Rajiv's pulse rate is 80 and Pierre's is 60 before exercise/after exercise Rajiv's pulse rate is 30 (bpm) higher than Pierre's at the end of exercise or Rajiv's pulse rate is 140 and Pierre's is 110 at the end of exercise Rajiv's recovery time is more than/twice that of Pierre's / **ora** Rajiv's pulse rate decreases more slowly after exercise / **ora**	**2**	similarity = 1 mark difference = 1 mark **Accept** any correct similarity **Accept** any correct difference

Question	Answer	Marks	Further Information
7(c)	(The breathing rate) increases **or** goes up **or** is more **or** is greater (during exercise because) more oxygen (is needed for exercise).	**2**	each correct answer = 1 mark

Question	Answer	Marks	Further Information
8(a)	0 (°C)	**1**	**Accept** any temperature in the range −5 to 5(°C)
8(b)	(Orange juice changes from a) **liquid** (to a) **solid**. (This is a) **physical** (change.)	**2**	each correct sentence = 1 mark **Accept** reversible
8(c)	(When an ice lolly is placed in the mouth it) **melts**. (The ice lolly changes from a) **solid** (to a) **liquid**.	**2**	each correct sentence = 1 mark