

<b>Name</b>	<b>Class: 9__</b>	<b>Teacher:</b>
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# SCIENCE

# 9BA

## Year 9 Examination 2015

### 9BA – 120 Marks

Answer all questions in the spaces provided on the paper.

Show all your working in calculations.

Give units for all answers (e.g. km or °C) unless they have already been provided.

Check you have pages 1 – 28.

Question	m/c	1	2	3	4	5	6	7	8	9	10	11	12	13	Total
Marks gained															
Marks available	30	4	5	2	2	3	3	5	4	5	5	4	5	3	80

Question	14	15	16	17	18	19	20	Total
Marks gained								
Marks available	6	6	6	6	5	6	5	40

**120**



MULTIPLE CHOICE

**Thinking with evidence in Science - Multiple Choice Questions**

- Use a **blue or black pen**
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer **you must** cross out your original answer as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.

A ○	B ●	C ○	D ○
A ○	B ✕	C ○	D ●
A ○	B (✕)	C ○	D ○

- 1    A ○    B ○    C ○    D ○
- 2    A ○    B ○    C ○    D ○
- 3    A ○    B ○    C ○    D ○
- 4    A ○    B ○    C ○    D ○
- 5    A ○    B ○    C ○    D ○

- 16    A ○    B ○    C ○    D ○
- 17    A ○    B ○    C ○    D ○
- 18    A ○    B ○    C ○    D ○
- 19    A ○    B ○    C ○    D ○
- 20    A ○    B ○    C ○    D ○

- 6    A ○    B ○    C ○    D ○
- 7    A ○    B ○    C ○    D ○
- 8    A ○    B ○    C ○    D ○
- 9    A ○    B ○    C ○    D ○
- 10    A ○    B ○    C ○    D ○

- 21    A ○    B ○    C ○    D ○
- 22    A ○    B ○    C ○    D ○
- 23    A ○    B ○    C ○    D ○
- 24    A ○    B ○    C ○    D ○
- 25    A ○    B ○    C ○    D ○

- 11    A ○    B ○    C ○    D ○
- 12    A ○    B ○    C ○    D ○
- 13    A ○    B ○    C ○    D ○
- 14    A ○    B ○    C ○    D ○
- 15    A ○    B ○    C ○    D ○

- 26    A ○    B ○    C ○    D ○
- 27    A ○    B ○    C ○    D ○
- 28    A ○    B ○    C ○    D ○
- 29    A ○    B ○    C ○    D ○
- 30    A ○    B ○    C ○    D ○

**Do NOT answer questions 31-40 from the booklet.**

Answer ALL the questions in the spaces provided.

**Question One [4 marks]**

Laboratory safety is very important.



(a) Circle any FIVE dangers. One has been done as an example.

For ONE danger explain, in detail;

- What the danger is.
- What might happen.
- What the student should be doing instead.

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Hazard symbols are used on chemicals to warn of danger.



(b) Why is a hazard symbol better than just words on chemical bottle?

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**Question Two [5 marks]**



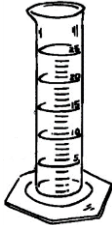

Tane was asked to find the mass of salt dissolved in 100 mL of sea water.

- A Measure the mass of an empty evaporating basin
- B Put 50 mL of sea water into the basin
- C Heat the sea water until all the water has evaporated
- D Let the basin and residue to cool
- E Measure the mass of the basin and residue of salt

(a) During the experiment Tane used several pieces of apparatus.

Some are shown in the table.

Complete the table.

Picture of apparatus	Name of apparatus	One step when the apparatus was used
	evaporating basin	C
		
	tripod	
		
		C

(b) Tane obtained the following results.

- mass of basin and salt (step E) = 81.50 g
- mass of empty basin (step A) = 78.60 g

Calculate the mass of salt dissolved in 100 mL of sea water.

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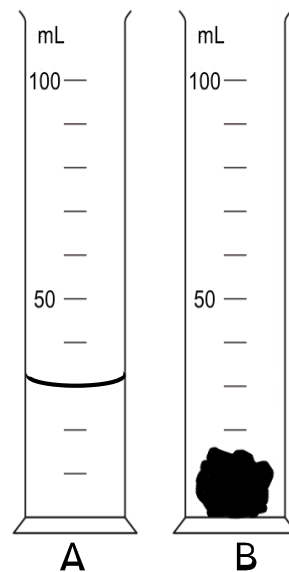
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**Question Three [2 marks]**

(a) What is the volume of water in A? \_\_\_\_\_ mL

A stone with a volume of 15 mL was then added.

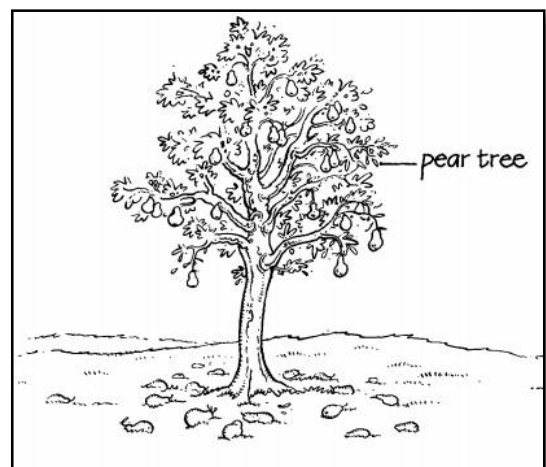
(b) Accurately draw the new water level on B.



**Question Four [2 marks]**

Look at the picture. Decide which statements are observations (O) and which are inferences (I). Label each statement as O or I.

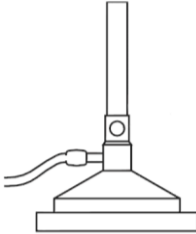
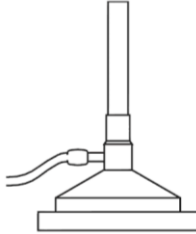
- \_\_\_ The wind has blown some pears off the tree.
- \_\_\_ Some pears are on the ground.
- \_\_\_ The ripe pears have fallen off the tree.
- \_\_\_ The tree is too full and cannot hold all the pears.



**Question Five [3 marks]**

The diagrams show methane gas burning under different conditions.

Complete the table.

Air hole	open	closed
Draw the flames you would see.		
Colour of flame		
What the flame is used for		

**Question Six [3 marks]**

Katelyn did an experiment to separate salt from rock salt (impure salt containing sand and clay).

- (a) Which TWO pieces of equipment would she use to grind up (crush) the rock salt at the start of the experiment? (Circle your answers).



A



B



C



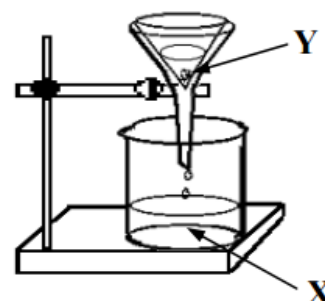
D



E

She put rock salt in a beaker, added hot water and stirred. She separated the salty water from the insoluble impurities (dirt) using this apparatus.

- (b) What is the name of the separation technique?



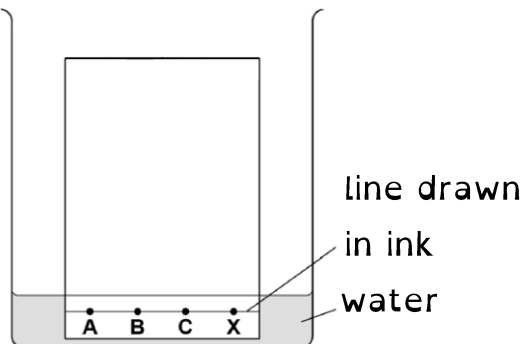
The salty water was collected at X.

- (c) Explain why the insoluble impurities (dirt) collected at Y.

**Question Seven [5 marks]**

Aroha investigated food colouring using chromatography.

- She put a spot of food colouring X on the start line.
- She put spots of three separate dyes, A, B and C on the start line.
- She placed the bottom of the paper in the water and left it for a few minutes.



(a) Write down two mistakes Aroha made in setting up the experiment and explain what problems they would cause.

Mistake 1:

\_\_\_\_\_

Problem:

Mistake 2:

\_\_\_\_\_

Problem:

Emily set up the apparatus correctly. The diagram shows the results.

(b) What does the chromatogram tell you about food colouring X?

\_\_\_\_\_

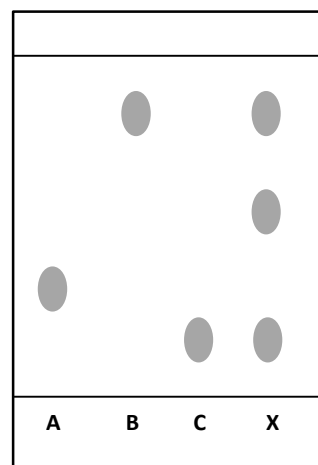
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_







(c) Explain how paper chromatography separates mixtures of inks.





\_\_\_\_\_

**Question Eight [4 marks]**

(a) Which of these is a reversible change? (Circle your answer.)

A	B	C	D
baking a cake	melting icecream	frying an egg	toasting bread
			

(b) Which of these is an irreversible change? (Circle your answer.)

A	B	C	D
chocolate bar melting	ice cube freezing	pan of water boiling	Toasting marshmallows
			

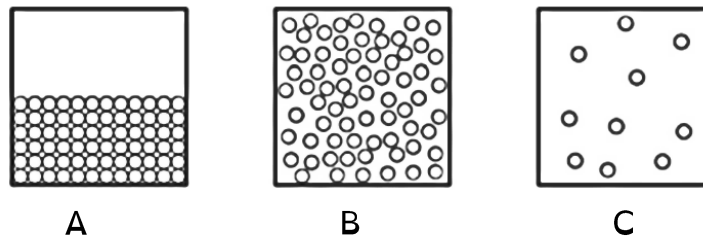
(c) For the six objects shown below, match FOUR to their properties. (ONE object to ONE property: Two objects will not be used).

Object	Property
Tissue paper •	• Light and waterproof
Glass •	• Elastic and light
Gold ring •	• Transparent and easily breakable
Brick •	• Shiny and strong
Rubber band •	
Plastic bag •	



**Question Nine [5 marks]**

The diagrams A, B and C show the arrangement of the particles in a solid, liquid and a gas.

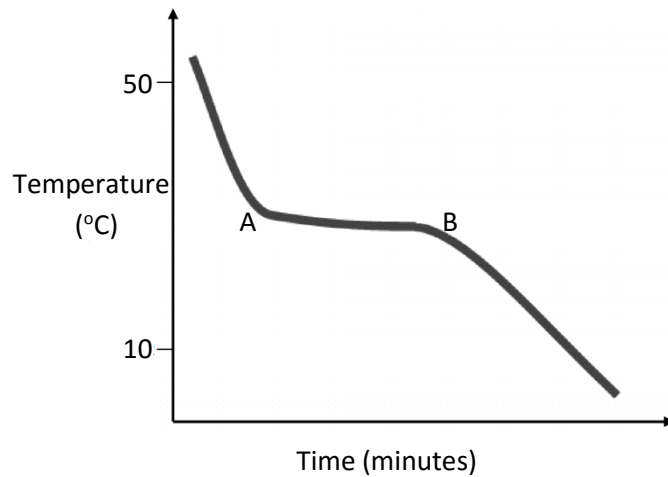


(a) Which diagram shows the liquid? (Circle your answer).

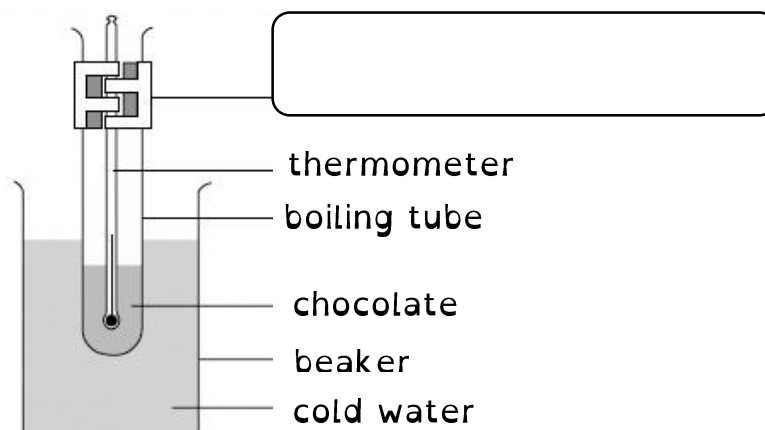
A      B      C

(b) Circle the physical change that takes place when C changes to B.  
 evaporation • condensation • freezing • melting

Some chocolate was put in a boiling tube and melted. The temperature was taken every 20 seconds as it cooled down. The graph shows the cooling curve for chocolate.



(c) Complete the labelling of the diagram.



(d) Which state (solid, liquid, gas) describes the chocolate when it is at 50°C? \_\_\_\_\_

(e) From the graph, estimate the freezing point (point when it turned solid) of chocolate. \_\_\_\_\_°C

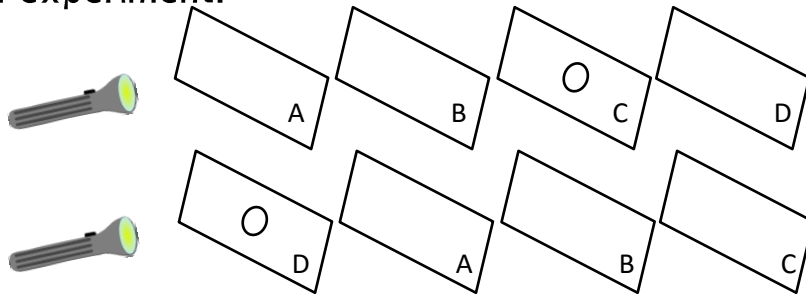
**Question Ten [5 marks]**

An experiment was done to investigate whether light can pass through sheets of material, A, B, C and D, all made of different materials.

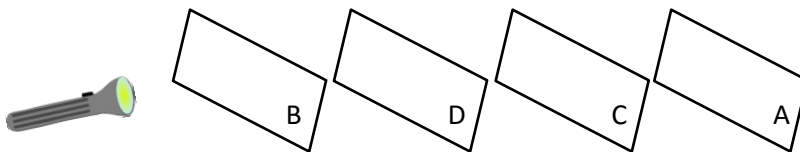
(a) What do we call material that allows light to pass through, making objects clearly visible? (Circle your answer).

- transitional • opaque • translucent • transparent

A bright spot of light was seen on C in the first experiment and D in the second experiment.

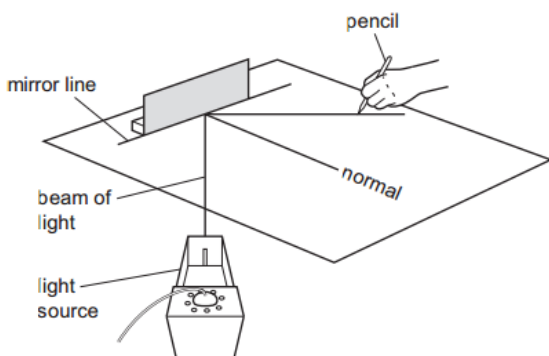


(b) Draw the spot of light you would expect if the following experiment was carried out.

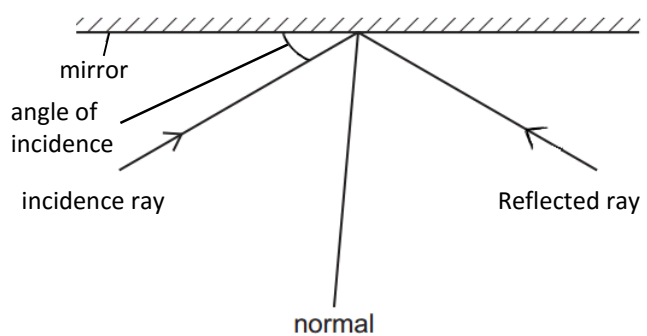


A student is testing the law of reflection which says ‘the angle of reflection is equal to the angle of incidence’.

How he set up the apparatus



Students ray diagram



(c) List 3 errors the student made when drawing their diagram.

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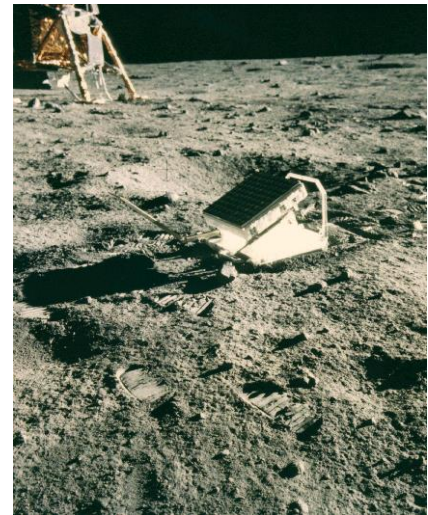
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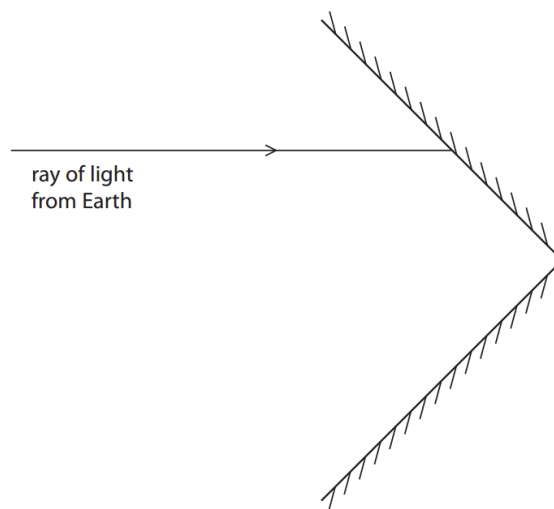
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In 1969, astronauts left a reflector on the surface of the Moon.

The reflector consists of a panel with 100 mirrors. Scientists on Earth aim light from a laser at the reflector. This light reflects back to them.



(d) The diagram shows two mirrors at  $90^\circ$  to each other in the reflector. Complete the diagram to show the path of the ray of light.



The diagram shows the human eye.

(e) In the table

- write the letter A beside the name of the part labelled A.
- write the letter B beside the name of the part labelled B.
- write the letter C beside the function of the pupil.

Part	
	iris
	lens
	retina
Function	
	allows light in
	focusses light
	gives the eye its shape

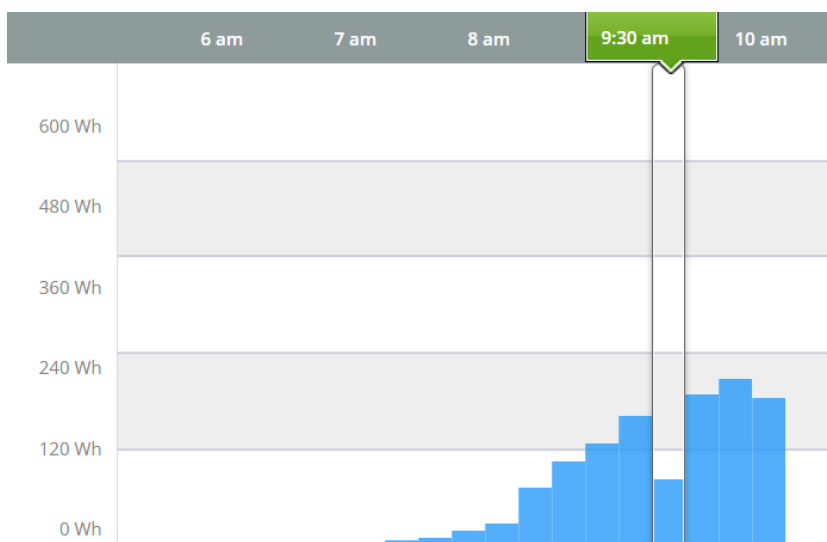
**Question Eleven [4 marks]**

Energy sources can be renewable or non-renewable.

(a) Identify this type of renewable energy.



The graph below shows the energy produced by (a) one morning.



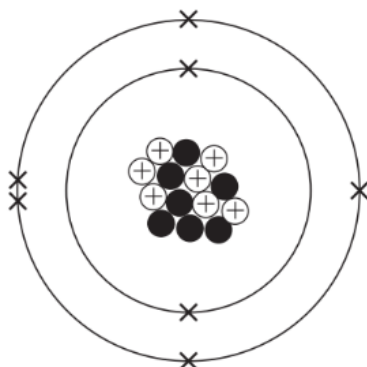
(b) Suggest what happened at 9.30 am.

(c) Match an energy change from the list with that occurring in each of the following. One answer won't be used. (Use a ruler).

- |                     |                                       |
|---------------------|---------------------------------------|
| kinetic to heat •   | • Guitar string vibrating             |
| chemical to heat •  | • Plant making food by photosynthesis |
| light to chemical • | • Fuel being burned                   |
| kinetic to sound •  |                                       |

**Question Twelve [5 marks]**

(a) The diagram shows a nitrogen atom.



Use a number / word from the list to complete the sentences below.

**7 14 electrons molecule neutrons nucleus**

- (i) The protons and \_\_\_\_\_ are in atom's centre.  
 (ii) The centre of the atom is called the \_\_\_\_\_.  
 (iii) The tiny negatively charged particles are the \_\_\_\_\_.  
 (iv) The mass number of this atom is \_\_\_\_\_.

(b) Choose the correct word from each list. (Circle your answer.)

Seawater	element • compound • mixture
Gold	element • compound • mixture

(c) Diagrams A-D represent the arrangement of atoms or molecules in four different gases. Each sphere represents one atom. For example ● represents one hydrogen atom.



Which diagram, A, B, C or D, represents:

- (i) oxygen (O<sub>2</sub>) \_\_\_\_\_ (iii) water vapour (H<sub>2</sub>O) \_\_\_\_\_  
 (ii) neon (Ne) \_\_\_\_\_ (iv) methane (CH<sub>4</sub>) \_\_\_\_\_

**Question Thirteen [3 marks]**

Seth is going to use the Durie Hill elevator and is walking along the tunnel. He claps his hands, once.



(a) Explain why he hears two claps.

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A ship is sinking in the dark.



The captain on the ship fires a distress flare. The lifeboat crew hear the bang and see the flash, but not at the same time.

(b) Which reaches the lifeboat first, the bang or the flash? Give a reason.

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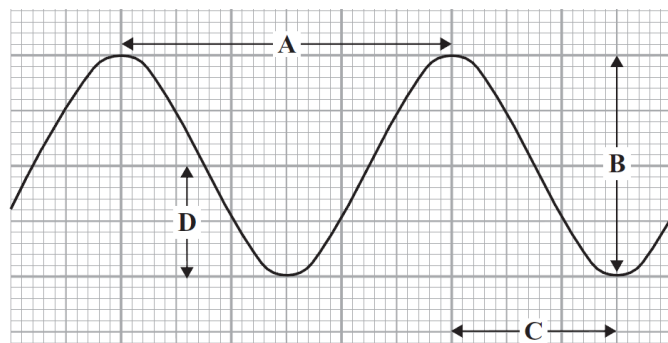


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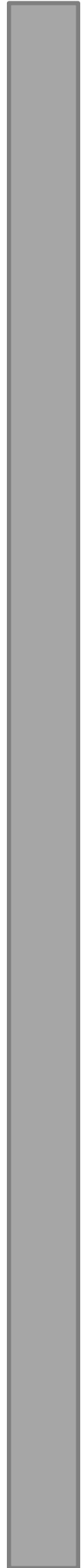
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The diagram shows an a note produced by a musical instrument.



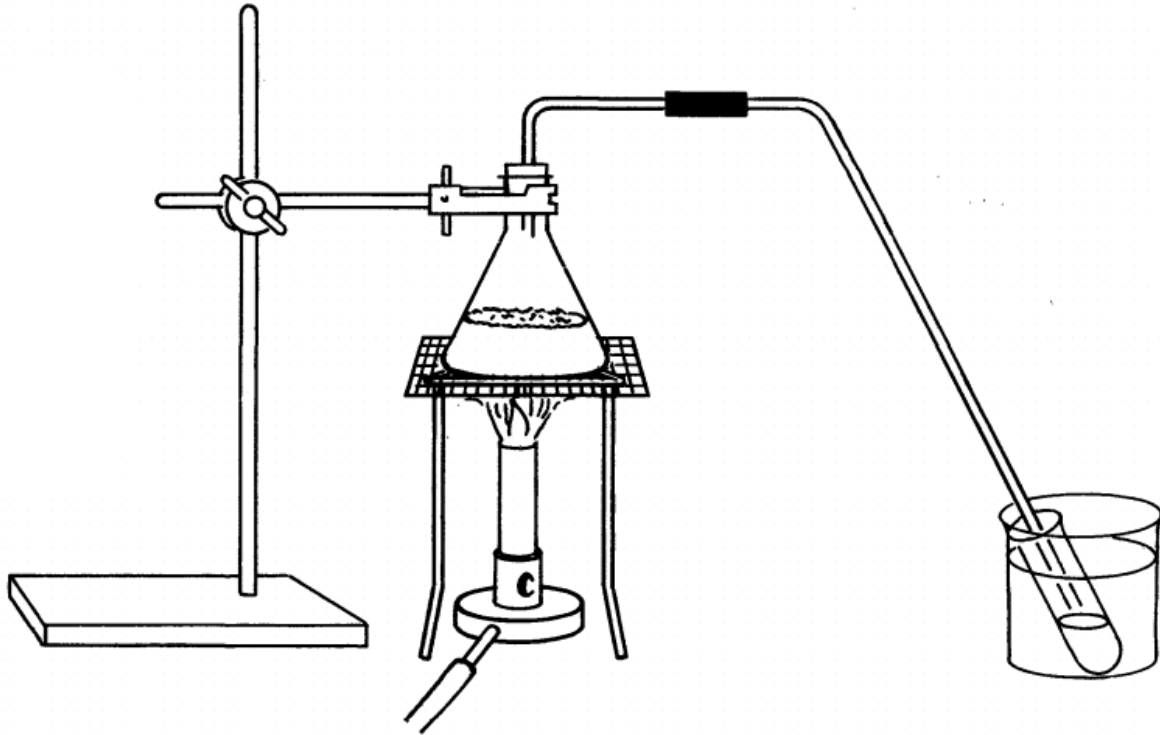
(c) Which letter, **A**, **B**, **C** or **D**, represents:

- (i) the amplitude of the sound wave \_\_\_\_\_
- (ii) the wavelength? \_\_\_\_\_

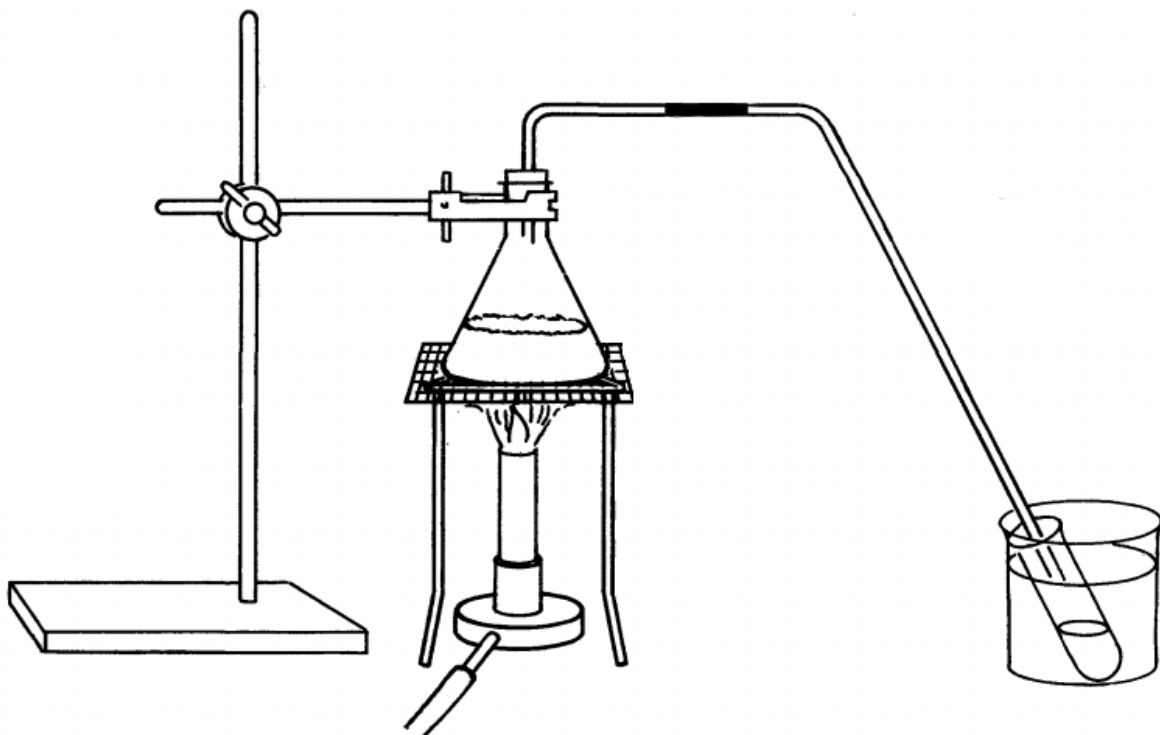


**Question Fourteen [6 marks]**

Look at the two diagrams. Spot the differences.



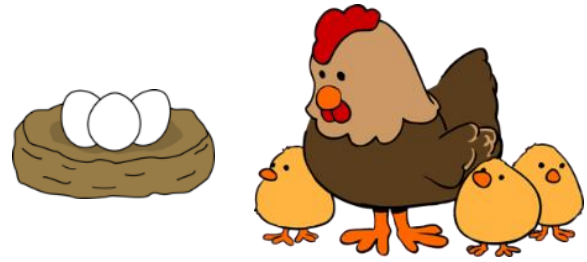
Circle any SIX differences in the diagram below.





**Question Fifteen [6 marks]**

Hone visited a chicken farm. He recorded his observations in this exercise book.



I visited a chicken farm. I saw a hen sitting on some eggs. A few weeks later when I visited the farm again, I saw the eggs had hatched into chicks. One was eating corn. When I tried to pick one up, it ran away from me. A few months later I saw that the chicks were much bigger.

(a) Match the characteristics of living things to the correct description. Use a ruler.

- |                              |   |   |  |
|------------------------------|---|---|--|
| Living things can grow       | • | • | The hen laid eggs which hatched into chicks a few weeks later. |
| Living things need nutrition | • | • | The chick ran away when Hone tried to pick it up.              |
| Living things can reproduce  | • | • | The chicks were quite a lot bigger a few months later.         |
| Living things are sensitive  | • | • | One chick was eating corn.                                     |

Here are four insects that all look very similar.



bee beetle



clearwing moth



hoverfly



wasp

The bee beetle, clearwing moth and hoverfly do not have a sting.

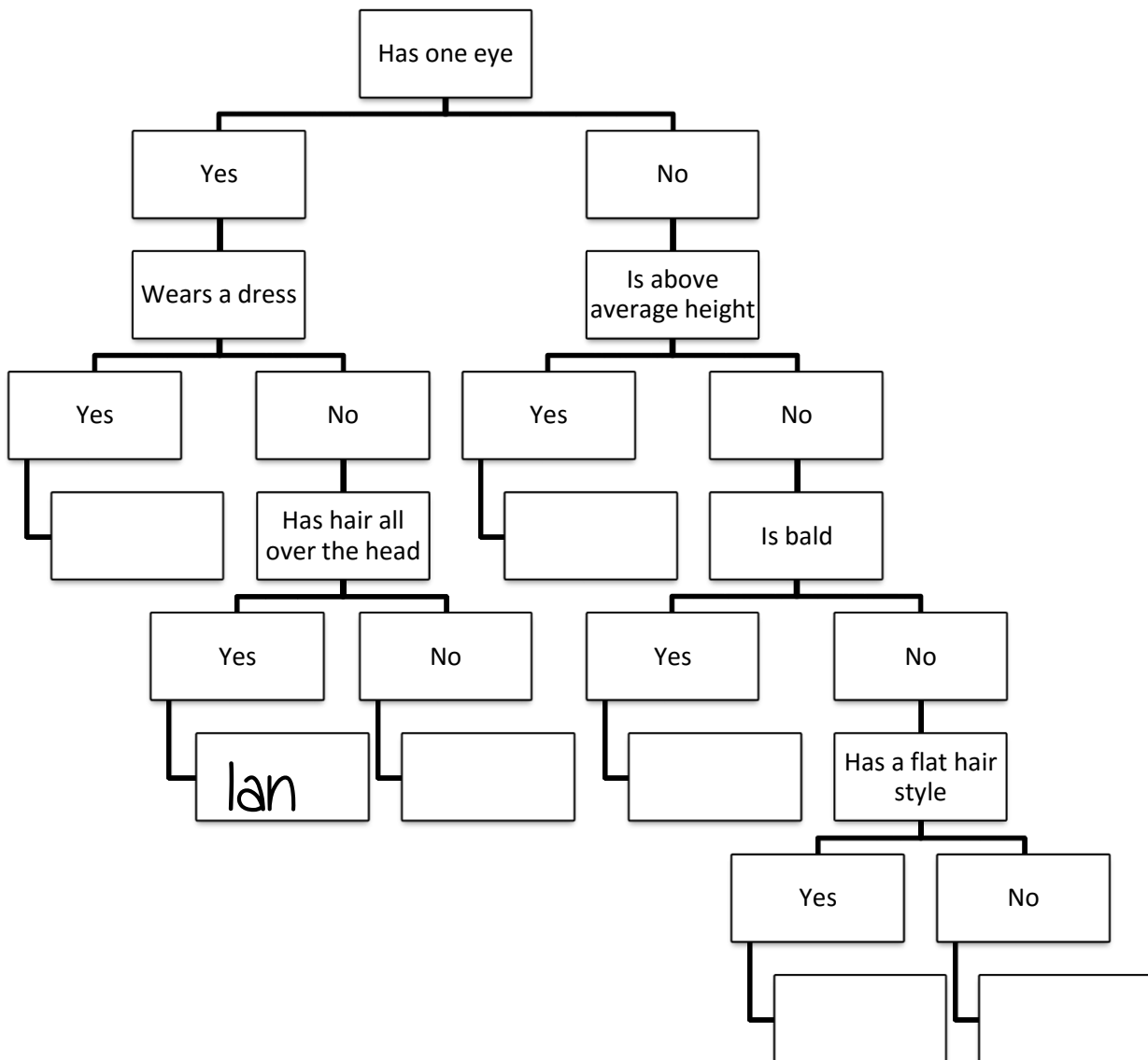
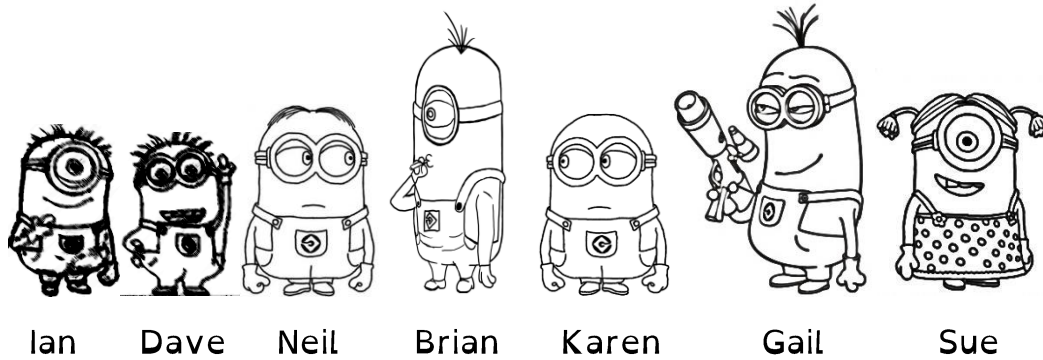
(b) Why is it an advantage for them to look like a wasp?

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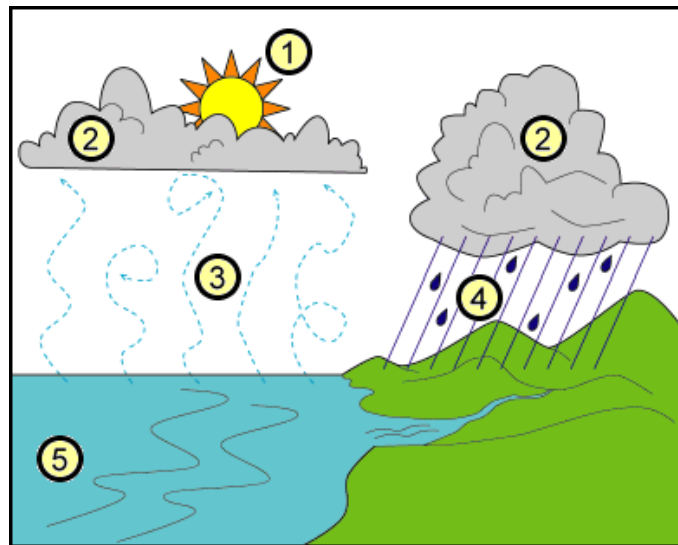
(c) Scientists often use KEYS to identify living things.

Study the Minions and complete the key. The Minion called Ian has been done as an example.



**Question Sixteen [6 marks]**

This question is about the water cycle.



(a) Use the diagram to identify the different parts of the water cycle:

**clouds    evaporation    ocean    precipitation    sun**

1		4	
2		5	
3			

(b) Choose the correct word from each set of { **words** }. (Circle your answer. The first one has been done as an example).

The { moon / sun / water } evaporates { fish / seas / water } from lakes and oceans.

As the air rises, it cools. The water vapour condenses into tiny droplets of { evaporation / clouds / water }.

The droplets crowd together. They form a { cloud / lake / precipitation } .

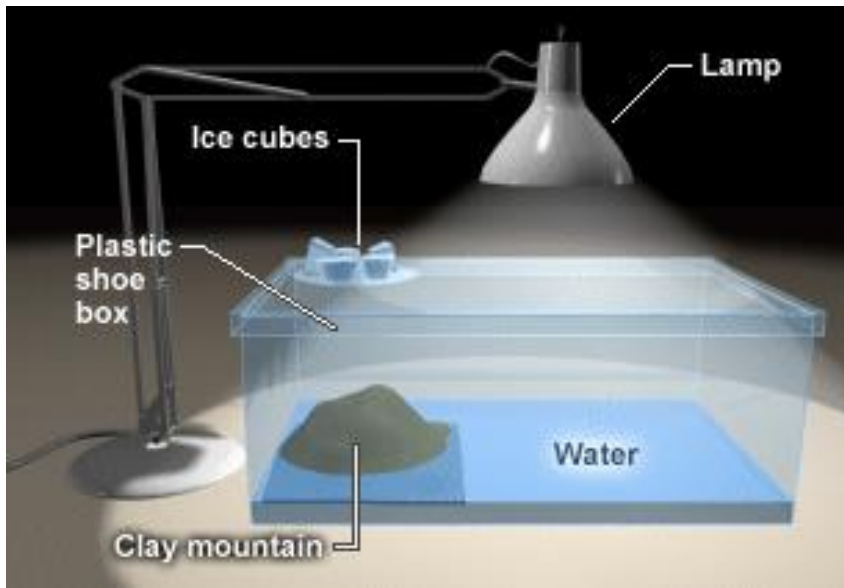
Wind blows the { rain / droplet / cloud } towards the land.

The tiny droplets join together and fall as rain to the { river / lake / ground }.

The water soaks into the ground and collects in { rivers and lakes / oceans and clouds / plants and animals } .

The { storm / cycle / river } that never ends has started again!

A student makes a model water cycle.



(c) What would they see some time after the lamp is switched on?

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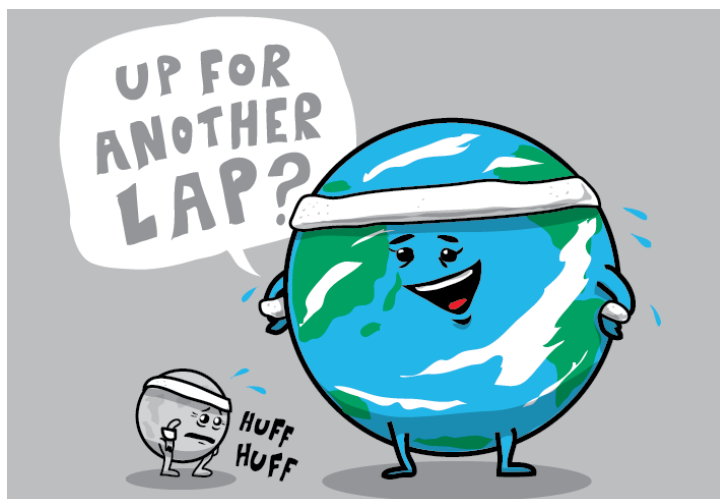
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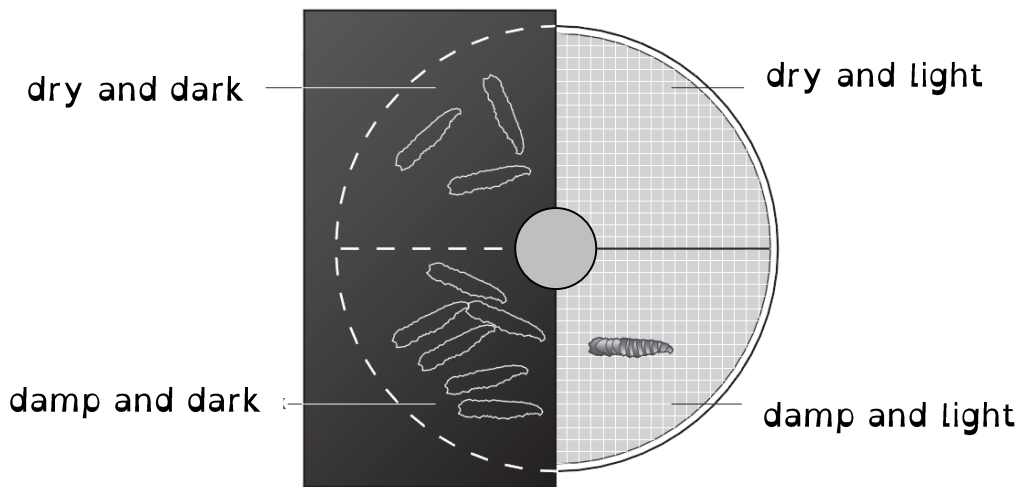
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**Question Seventeen [6 marks]**

Ten maggots were put in a choice chamber. The diagram shows the positions of the maggots after 10 minutes.



- (a) Where should the maggots have been placed at the start of the experiment? (You can draw an X on the diagram to show your answer).

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- (b) Use the diagram to complete the results table, to show the positions of the maggots after 10 minutes.

Conditions	Number of maggots
Dry and dark	
Damp and dark	
	1
	0

- (c) Write a conclusion for this investigation.

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(d) Suggest one way in which the pupils could make sure they have more reliable results.

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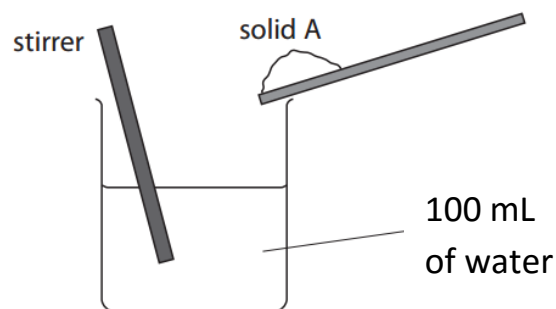


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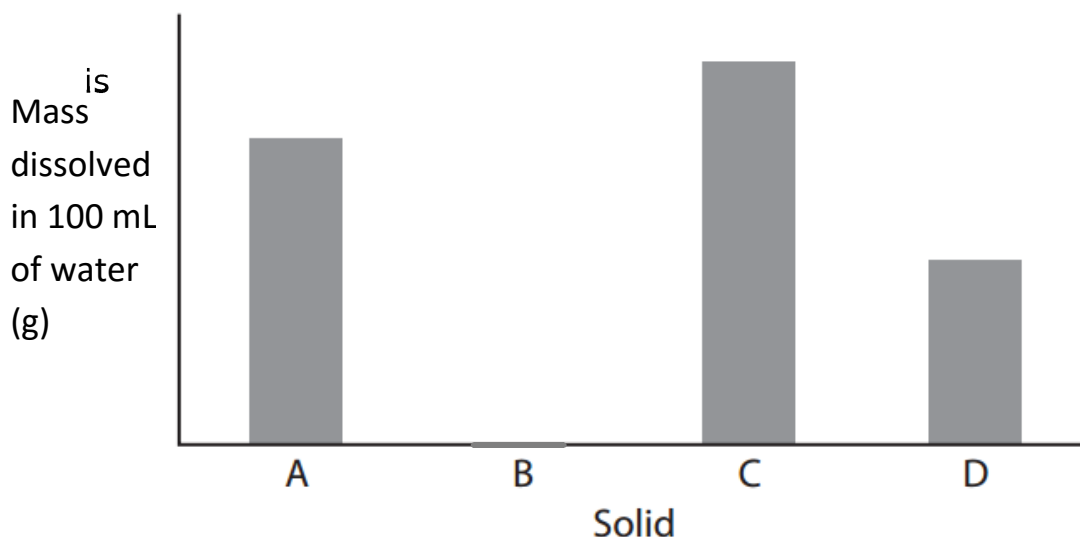
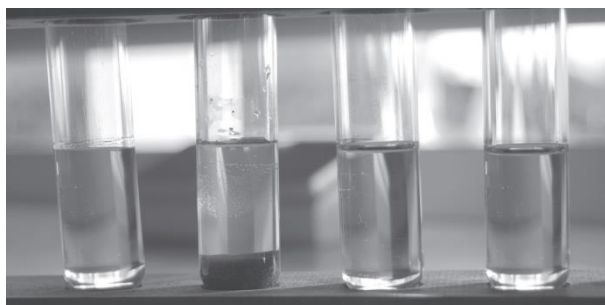
**Question Eighteen [5 marks]**

Becky investigates what happens when she adds different solids to water. She:

- adds solid A in small, weighed amounts, to 100 mL of water.
- stirs the water each time.
- keeps adding the solid until no more dissolves.
- records the mass of solid added.
- repeats this for solid B, solid C and solid D.



She records her results and draws a bar chart.



(a) What is the solid called? (Circle your answer.)

solute solvent suspension

(b) What is made when a solid dissolves in a liquid?

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(c) What do the picture and bar chart suggest about solid B?

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(d) From the bar chart, give a conclusion about solid C compared to solid D.

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(e) Becky wants to get solid A back. What does she need to do?

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**Question Nineteen [6 marks]**

Some students are investigating the materials that are used to make 'fabric' shopping bags. Each pupil asks a question about the bags.



Max says "how strong is the material?"

Carla says "which is the best material?"

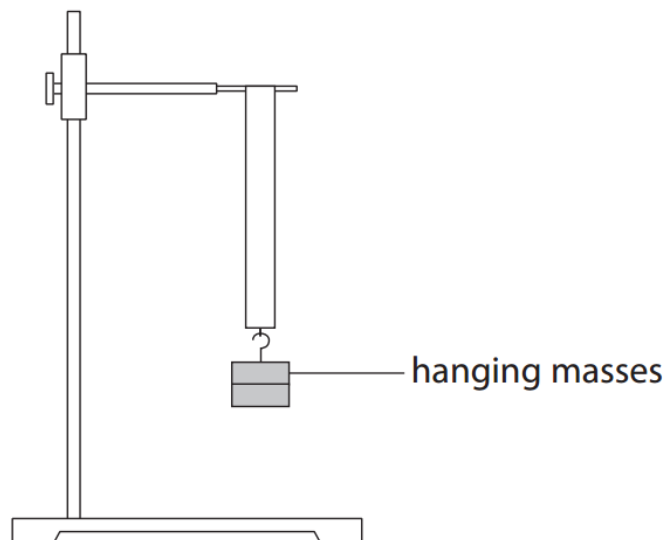
Tipene says "which is the heaviest material?"

Sammy says "how waterproof is the material?"

- (a) Which student has asked a question that **cannot** be tested scientifically?

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The pupils cut each material into strips. They test which material is the strongest by hanging masses on each strip. They write down the mass that caused each strip of material to break.



- (b) Write down two things (variables) that need to be kept the same to make it a fair test.

1

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2

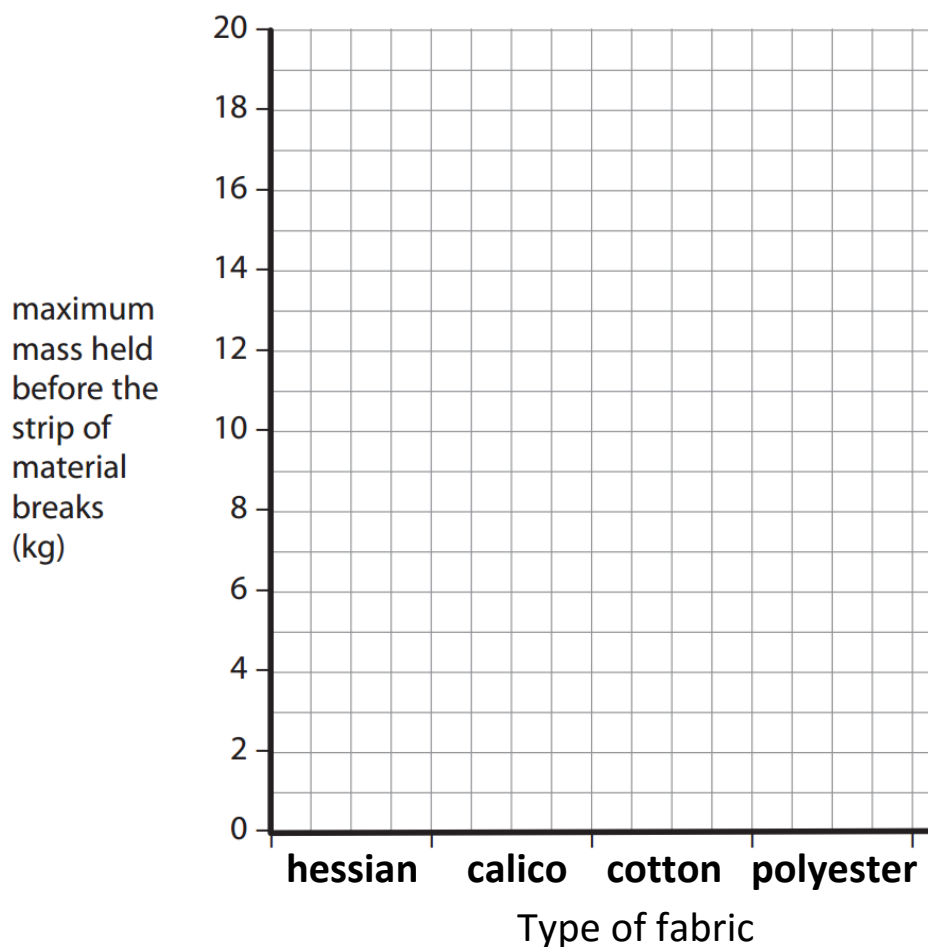
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This table shows their results.



Type of fabric	Maximum mass held (kg)
Hessian	17
Calico	14
Cotton	12
Polyester	16

(c) Draw a bar chart of these results.



(d) Write a conclusion for their experiment.

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**Question Twenty [5 marks]**

Read the passage below and answer the questions that follow.



In the wild, meerkats live in dry scrubland. They mostly eat insects. They also eat animals such as lizards, spiders, small mammals, as well as millipedes and centipedes. They also eat plant roots. Meerkats are immune to scorpion stings. They usually bite off the scorpion's stinger and then eat its body.

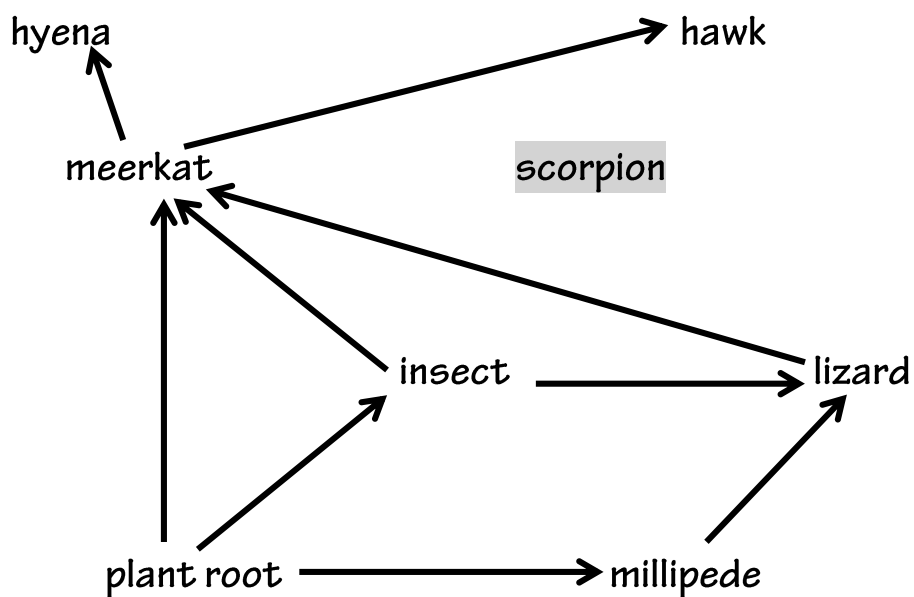
Colonies of meerkats live in burrows with many entrance and exit holes. Meerkats learn where the holes are, so they can run to the closest one if they see a predator such as a hyena or a large bird of prey such as a hawk.

(a) Meerkats are: (circle correct answer).

carnivores      herbivores      omnivores

(b) Scorpions eat insects and lizards. Meerkats eat scorpions.

Add arrows to the food web to show this information.



Each meerkat has a job – baby-sitting, teaching youngsters how to survive, sentry duty and looking for food. When resting, they sunbathe or sleep in the shade.

Meerkats have black ears that can close when digging to keep sand out.

Meerkats have long non-retractable claws. They use them to dig holes to find prey and for fighting and for self-defence.

(c) Meerkats have many adaptations to help them survive

- (i) From the diagram, describe ANY one adaptation shown by the meerkat.
- (ii) Explain how this adaptation helps the meerkat to survive in the wild.

Adaptation:

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How it helps the meerkat survive:

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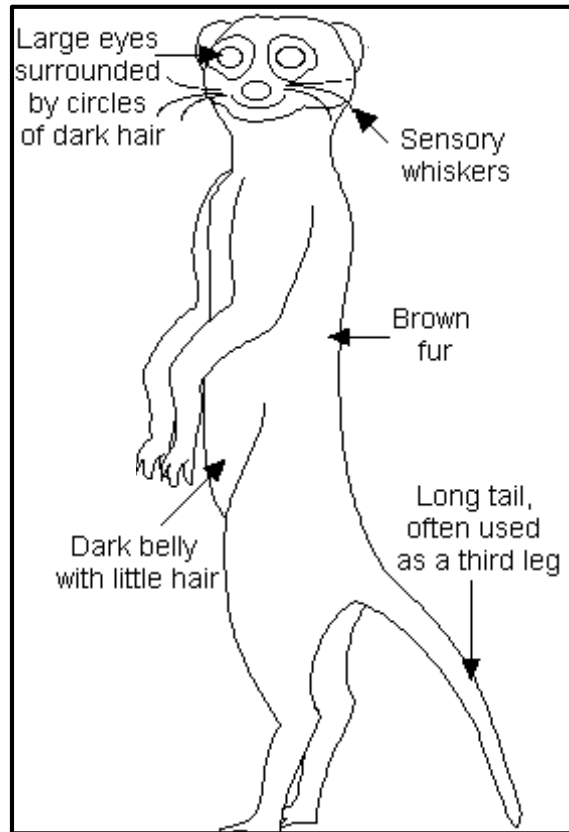
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**CHECK YOUR ANSWERS**