

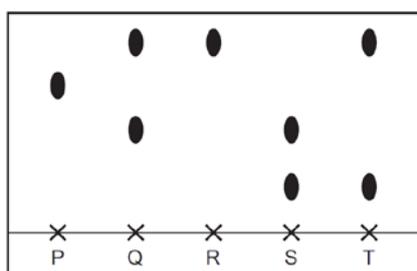
## 2016 Year 9 Practice Science Exam

### Multiple Choice.

Q1. Which row describes the particles in a solid?

	movement	attraction	distance
A	stationary	strong	close together
B	vibrating	strong	close together
C	vibrating	strong	far apart
D	vibrating	weak	close together

Q2. The diagram shows the chromatogram obtained using five felt-tip pens.



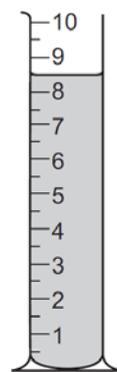
Which statement about the pens is **not** correct?

- A. One of the dyes is found in three pens.
- B. Pen R contains a mixture of dyes.
- C. Three pens contain two dyes.
- D. Two pens contain only one dye.

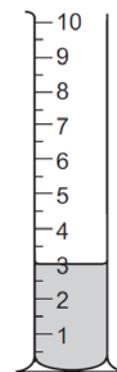
Q3. Some water is poured from a 10 mL measuring cylinder. The diagrams show the measuring cylinder before and after the water is poured from it.

What volume of water is poured from the measuring cylinder?

- A. 3.0 mL
- B. 5.5 mL
- C. 6.5 mL
- D. 8.5 mL



before pouring

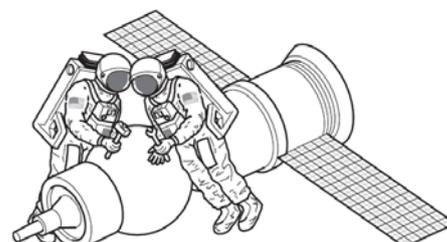


after pouring

Q4. Two astronauts without radios can only communicate in space if their helmets are touching. There is no air in space.

What does this show about sound?

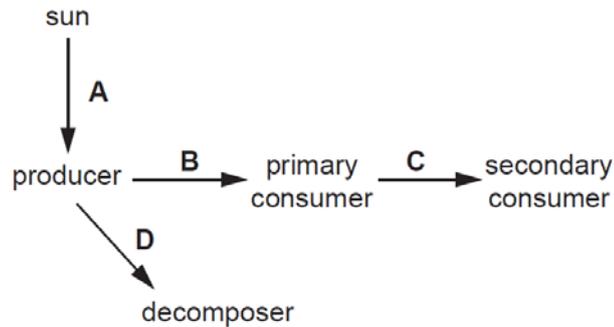
- A. It can travel through a solid and a vacuum.
- B. It can travel through a solid but cannot travel through a vacuum.
- C. It cannot travel through a solid but it can travel through a vacuum.
- D. It cannot travel through either a solid or a vacuum.



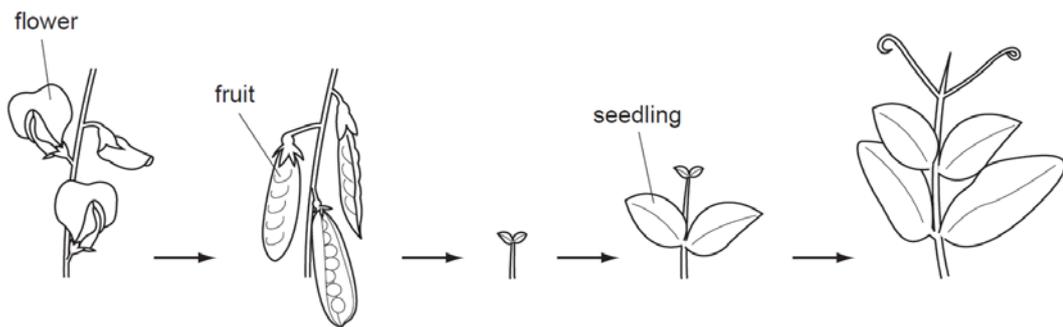
Q5. Which parts are found in both plant and animal cells?

- A. cell membrane, large vacuole
- B. cell membrane, cytoplasm
- C. cell wall, large vacuole
- D. cell wall, cytoplasm

Q6. The diagram shows a food chain. Where does energy enter the food chain?



Q7. The diagrams show two characteristics of living organisms.



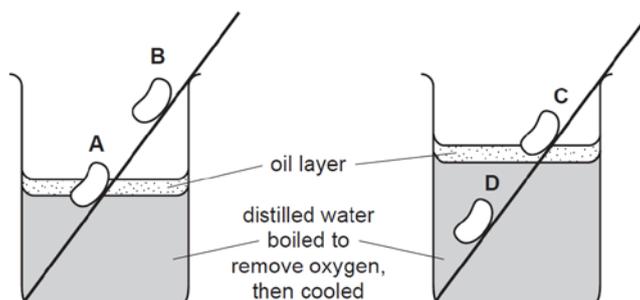
Which characteristics are shown?

- A. excretion and growth
- B. growth and reproduction
- C. reproduction and respiration
- D. respiration and excretion

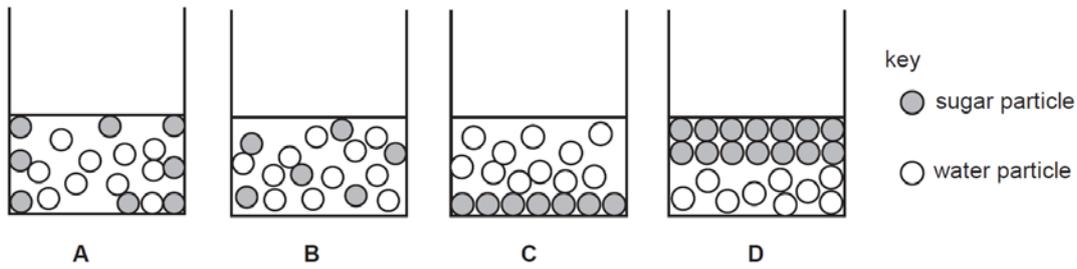
Q8. During digestion, large molecules are broken into smaller molecules by which of the following?

- A. bile
- B. enzymes
- C. peristalsis
- D. teeth

Q9. The experiment shown in the diagram was set up to investigate the conditions required for the germination of bean seeds. Which seed would be most likely to germinate?



Q10. Some sugar is dissolved in water. Which diagram shows how the particles are arranged in the solution?



Q11. Which stages occur in distillation?

- A. condensation then evaporation
- B. condensation then filtration
- C. evaporation then condensation
- D. filtration then evaporation

Q12. The diagram shows a sugar lump in a cup of tea. Which two processes must happen to spread the sugar evenly in the tea?

	first process	second process
A	diffusion	dissolving
B	dissolving	diffusion
C	dissolving	melting
D	melting	diffusion



**NEWS ARTICLE**

**Climate change causing polar bears to look for food in Alaska villages**

PBS NewsHour, 10.24.16



A polar bear roams Alaska.

One morning, Carla SimsKayotuk peeked outside her door. “And what do I see? Two huge eyes staring at me. It was a baby polar bear,” she recalled. Carla lives in Alaska in a part called the Arctic.

**Melting Ice Bad For Bears And People**

Earth is hotter than it was 200 years ago. Much of the heat is from people burning coal, oil, and gas for cars and houses. The Arctic is warming faster than anywhere else.

Sea ice is melting around Alaska. This is where polar bears hunt for food. They are forced to find land on the coast. If they are hungry enough, they roam into villages.

Higher temperatures also melted outdoor freezers. The people of Alaska have used these for over 100 years to store whale meat. They call the meat muktuk. Now the freezers are open to hungry bears.

### **Villagers Want To Protect Whale Meat**

Carla would occasionally see a polar bear near her village as a child. "Now we have like 40 bears," she said.

With more bears in town, it's hard to keep the whale meat safe, she says.

Last fall, the village received four special food containers. They were expensive.

Karla Dutton helped get the containers. She said they worked well in the villages.

More villagers want the containers now. Back in 2008, people still used their ice cellars.

Not anymore. There is only one working ice cellar in their village of about 250 people.

For now, polar bears continue to come to the village. They are attracted to the bone piles leftover from the whale hunts.

### **Hungry Bears Dangerous To Humans**

Todd Atwood studies polar bears for the U.S. government. He says that hungrier bears are braver about going into towns. This is bad for polar bears. They are not meant to spend long periods of time on land.

Todd found that polar bears are a lot more likely to come on shore today. Also, there are far fewer polar bears in Alaska. In four years, it went from about 1,500 bears to just over 900.

When Carla saw the baby polar bear outside, she called the Polar Bear Patrol. It is the team that scares bears away from town.

Eventually, the bear left. No one was hurt. Things could get more dangerous, though. The animals might stay longer. They might also get hungrier.

Circle your answer A – D.

Q1: Which sentence BEST states a main idea of the article?

- A. The temperature of Earth is hotter than it used to be.
- B. Carla SimsKayotuk saw 40 bears near her village.
- C. The Polar Bear Patrol scares bears away from town.
- D. Polar bears are looking for food in towns in Alaska.

Q2: What is the MAIN idea of the section "Villagers Want To Protect Whale Meat"?

- A. The special food containers cost a lot of money.
- B. Polar bears are attracted to the bone piles left over from whale hunts.
- C. Villagers need special containers to keep polar bears away from their food.
- D. Villagers want to rebuild their ice cellars and get them working again.

Q3: What is the MAIN reason why polar bears are looking for food in the village?

- A. Polar bears like the whale meat that villagers eat.
- B. The ice where polar bears hunt is melting.
- C. Polar bears prefer to spend more time on land than on ice.
- D. There are more polar bears in Alaska, so they have less food to eat.

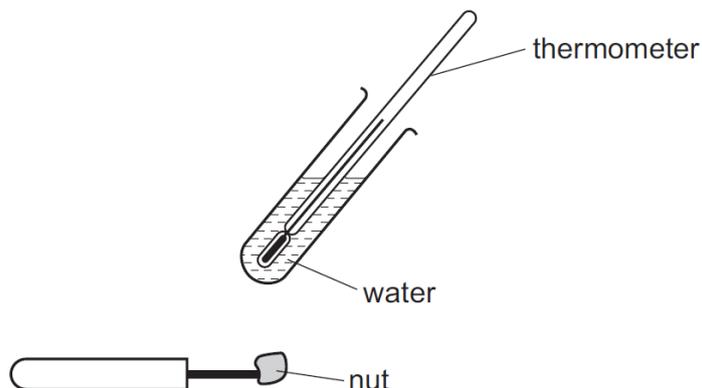
Q4: Why are the higher temperatures on Earth important?

- A. The hotter temperatures mean that more people will want to live in Alaska.
- B. The hotter temperatures force people to buy expensive freezers for their meat.
- C. The hotter temperatures mean that people won't have to burn as much oil and gas to keep warm.
- D. The hotter temperatures melt the ice where bears live and make it hard for people to store their meat.

## ENERGY IN NUTS

Nuts contain oil. Nuts can be burned to produce energy.

The apparatus shown can be used to compare the energy produced by burning different nuts.



You are provided with peanuts and brazil nuts. Other equipment available includes a clamp and stand, a Bunsen burner and a digital balance.

Plan an investigation to show which of two different types of nut produce the most energy.

You should include:

- How you will make this a fair test
- What will you change (independent variable)
- What will you measure to get some data (dependent variable)
- What will you keep the same (controlled variables)
- How you will make your results reliable
- How you will make your results accurate
- Any safety precautions you will take

## GROWING PLANTS

The diagram shows three cress seedlings grown under different conditions.

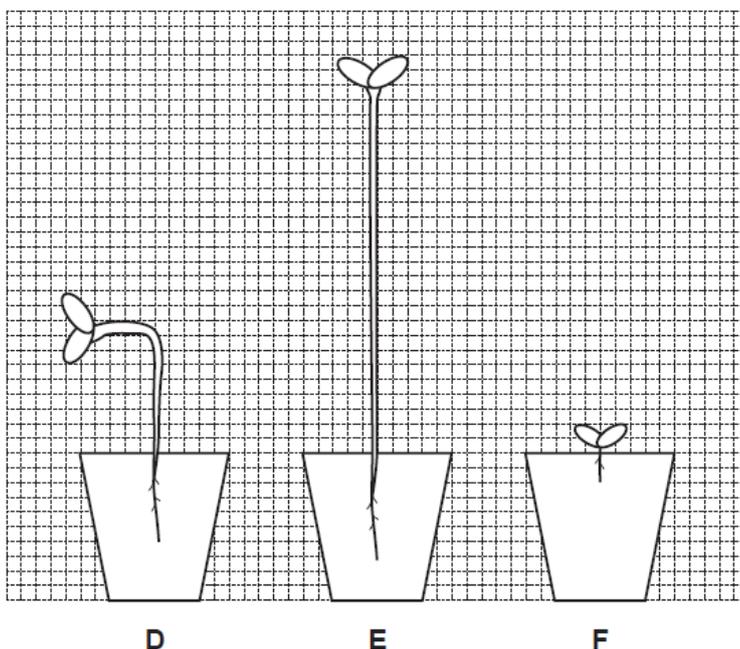
The seeds came from the same plant and the seedlings have been grown for the same length of time.

The seedlings are drawn to scale.

The cress seedlings, D, E and F differ in appearance.

For each seedling

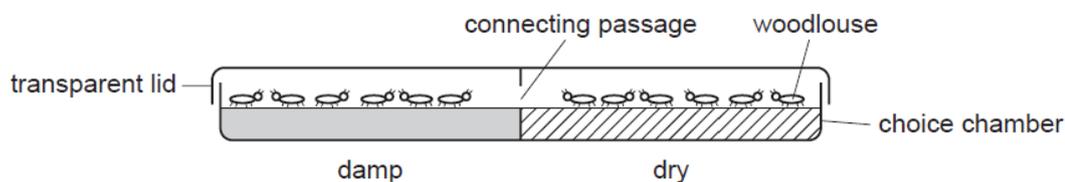
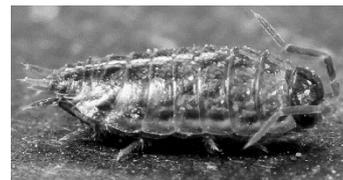
- state how it is different
- suggest an explanation for the way it has grown



## THE BEHAVIOUR OF THE WOODLICE

The diagram shows a woodlouse.

Small invertebrates such as woodlice respond to different environmental conditions. 24 woodlice were placed in a choice chamber linked by a connecting passage, as shown. 12 of the woodlice were placed in the damp area on one side of the choice chamber; the other 12 were placed in the dry area on the other side of the choice chamber.



After 5 minutes the number of woodlice in each area of the chamber was recorded. The woodlice were released into their natural environment. This procedure was repeated four more times using different woodlice.

The results are shown.

trial	positions of woodlice		number of woodlice in the damp area	number of woodlice in the dry area
	damp area	dry area		
1			.....	.....
2			.....	.....
3			.....	.....
4			.....	.....
5			.....	.....

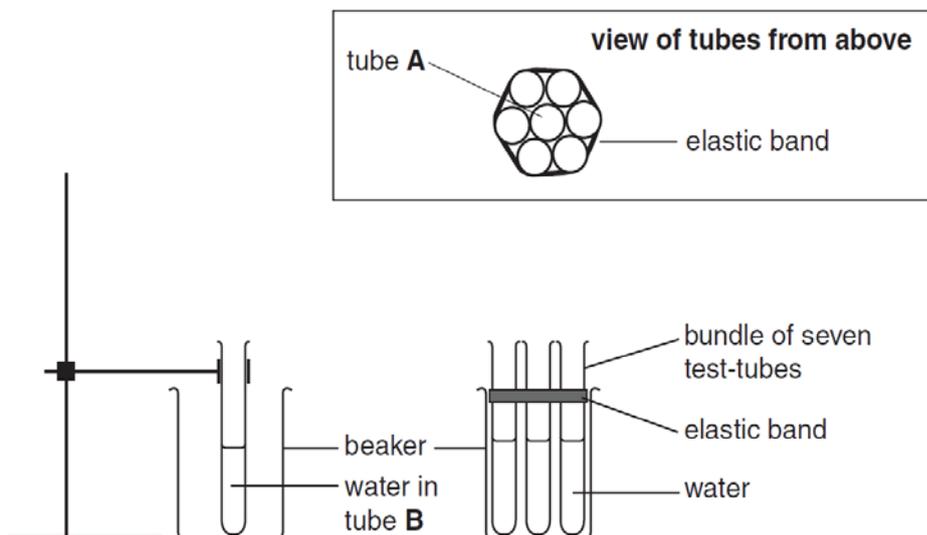
- (a) Analyse the results. In your answer you should
- Count and record the number of woodlice in each area of the choice chamber for each trial
  - Calculate the total number of woodlice and the average for each area.
  - Write a conclusion
- (b) Suggest how you might improve this investigation.
- (c) Explain how the behaviour of the woodlice would help them to survive in their natural habitat.

## HEAT LOSS IN PENGUINS

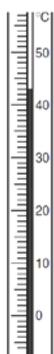
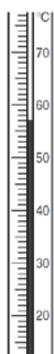
This question is about heat loss in animals. During cold weather some animals group together (huddle) to keep warm.

A student did an experiment to find how effective such huddling is. She used test-tubes of hot water to represent the animals.

- She half-filled eight test-tubes with hot water.
- She used an elastic band to make a bundle of seven tubes with test-tube A surrounded by six other test-tubes.
- She put a thermometer into test-tube A.
- She also put a thermometer into the eighth test-tube, B, which she kept separate.
- She then put the tubes in beakers as shown in the diagram
- Then she took the initial temperature of the water in both test-tubes. She continued to take the temperature every minute for ten minutes.



- (a) Read the thermometers (i) and (ii) below to complete the sets of results. Write your answers in the spaces provided.



### results for test-tube A

initial temperature = 60 °C

readings / °C

59 58 reading (i) 57 57 56 55 55 54 54

### results for test-tube B

initial temperature = 61 °C

readings / °C

58 55 53 51 49 47 46 44 reading (ii) 42

(i) ..... °C

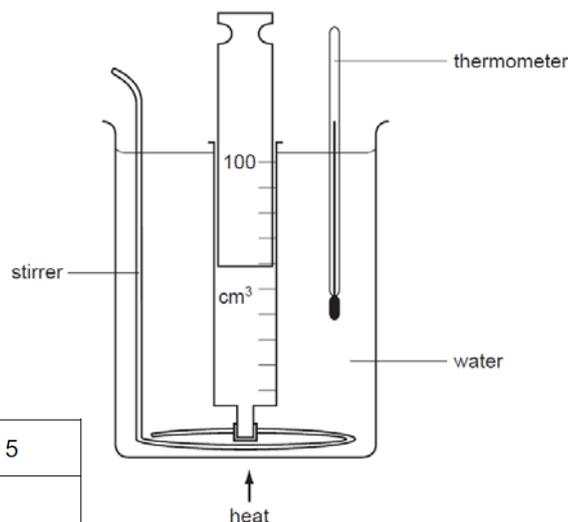
(ii) ..... °C

- (b) Draw a results table showing times and temperatures to display all the results clearly.
- (c) Is huddling effective?
- which test-tube, A or B, took longer to cool down?
  - use your results and your knowledge of heat transfer to explain your answer.
- (d) Suggest two ways in which you could improve the accuracy of the experiment.

## HEATING GASES

When air is heated, it expands. An experiment was done to investigate this expansion. Air was drawn into a 100 cm<sup>3</sup> glass syringe and then the nozzle was sealed. The syringe was placed in a tall beaker of cold water.

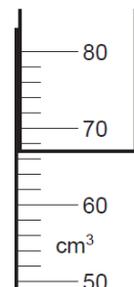
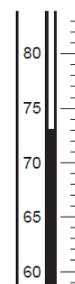
The water was slowly warmed and gently stirred. At intervals, a thermometer was used to find the temperature of the water. The temperature reading and the volume of air in the syringe were recorded.



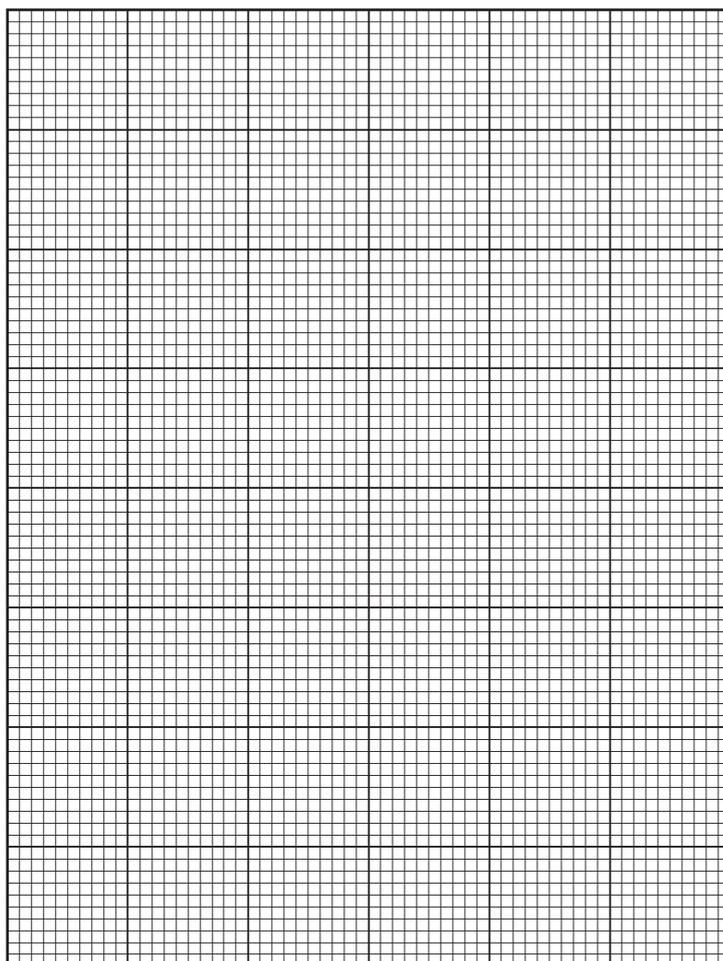
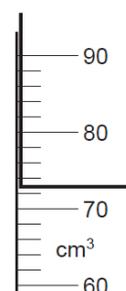
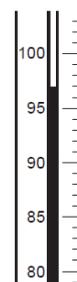
reading number	1	2	3	4	5
temperature/°C	2	25	50		
volume/cm <sup>3</sup>	53	59	64		

- The scales of the thermometer and the syringe for the two missing readings are shown. Read the temperatures and the volumes and record the values the table.
- On the grid provided, plot the volume of air (vertical axis) against the temperature. Draw the best fit straight line.
- Use your knowledge of the behaviour of gas molecules to explain why the air in the syringe expanded when it was heated.

reading 4



reading 5



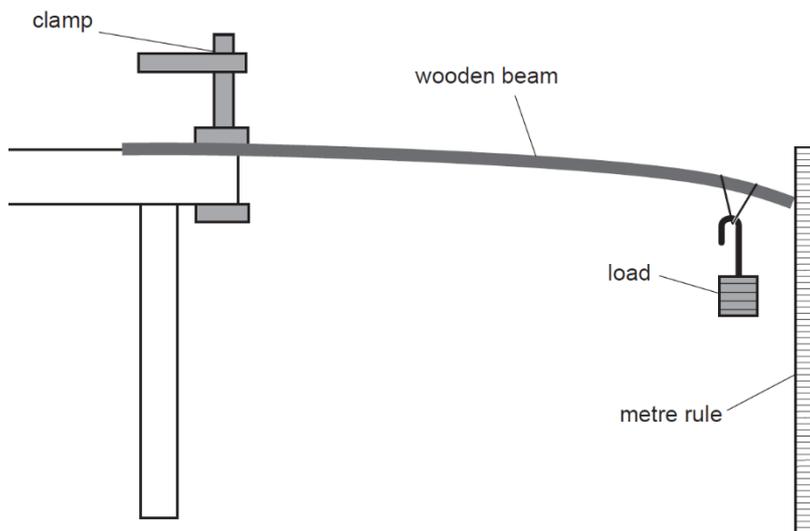
## FORCES

A student investigated how much a wooden beam bent when different loads were placed near the end of the beam.

She set up the apparatus shown.

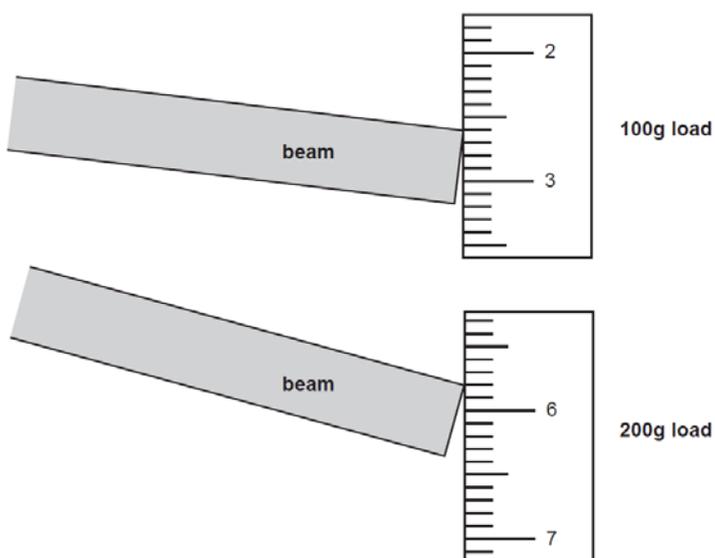
The metre rule was positioned so that, with no load on the beam, the top of the beam was level with the 0 cm mark.

The student added a 100 g load to the end of the beam and recorded the displacement (bend) of the beam using the metre rule. She added further 100 g loads, recording the displacement of the beam, until the total load was 500 g. She recorded her results in a table.



The measurements of the bend of the beam, for 100 g and 200 g are shown.

(a) Record these measurements, from the **top** of the beam.



load / g	displacement / cm
0	0
100	
200	
300	10.0
400	15.5
500	22.0

- (b) What relationship is there between the load and the displacement (bend) of the beam?
- (c) How could the student improve the accuracy of her results?
- (d) How do you think the results be affected if:
- the beam was thicker?
  - the beam was shorter?
- (e) Describe how the student could use this apparatus to measure the mass of an object that weighed between 200 g and 500 g.