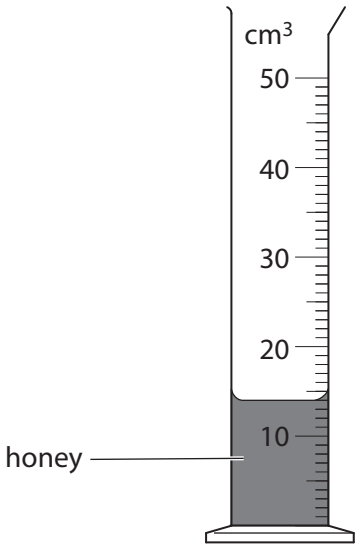
1 A student investigates the density of three different liquids.

The student pours liquid honey into a container, as shown in the figure.

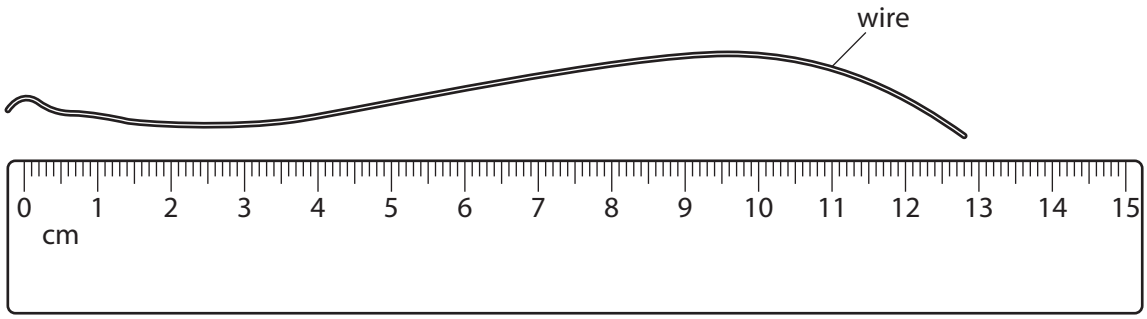


Name the container shown in the figure.

..... [1]

[Total: 1]

2 A student uses a rule to measure a thin piece of wire as shown in the figure.



The student records the length of the wire as 12.8 cm.

State two errors in the student's measurement of the length of wire.

1. .....

.....

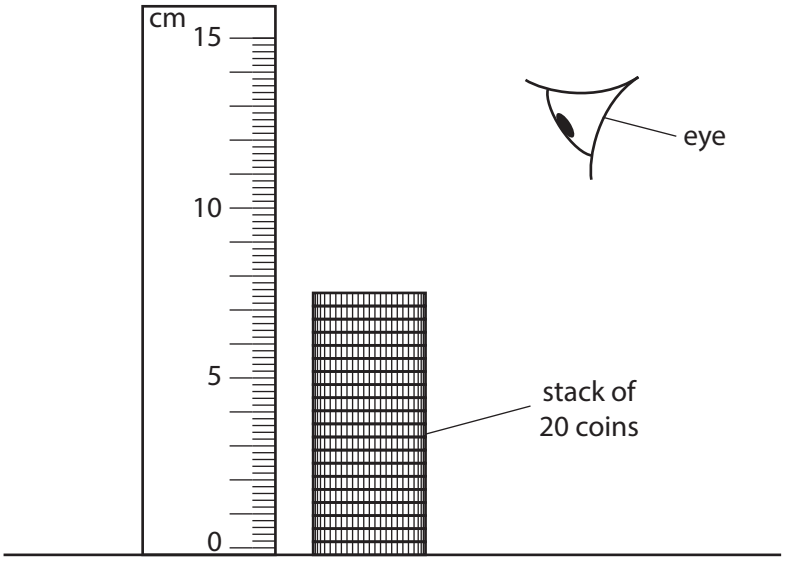
2. .....

..... [2]

[Total: 2]

3 A student has a stack of 20 identical coins.

The figure shows the student measuring the height of the stack using a ruler.



With his eye at the position shown, the student's measurement of the height of the stack is 6.8 cm.

Suggest two reasons why the student's measurement is inaccurate.

1. .....

.....

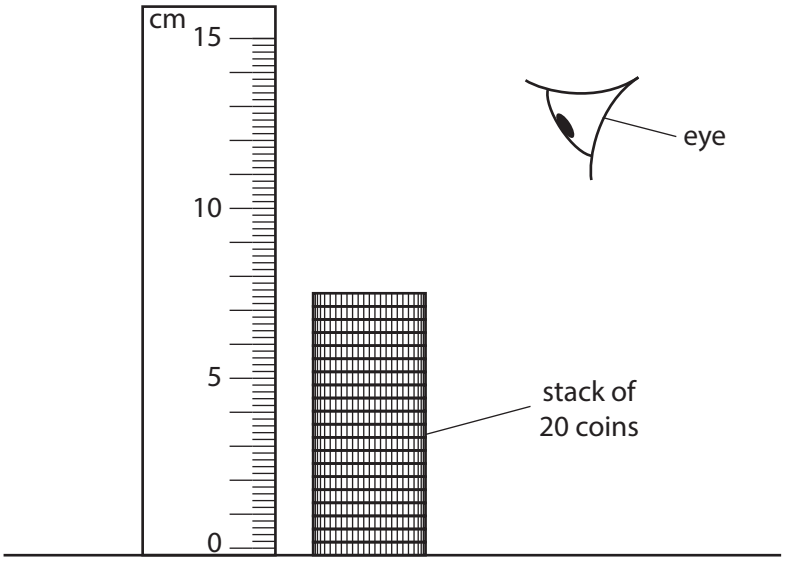
2. .....

..... [2]

[Total: 2]

4 A student has a stack of 20 identical coins.

The figure shows the student measuring the height of the stack using a ruler.



The student correctly determines the height of the stack as 7.7 cm.

Calculate the average thickness of one coin.

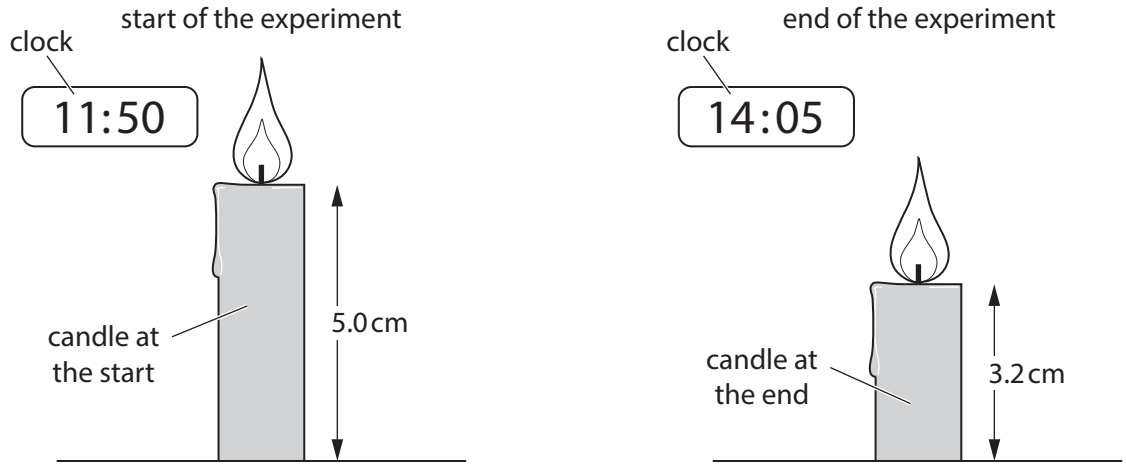
thickness = ... cm [2]

[Total: 2]

5 In the past, burning candles were used as timers.

A boy carries out an experiment to make his own timer using a burning candle.

The figure (not to scale) shows the length of the candle, and the clock he used, at the start of the experiment and at the end of the experiment.



The candle has a cross-sectional area of 1.6 cm^2.

Calculate the volume of candle at the start of the experiment.

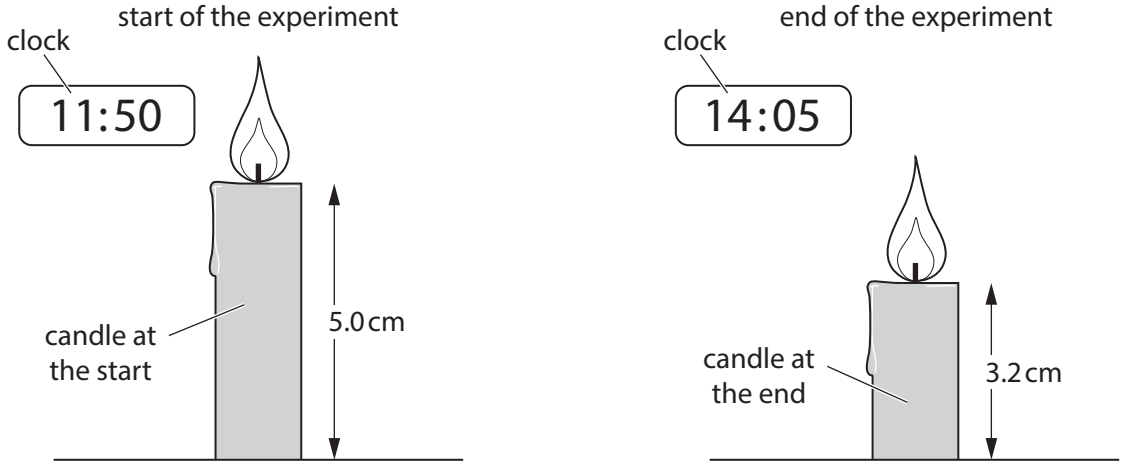
volume = ... cm^3 [2]

[Total: 2]

6 In the past, burning candles were used as timers.

A boy carries out an experiment to make his own timer using a burning candle.

The figure (not to scale) shows the length of the candle, and the clock he used, at the start of the experiment and at the end of the experiment.



(a) Use the figure to complete the table.

time at start of the experiment	
time at end of the experiment	
time for which the candle was burning	..... hours .....minutes = ... hours

[2]

(b) The difference in the length of the candle from the start to the end of the experiment was 1.8 cm.

Calculate the rate, in cm / hour, at which the candle burns.

rate = ... cm / hour [2]

(c) The boy estimates that he would need a candle about 24 cm long, of the same material and diameter, to make a candle timer that would last at least one day.

State whether the boy's estimate is correct. Give a reason for your answer.

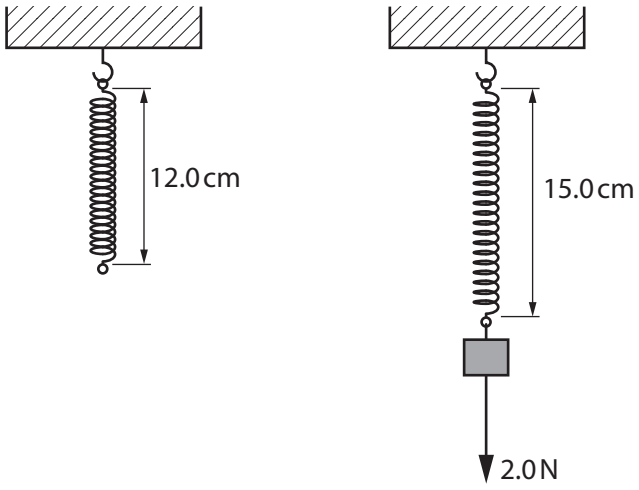
.....

.....

..... [2]

[Total: 6]

7 A student hangs a spring vertically from a hook, as shown in the figure.



Describe how the length of the spring can be measured accurately, after it has been hung from the hook.

.....

.....

.....

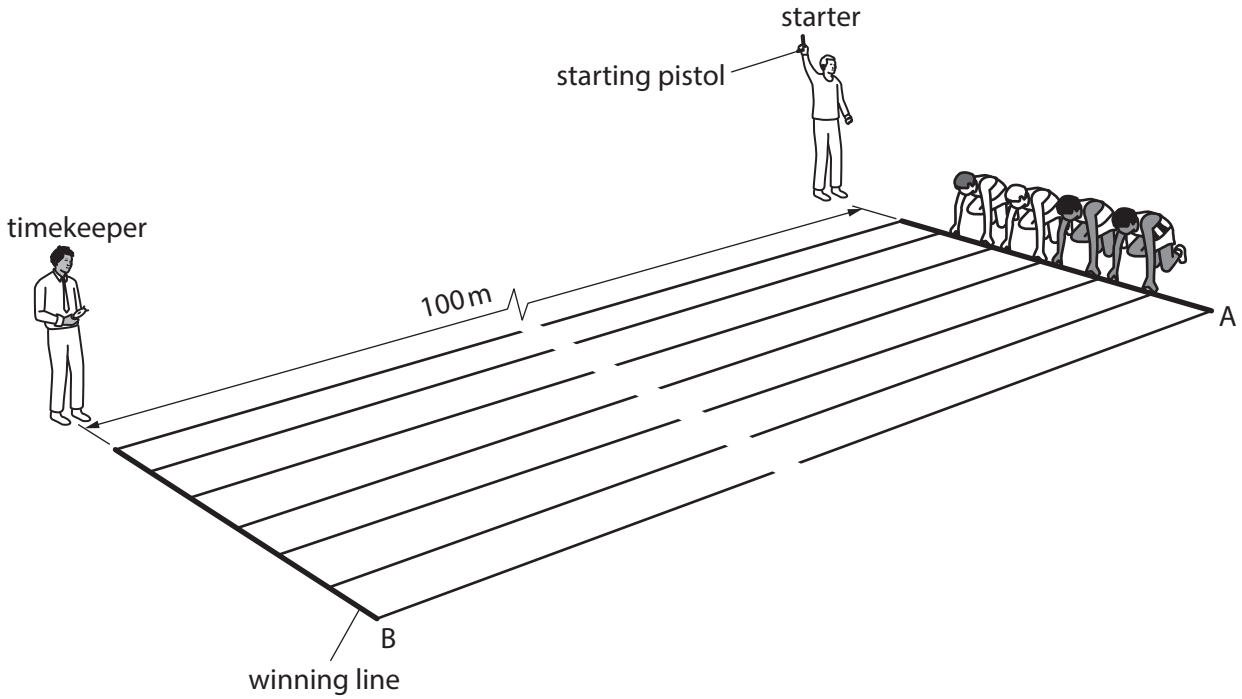
.....

.....

..... [3]

[Total: 3]

8 Four school athletes are about to run a 100 m race, as shown in the figure below.



The runners start at A, when the starter fires the starting pistol, and they finish at B.

The timing instrument is known to work correctly.

What might cause the timekeeper to introduce an inaccuracy into the timing of the race?

..... [1]

[Total: 1]

9 A student has been told to find the density of some liquid paraffin by measuring its mass and its volume.

(a) Which piece of laboratory equipment should she use to measure the volume of the liquid paraffin?

..... [1]

(b) Which piece of laboratory equipment should she use to find the mass of the liquid paraffin?

..... [1]

(c) Describe the procedure she would follow in order to find the mass.

.....

.....

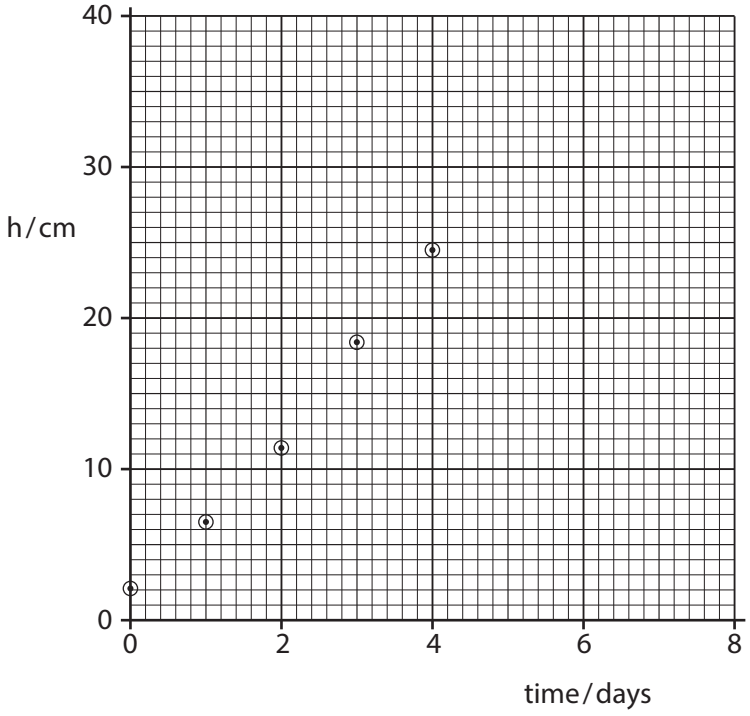
.....

.....

..... [3]

[Total: 5]

10 **(a)** Complete the graph by plotting the last three values of height *h* against time. Do **not** draw a line through the points.



[2]

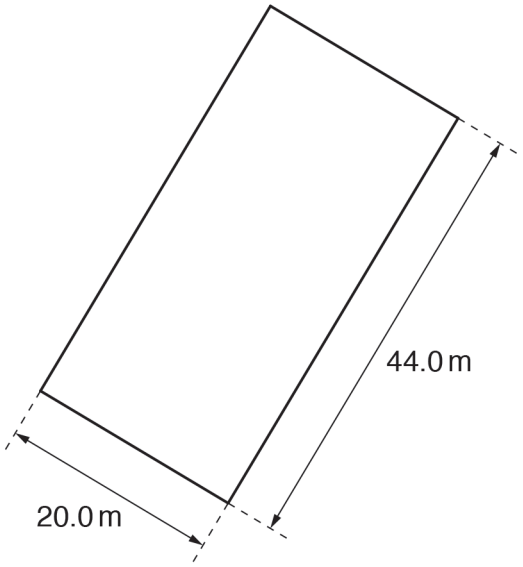
(b) Describe how the graph shows that the speed of growth of the plant is not constant.

.....

..... [1]

[Total: 3]

11 The diagram shows the top view of a rectangular paddling pool of constant depth. The pool is filled with sea water.

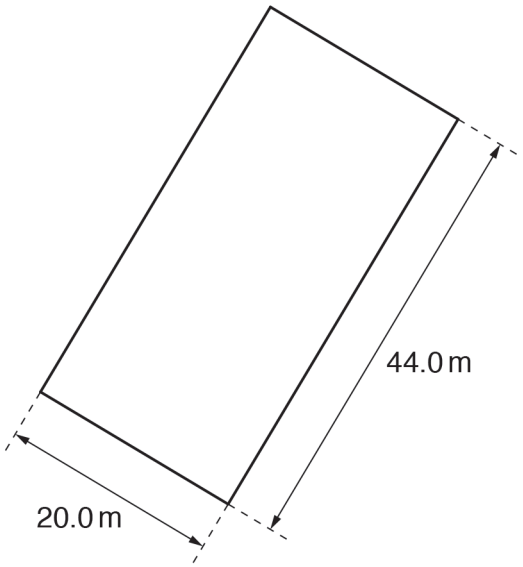


State a suitable instrument for measuring the dimensions given in the diagram.

..... [1]

[Total: 1]

12 The diagram shows the top view of a rectangular paddling pool of constant depth. The pool is filled with sea water.



(a) The volume of the sea water in the pool is 264 m^3.

Calculate the depth of the pool.

depth = ... [3]

(b) The mass of the sea water in the pool is 2.70×10^5 kg.

Calculate the density of the sea water. Give your answer to 3 significant figures.

density = ... [2]

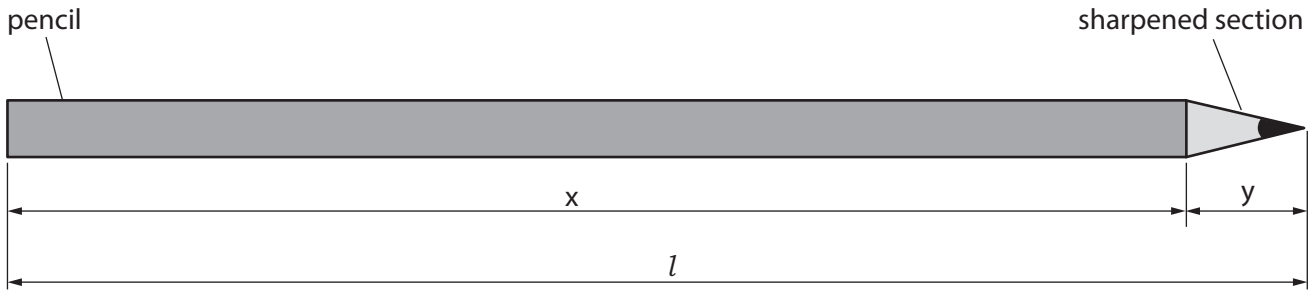
(c) Calculate the pressure due to the sea water at the bottom of the pool.

pressure = ... [2]

[Total: 7]

13 An IGCSE student is taking measurements of a pencil.

The figure shows the pencil, drawn full size.



(a) Describe how you would use a length of string and a rule to determine the circumference *c* of the unsharpened section of the pencil.

.....

.....

.....

.....

..... [2]

(b) The student's value for the circumference is $c = 2.4\,\text{cm}$.

Suggest a source of inaccuracy in determining the circumference of the pencil.

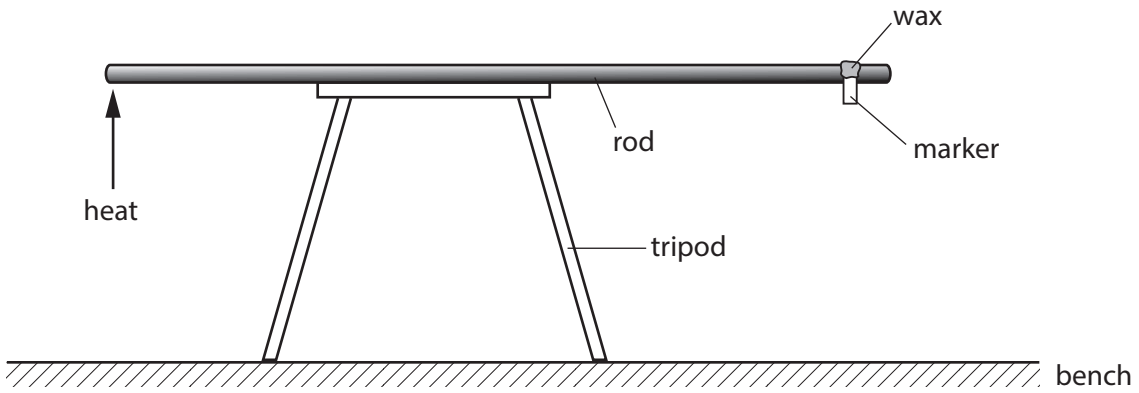
.....

..... [1]

[Total: 3]

14 A student carries out an experiment to compare how quickly thermal energy is conducted along rods made from different metals. Each rod is heated at one end with a Bunsen burner flame.

Each rod carries a marker held on the rod with a little wax. When the wax melts, the marker falls.



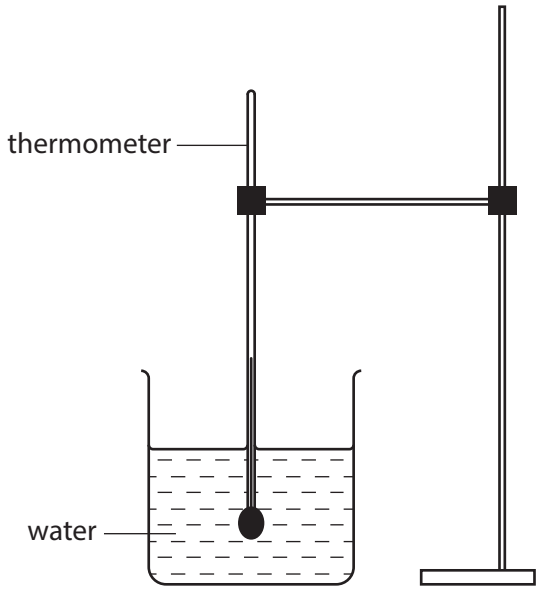
One other piece of equipment is required to compare how quickly thermal energy is conducted. Name this piece of equipment.

..... [1]

[Total: 1]

15 The IGCSE class is investigating the cooling of water.

A student places a thermometer into a beaker containing 200 cm^3 of hot water, as shown in the figure.



Describe briefly how you would read a measuring cylinder to obtain an accurate value for the volume of water. You may draw a diagram.

.....

.....

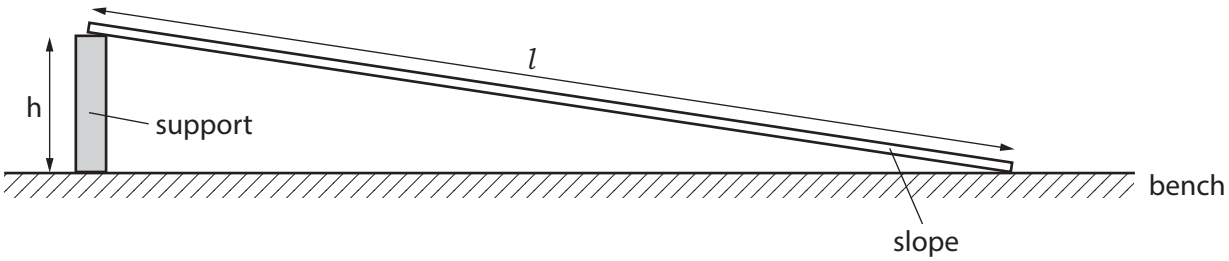
.....

..... [1]

[Total: 1]

16 An IGCSE student is investigating the average speed of a toy car travelling down a slope.

She releases the toy car on the slope. She uses a stopwatch to measure the time taken for the car to travel down part of the slope. The figure shows the slope.



The student tries to determine the time that the toy car takes to travel a distance down the slope.

Make three suggestions about what she could do to ensure that the distance travelled and the time taken by the toy car are measured as reliably as possible.

1. .....

.....

2. .....

.....

3. .....

..... [3]

[Total: 3]