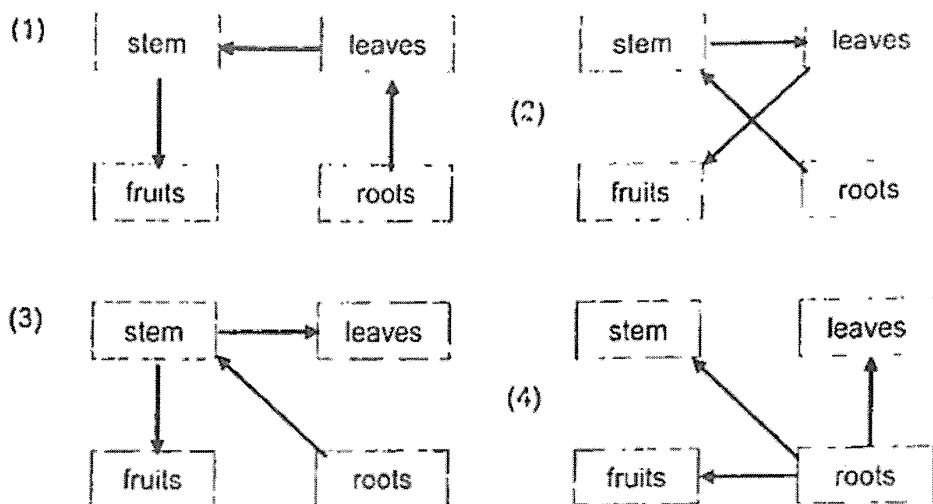


1. (3)	2. (2)	3. (4)	4. (3)	5. (1)	6. (1)
7. (4)	8. (3)	9. (1)	10. (4)	11. (3)	12. (4)
13. (2)	14. (2)	15. (4)	16. (2)	17. (2)	18. (1)
19. (1)	20. (2)	21. (2)	22. (4)	23. (3)	24. (4)
25. (2)	26. (4)	27. (1)	28. (2)	29. (3)	30. (4)

BOOKLET A, QUESTION 1 (2 MARKS)



(3)

Water is absorbed by the roots and travels up the stem through the water-carrying tubes, and from the stem it is carried to the leaves and to the fruits. The flow therefore starts at the roots and passes through the stem before reaching the other parts.

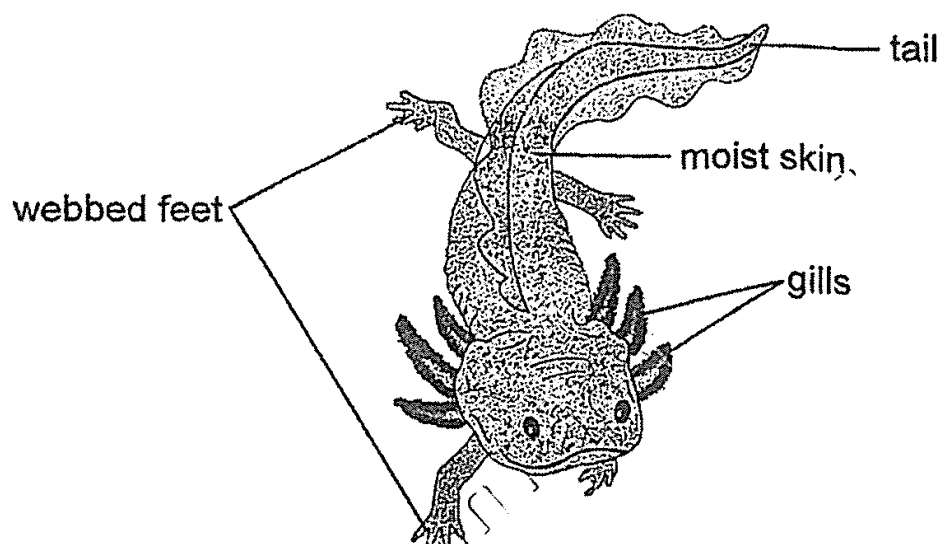
BOOKLET A, QUESTION 2 (2 MARKS)

(2)

The material could be folded into a sailboat, so it is flexible.

The boat sank after a while, which shows that water soaked through the material, so it is not waterproof.

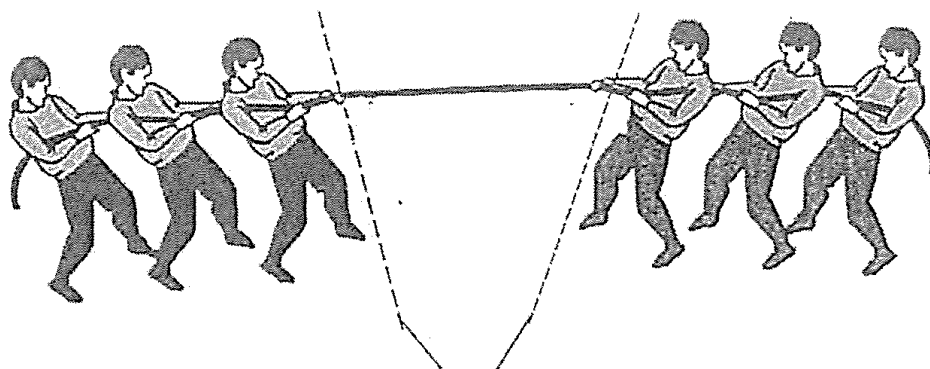
BOOKLET A, QUESTION 3 (2 MARKS)



(4)

Animal X has moist skin and webbed feet, which are characteristics of an amphibian. A fish has scales and fins, a reptile has dry scaly skin and a mammal has fur or hair and does not have gills.

BOOKLET A, QUESTION 4 (2 MARKS)

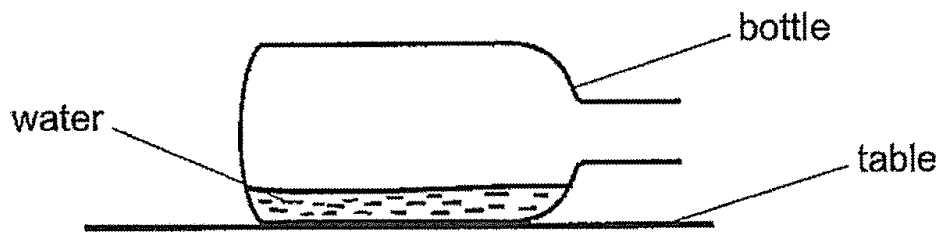


starting lines marked on the floor for each group

(3) Each group exerted an equal and opposite force on the other group.

The two groups pulled the rope in opposite directions. Because the two pulling forces were equal in size and opposite in direction, they cancelled each other out, so there was no overall force on either group and neither group moved from its starting line.

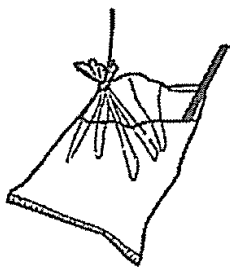
BOOKLET A, QUESTION 5 (2 MARKS)



(1)

Evaporation is faster when the water gains heat more quickly, so placing the bottle on a hot towel raises the temperature of the water and speeds up evaporation. A cupboard has still air, ice cools the water down and standing the bottle upright reduces the exposed surface area of water, so all three would slow evaporation down instead.

BOOKLET A, QUESTION 7 (2 MARKS)



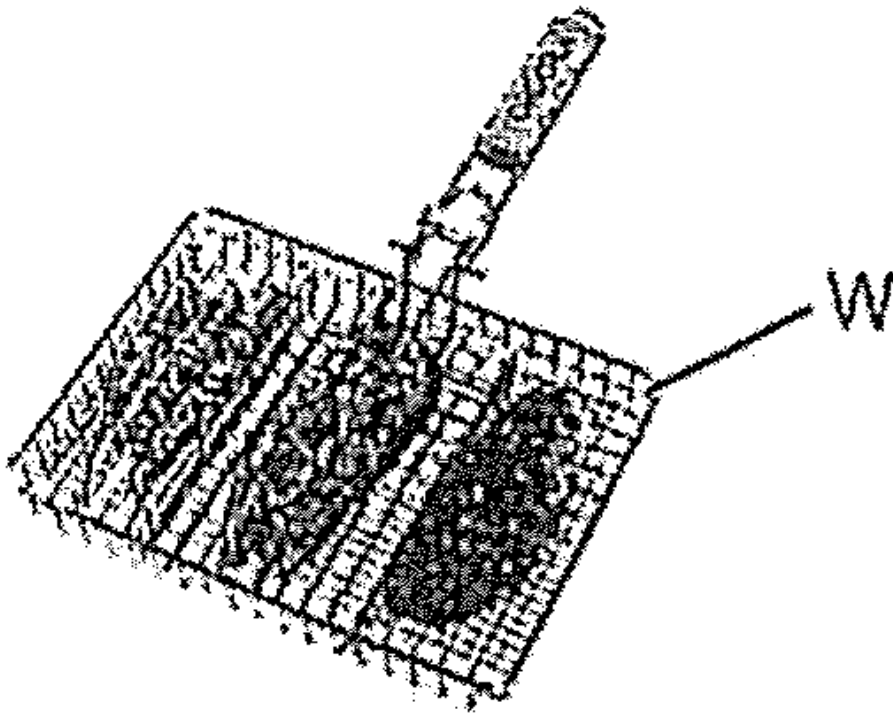
tea in a plastic bag



tea in a cup

(4)

The same tea takes the shape of the plastic bag in one picture and the shape of the cup in the other, showing that a liquid does not have a fixed shape.



(3)

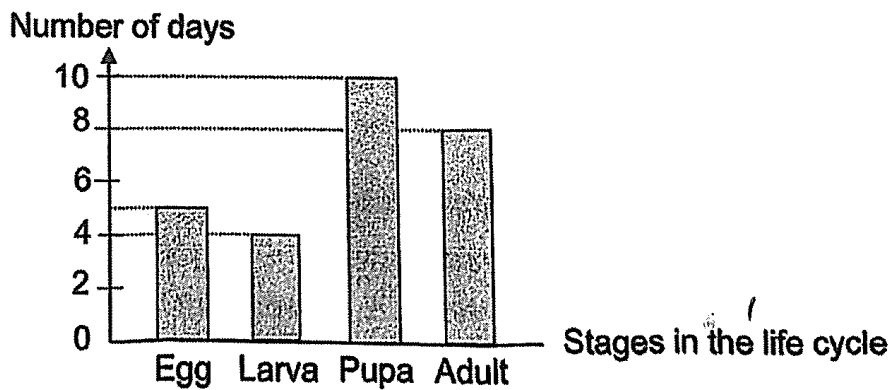
Part W must be strong so that it can hold the food without breaking, and it must be a good conductor of heat so that heat is passed quickly to the food to cook it. Only material C has both of these properties.

Group X	Group Y
coconut tree tree fern love grass	mushroom yeast mould

(1) C only.

Group X are plants and Group Y are fungi, so A is wrong. The coconut tree is a flowering plant and does not reproduce by spores, so B is wrong. Only the organisms in Group X contain chlorophyll to make their own food, so C is correct. A mushroom and mould are not micro-organisms, so D is wrong.

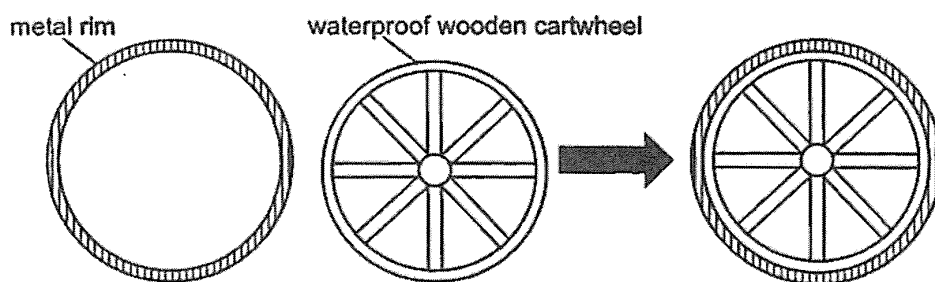
BOOKLET A, QUESTION 11 (2 MARKS)



(3) Pupa.

After the egg hatches the organism is a larva, and the larva stage lasts 4 days, so days 1 to 4 after hatching are the larva stage. The pupa stage follows and lasts 10 days, covering day 5 to day 14. The 6th day after hatching therefore falls in the pupa stage.

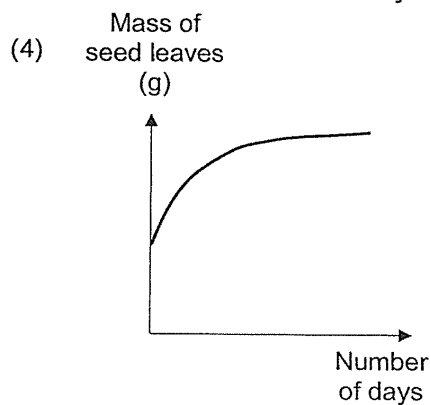
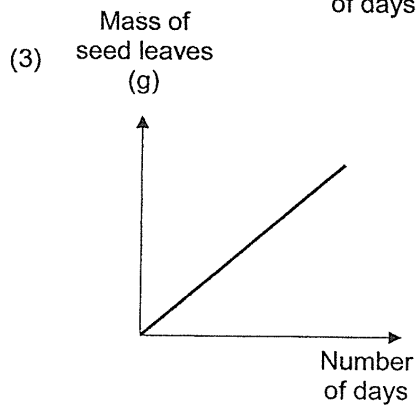
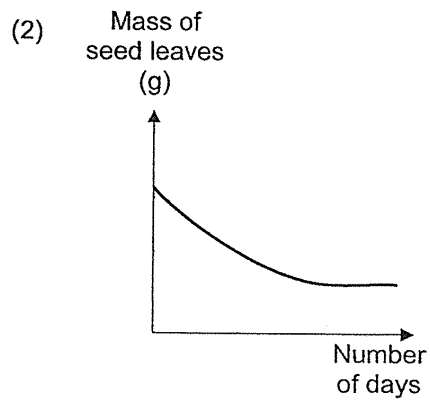
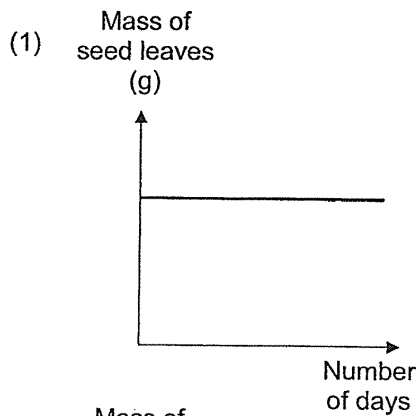
BOOKLET A, QUESTION 12 (2 MARKS)



(4)

Heating the metal rim over a fire makes it gain heat and expand, so it becomes large enough to slip over the cartwheel. Putting the rim and cartwheel into cold water then makes the rim lose heat and contract, so it grips the wooden wheel tightly. The cartwheel is waterproof, so the water does not damage it.

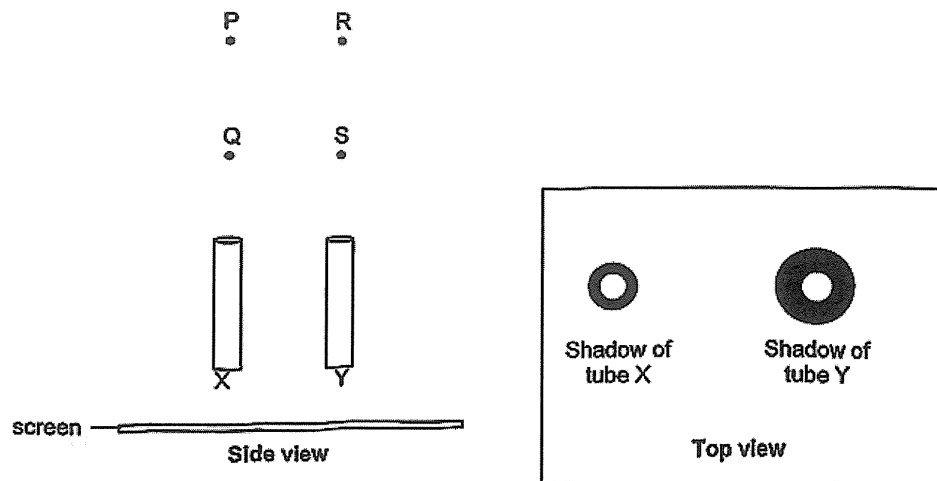
BOOKLET A, QUESTION 13 (2 MARKS)



(2)

The seed leaves store the food that the young plant uses before it can make its own food. As the seed germinates this stored food is used up, so the mass of the seed leaves decreases and then levels off once nearly all the food is gone.

BOOKLET A, QUESTION 14 (2 MARKS)

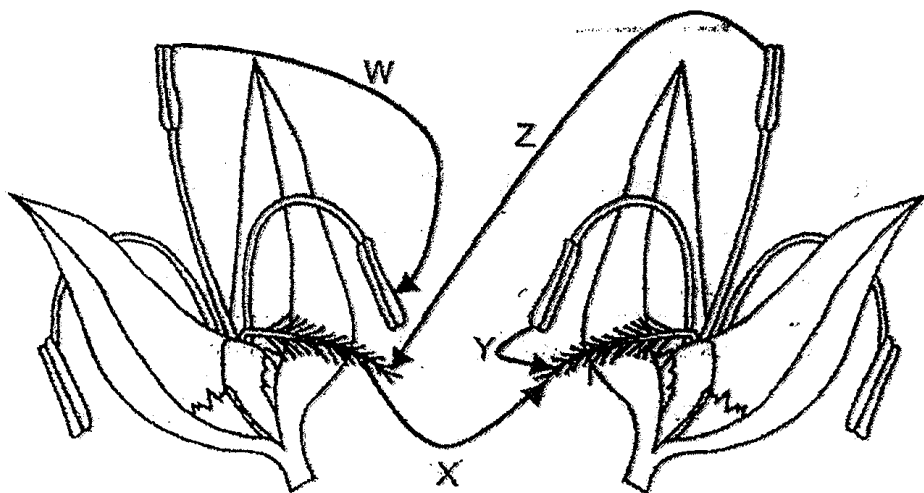


(2) P and S

The nearer a light source is to an object, the larger the shadow it casts.

Tube X casts the smaller shadow, so its light source must be the one further away, which is P. Tube Y casts the larger shadow, so its light source must be the nearer one, which is S.

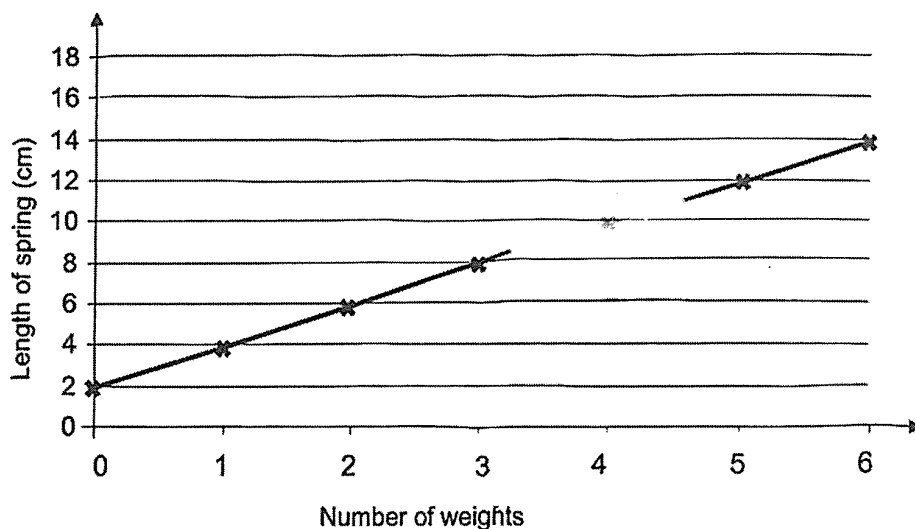
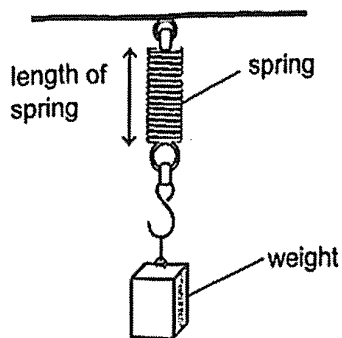
BOOKLET A, QUESTION 15 (2 MARKS)



(4) Y and Z only.

Pollination is the transfer of pollen grains from the anther to the stigma of a flower. Arrows Y and Z run from an anther to a stigma, so they show pollination. The other arrows do not end at a stigma, so they do not show pollination.

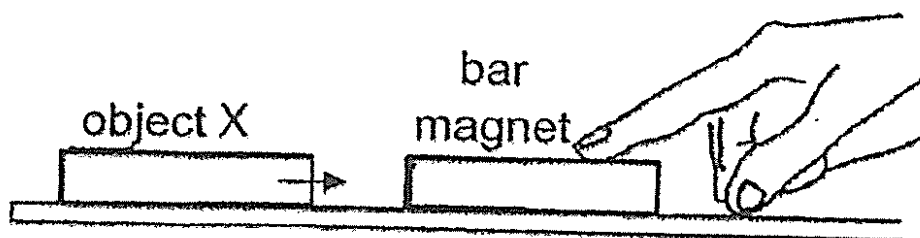
BOOKLET A, QUESTION 16 (2 MARKS)



(2) 2.

The original length of the spring with no weights is 2 cm. An extension of 4 cm gives a new length of $2 + 4 = 6$ cm. From the graph, the spring is 6 cm long when 2 weights are hung on it.

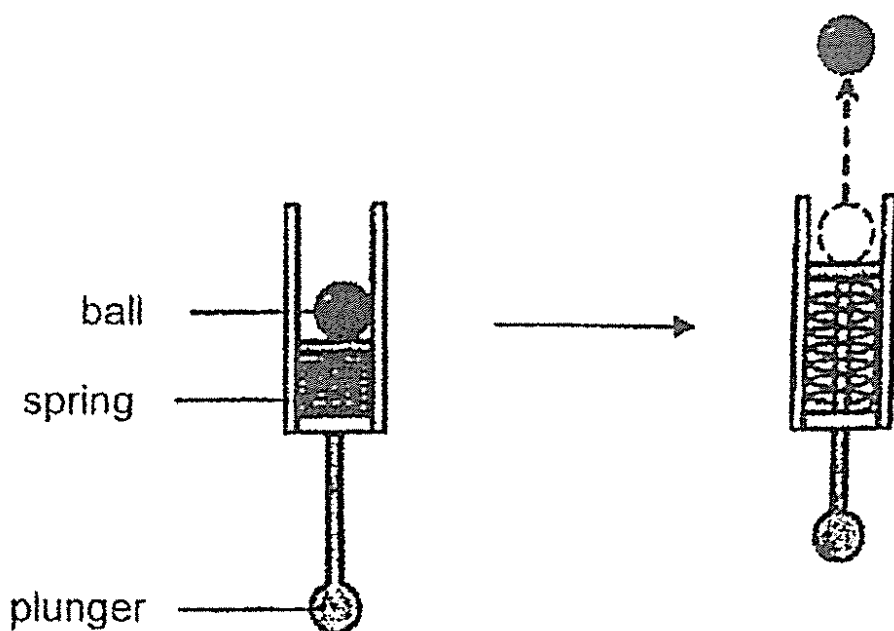
BOOKLET A, QUESTION 17 (2 MARKS)



(2)

Only B can be concluded. Object X was attracted, so it must be made of a magnetic material. It need not be a magnet, because a magnet would be repelled if a like pole were brought near. The diagram does not tell us which pole of the bar magnet was used, so C cannot be concluded.

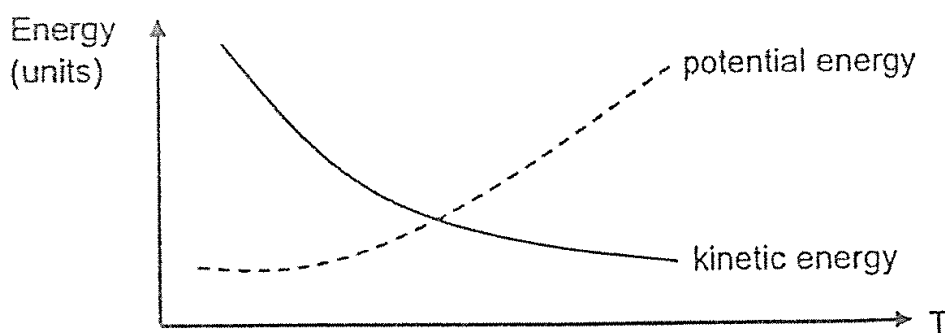
BOOKLET A, QUESTION 18 (2 MARKS)



(1) A and B only, following the printed answer key.

The spring is compressed when the plunger is pulled down and stores elastic potential energy, which is converted into kinetic energy and gravitational potential energy of the ball when the plunger is released. A spring that stretches and compresses more stores more elastic potential energy, so more energy is transferred to the ball. A ball with a smaller mass gains a greater speed and rises higher for the same amount of energy transferred, so B increases the distance moved. Decreasing the distance the plunger is pulled stores less elastic potential energy, so C would make the ball move a shorter distance.

BOOKLET A, QUESTION 19 (2 MARKS)



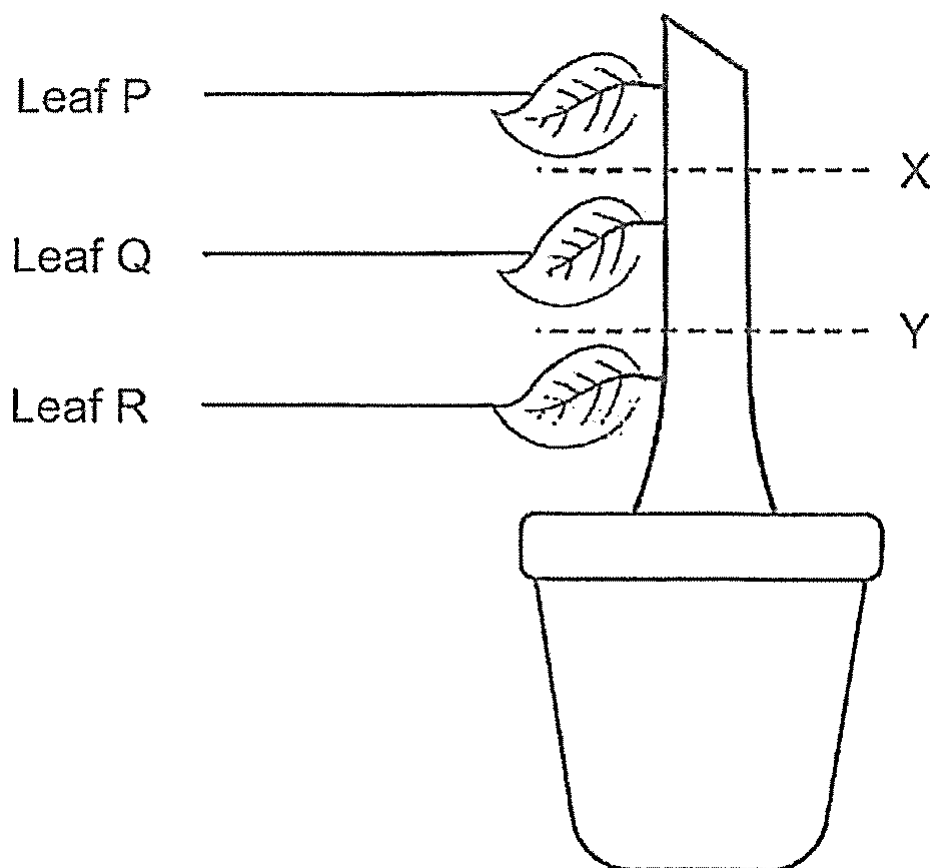
(1). A ball thrown upward slows down as it rises, so its kinetic energy decreases while its gravitational potential energy increases, matching the graph. A falling apple shows the opposite conversion.

BOOKLET A, QUESTION 20 (2 MARKS)

(2) L is the prey, M is the predator, and the amount of energy decreases.

K is a plant, which is a producer and not a prey, so the only prey is L and the only predator is M. Energy from the Sun is trapped by K, and only part of the energy is passed on at each step of the food chain, so the amount of energy decreases as it passes from K to L to M.

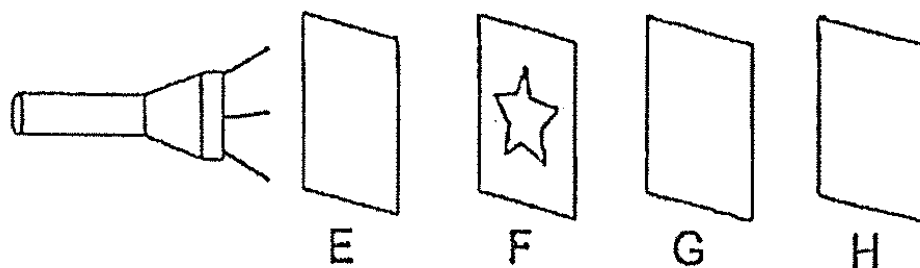
BOOKLET A, QUESTION 21 (2 MARKS)



(2) A and B only

Leaves P and Q withered because they did not receive water, while leaf R below part Y stayed healthy. The water-carrying tubes must therefore have been removed at part Y, so that water from the roots could not reach leaves Q and P above it. Options A and B are the only ones in which the water-carrying tubes at part Y are removed.

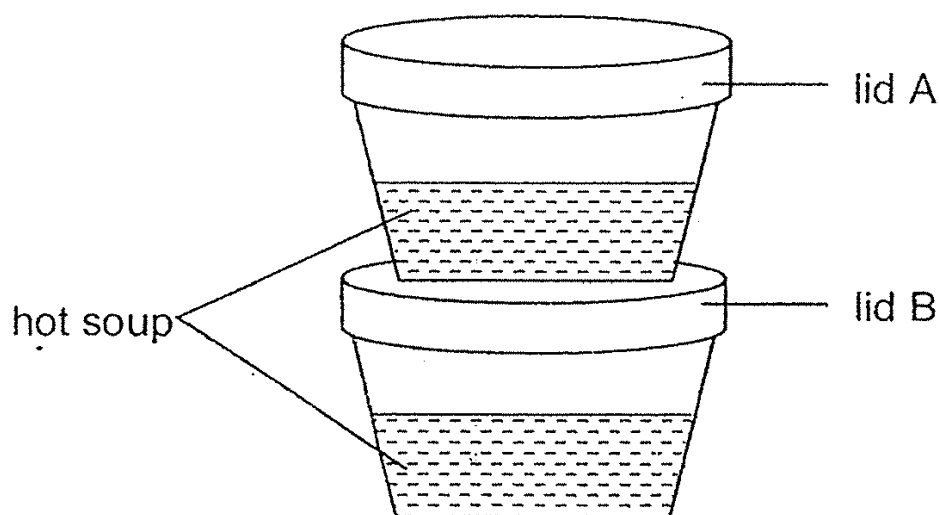
BOOKLET A, QUESTION 23 (2 MARKS)



(3) E is transparent, F and G are opaque and it is not possible to tell for H.

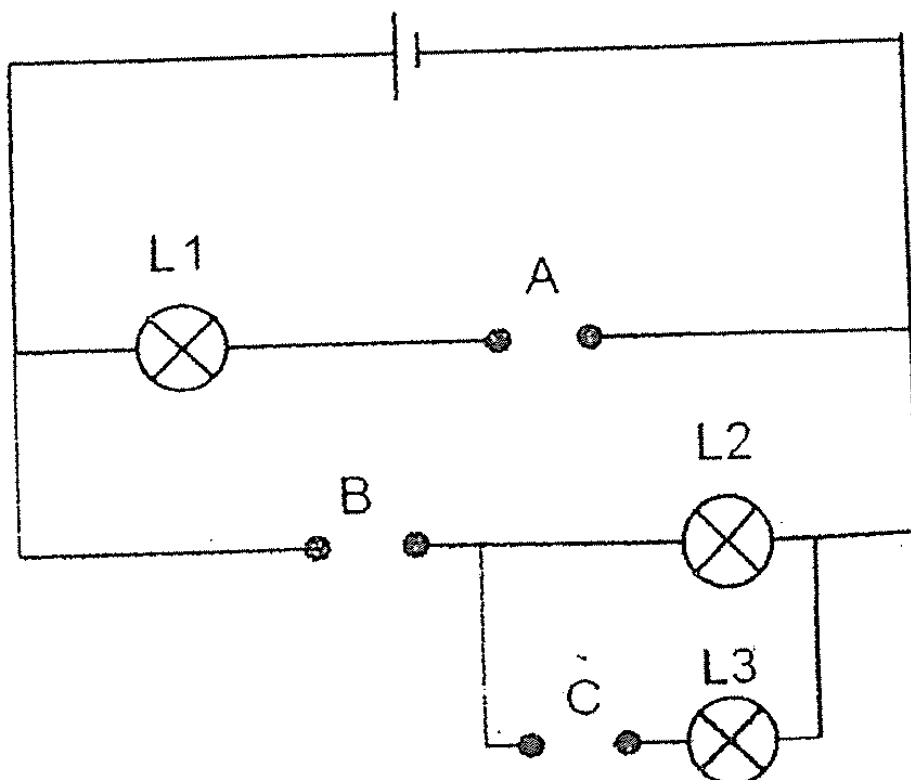
Light from the torch passed through sheet E, so E is transparent. Only a star-shaped patch of light got past sheet F, which means the rest of sheet F blocked the light, so F is opaque. The star-shaped patch stopped and was seen on sheet G, so G blocked the light and is opaque. No light reached sheet H, so nothing can be told about H.

BOOKLET A, QUESTION 24 (2 MARKS)



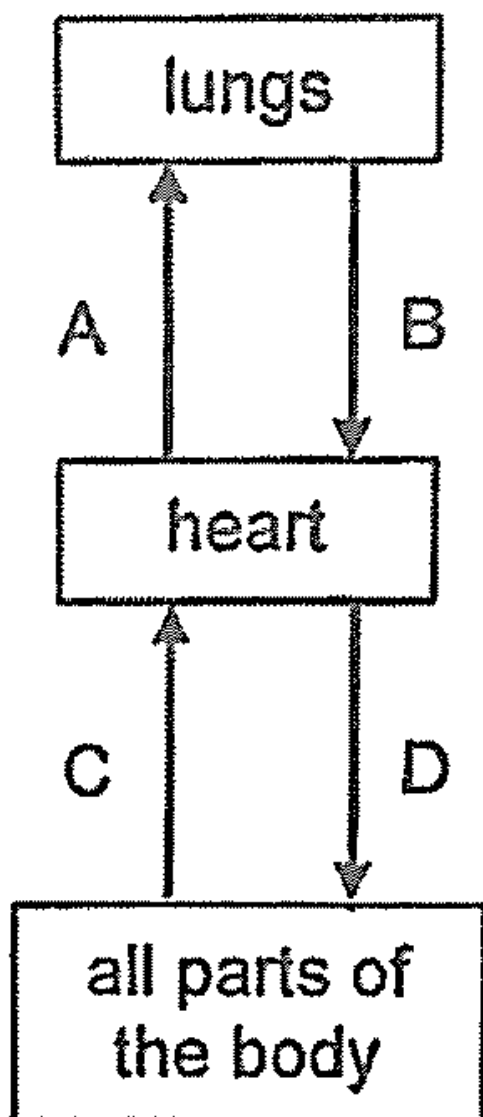
(4)

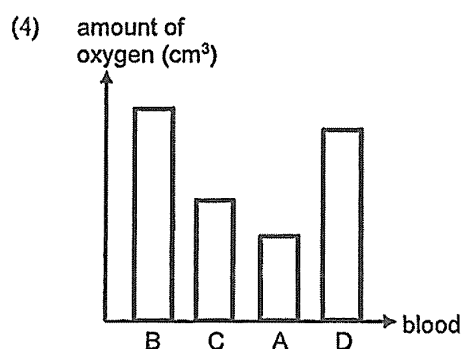
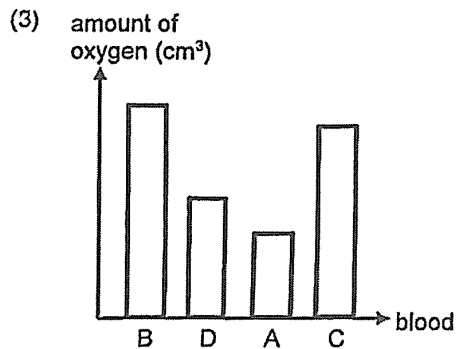
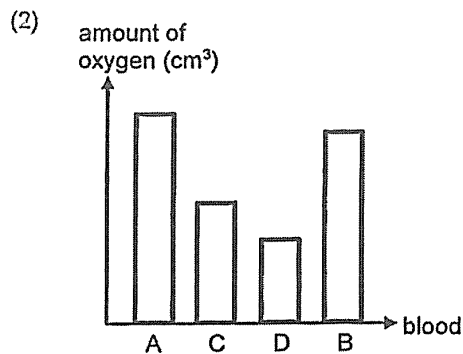
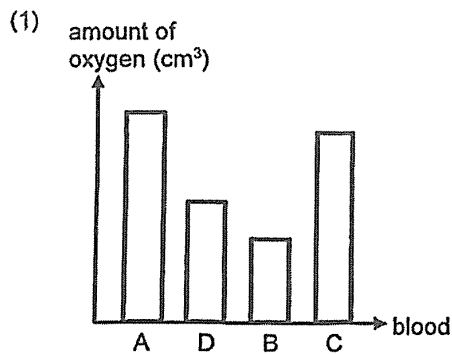
Water vapour from the hot soup rises, touches the cooler underside of a lid, loses heat and condenses into water droplets. Lid A has the cooler surrounding air above it, so its underside stays cool and droplets form all over it. Lid B has the hot upper container sitting directly on it, so it stays warm and much less condensation takes place, leaving droplets only around its cooler rim.



(2)

In the first experiment bulb L1 did not light up with rod P at position A, so rod P does not conduct electricity, while rods Q and R allowed L2 and L3 to light up, so both of them conduct electricity. In the second experiment rod Q at A closes the branch carrying L1, so L1 lights up. Rod P at B does not conduct, so the branch that carries L2 and L3 stays broken and neither bulb lights up.

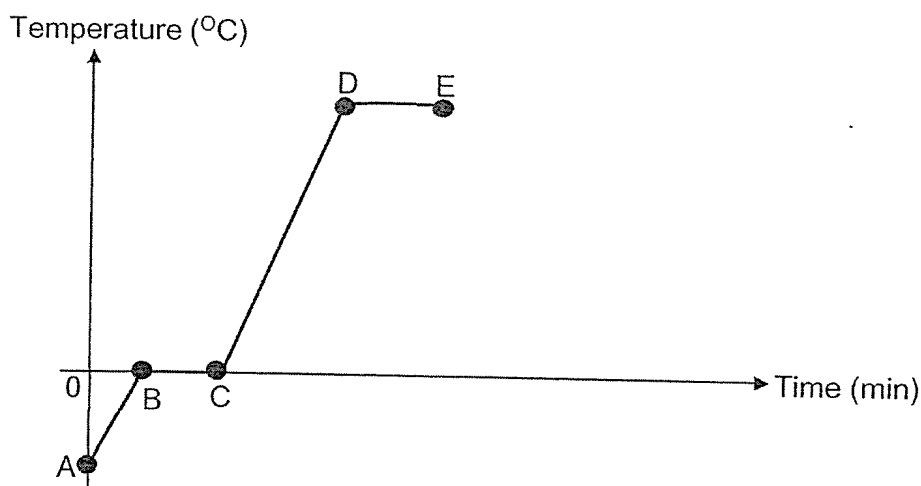




(4)

Blood at B has just come from the lungs and blood at D is leaving the heart for the body, so both carry the most oxygen and must be the two tall bars. Blood at C has given up oxygen to the body parts and blood at A is that same blood on its way to the lungs, so both carry the least oxygen and must be the shorter bars. Only graph (4) places B and D at the two tall bars.

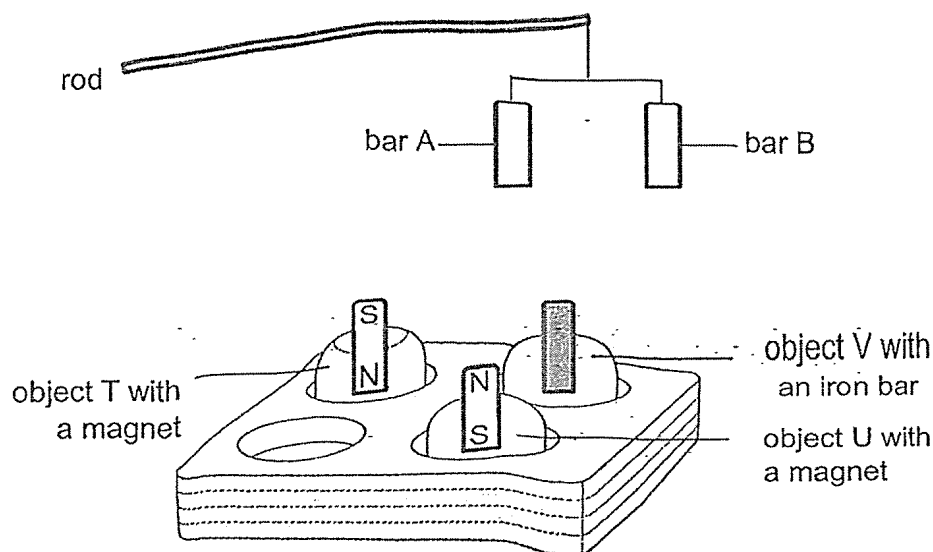
BOOKLET A, QUESTION 27 (2 MARKS)



(1) Ice melted from A to C.

The ice started below 0°C , so from A to B the ice was still a solid and was only gaining heat and warming up. Melting took place only from B to C, where the temperature stayed at the melting point of 0°C . The statement that ice melted all the way from A to C is therefore not correct.

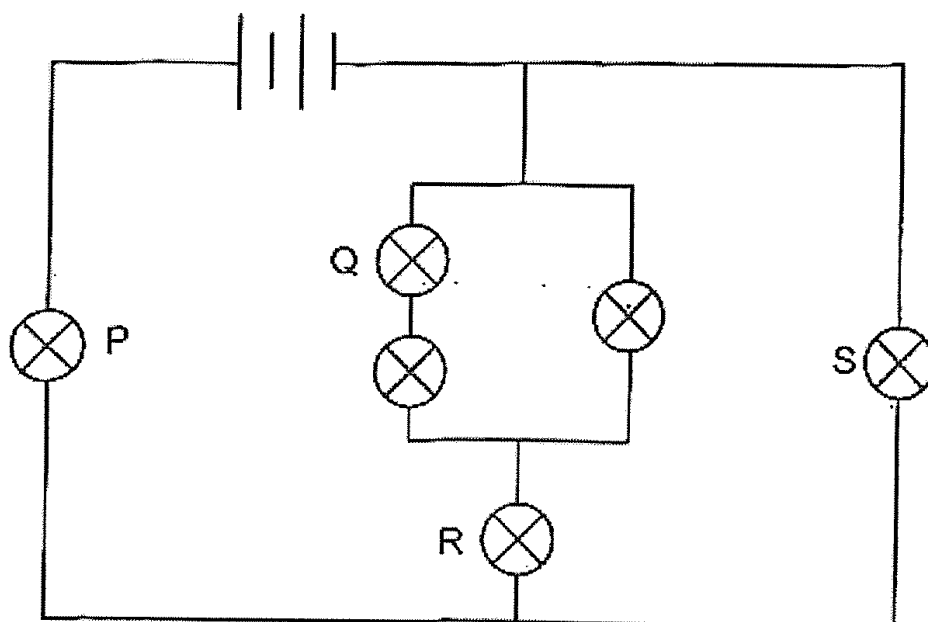
BOOKLET A, QUESTION 28 (2 MARKS)



(2) A is a magnet with its north pole at the bottom and B is an iron bar.

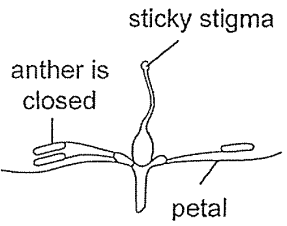
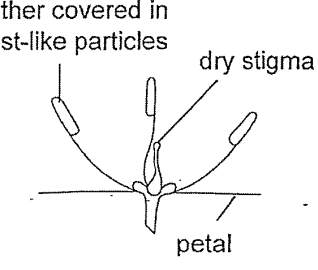
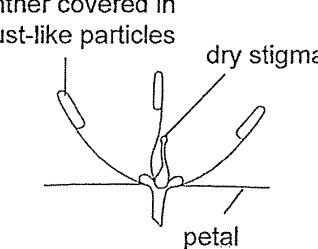
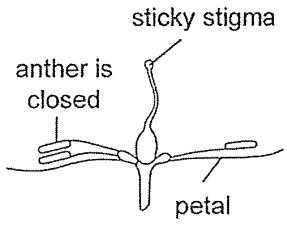
Bar B picked up both magnets T and U but not the iron bar V, so B cannot be a magnet, because a magnet would attract the iron bar. B is an iron bar, which is attracted by any magnet. Bar A picked up the magnet T and the iron bar V but not the magnet U, so A must be a magnet. Since the top pole of T is S and A attracted it while A repelled U whose top pole is N, the lower end of A must be a north pole, so A has S at the top and N at the bottom.

BOOKLET A, QUESTION 29 (2 MARKS)



(3) When R is blown, 2 bulbs are still lit.

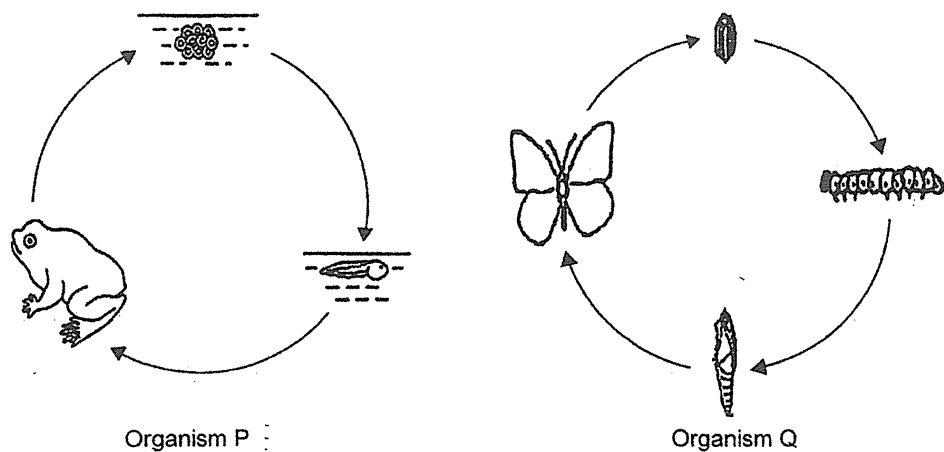
R is in the middle branch, so blowing it opens that branch only and the bulbs above it in that branch go out as well. The branches carrying P and S are still complete circuits with the battery, so those 2 bulbs remain lit.

tree A	<u>morning</u> 	<u>afternoon</u> 
tree B	<u>morning</u> 	<u>afternoon</u> 

(4) N, M, L

Pollination can only happen when pollen from an anther that is open lands on a stigma that is sticky at the same time. In plot N both types of tree are present, so in the morning the pollen from tree B can land on the sticky stigma of tree A, and in the afternoon the pollen from tree A can land on the sticky stigma of tree B. Pollination therefore happens all day and plot N has the most flowers pollinated. In plots L and M only one type of tree is grown, so when the anthers are open the stigmas are dry and very little pollination can happen, and these two plots come last.

BOOKLET B, QUESTION 31 (4 MARKS)



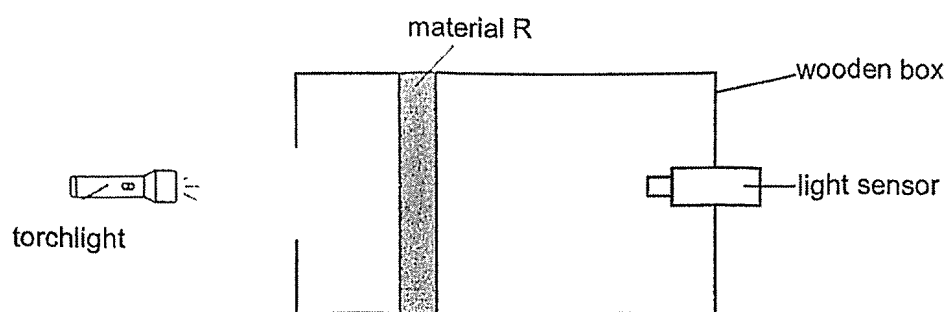
(a) (i) Similarity: the young of both organism P and organism Q do not look like the adult, and both life cycles begin with an egg stage.

(ii) Difference: organism P has a three-stage life cycle while organism Q has a four-stage life cycle.

(b) Laying many eggs at a time means that even though some of the eggs are eaten by predators, most of them can still hatch into young, so the species can continue to survive.

(c) The adult of organism P breathes through its moist skin, while its young breathes through its gills.

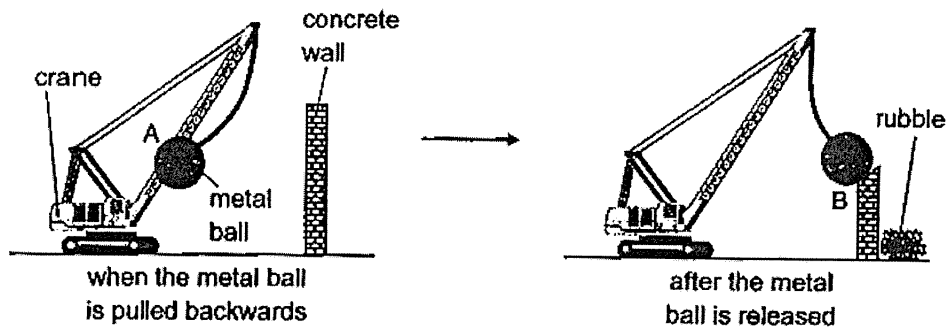
BOOKLET B, QUESTION 32 (4 MARKS)



(a) The transparency of the materials, that is how much light can pass through them.

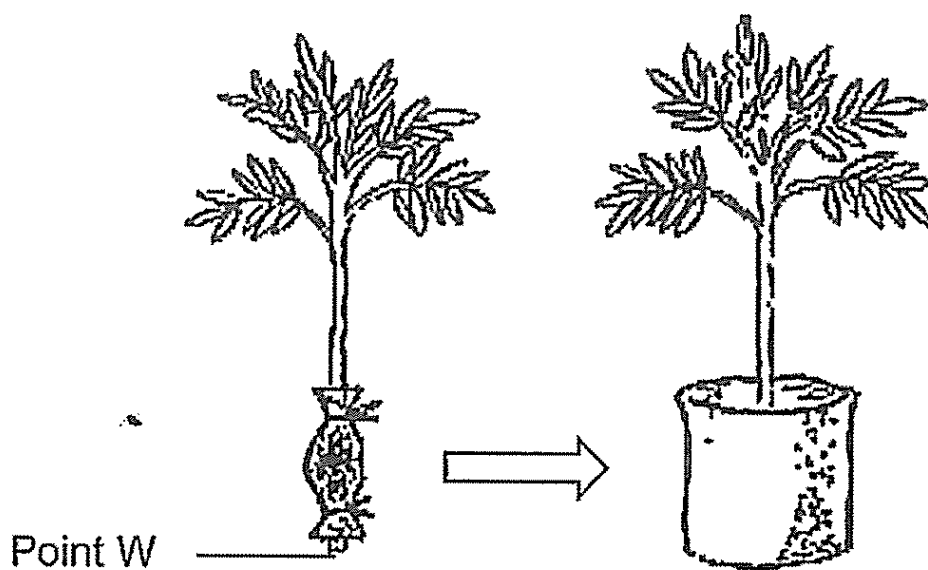
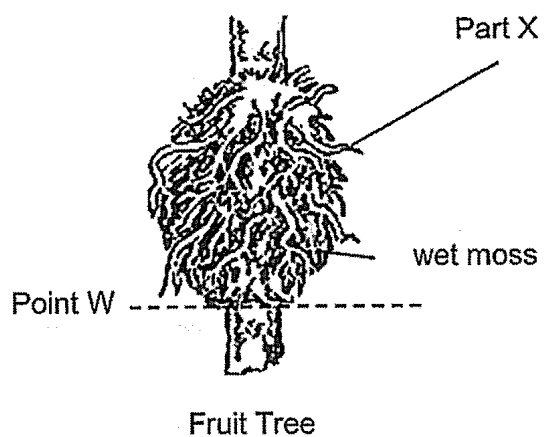
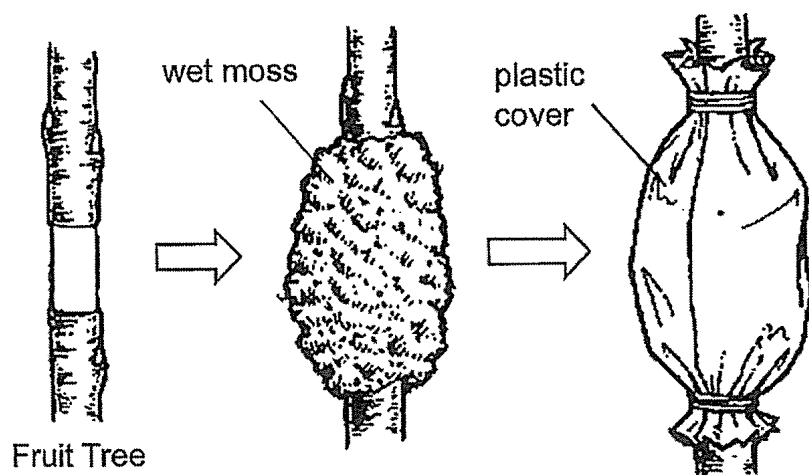
(b) Material S. Material S allows the most light to pass through it, as shown by the highest amount of light detected. The plants in the greenhouse will therefore receive the most light to make food, so they grow better.

(c) To make sure that the torchlight is the only source of light, so that no other light affects the amount of light detected by the light sensor.



(a) Gravitational potential energy of the metal ball at A is converted to kinetic energy as it swings to B, which is then converted to heat energy and sound energy when the metal ball hits the wall at B.

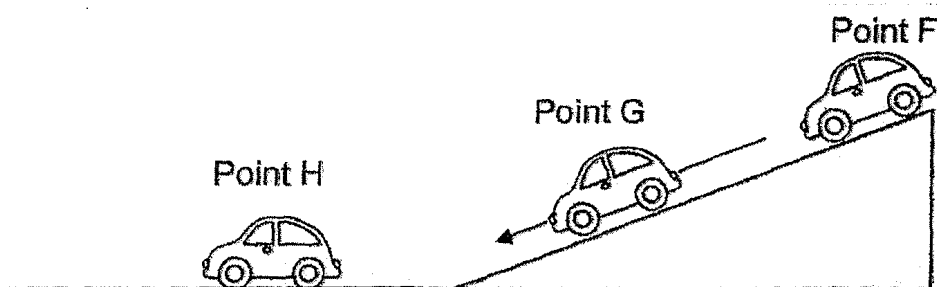
(b) Use a metal ball of greater mass. A metal ball of greater mass at position A has more gravitational potential energy, so more gravitational potential energy is converted into kinetic energy as it swings down. It hits the wall at B with greater kinetic energy, so the wall is demolished faster.



(a) Part X is the roots.

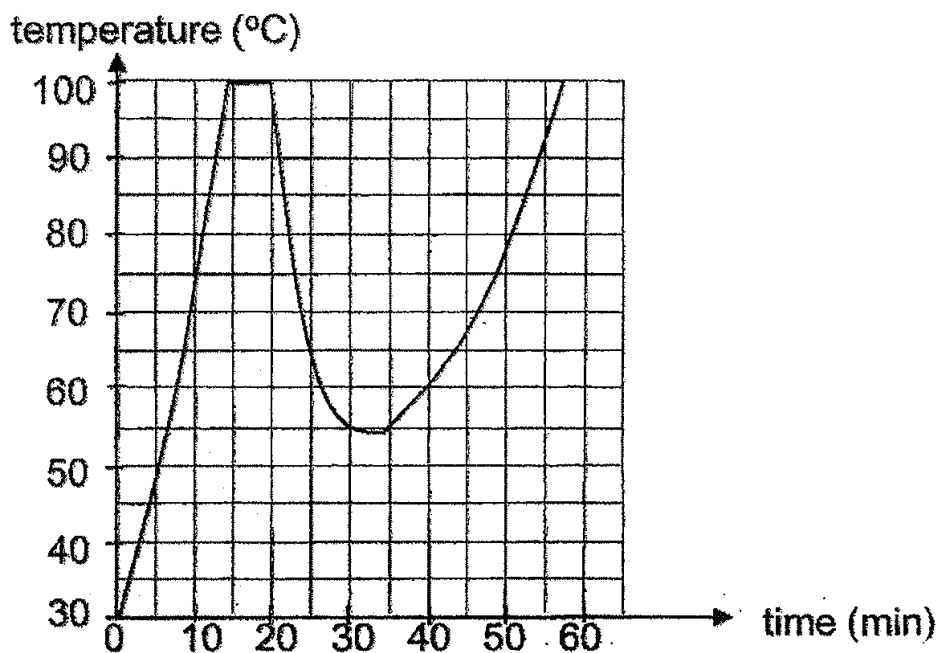
(b) The time taken for the plant to grow into an adult plant is shorter than growing it from a seed, so the farmer gets fruits sooner.

BOOKLET B, QUESTION 35 (2 MARKS)

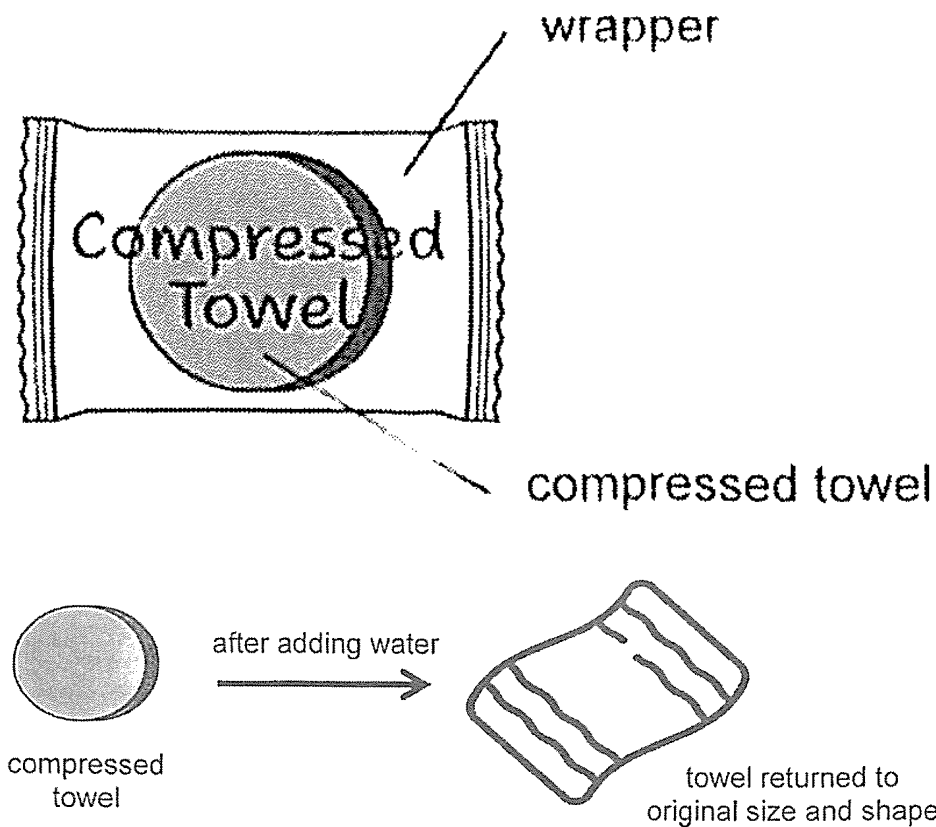


(a) They measured from the bottom of the slope to different points of the car. The car is 4 cm long, so one of them measured to the front of the car and the other to the back, giving readings that differ by about the length of the car.

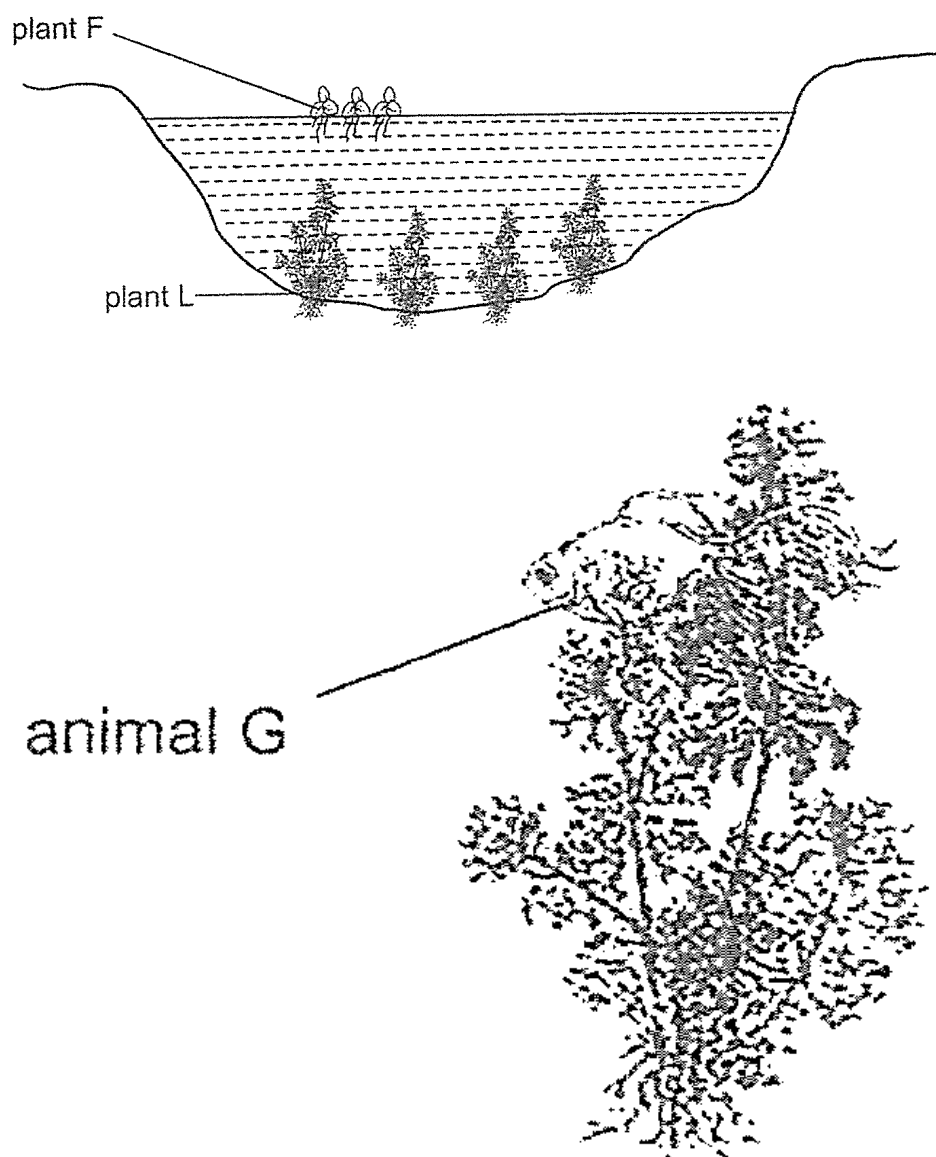
(b) The bars for points F and H should be drawn at exactly the same height as the bar already drawn for point G. The amount of gravitational force acting on the toy car does not change with position, because the mass of the car stays the same.



- (a) Temperature is a measure of how hot or cold an object is.
- (b) At 20 minutes, when the water had reached 100 degrees Celsius and the temperature began to fall.
- (c) Bowl H. There was less soup in bowl H, so there was less heat in the soup and the fishballs lose heat to the cooler surroundings more quickly and cool down faster.
- (d) The top of the glass table top gained heat faster from the bottom of the hot bowl than the rest of the glass. The top expanded faster than the bottom, and this uneven expansion caused the glass table top to crack.



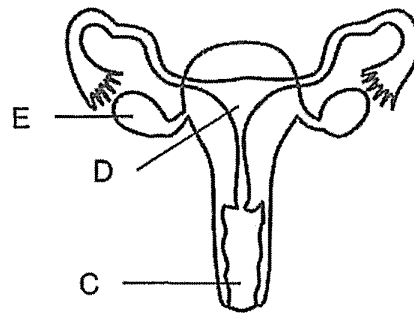
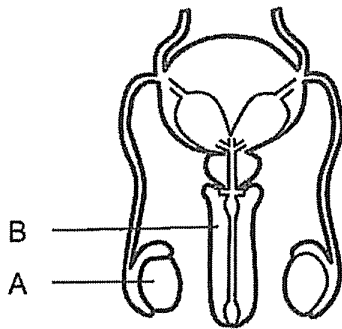
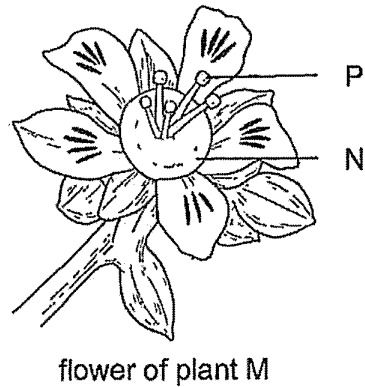
- (a) The towel must be flexible, so that it can be squeezed and folded into the small wrapper.
- (b)(i) Tick the box for Not possible to tell.
- (b)(ii) The towel is water absorbent and not waterproof, so it absorbed some of the water from the beaker. The drop in the water level is therefore not only due to the volume of the towel.
- (c) The compressed towel is a solid. Its shape stays fixed and does not change unless a force is applied to it.



(a) As the population of plant F increases, more of the water surface is covered by plant F. Less sunlight can reach plant L growing under the water, so plant L cannot make enough food to survive. Fewer plant L survive and its population decreases.

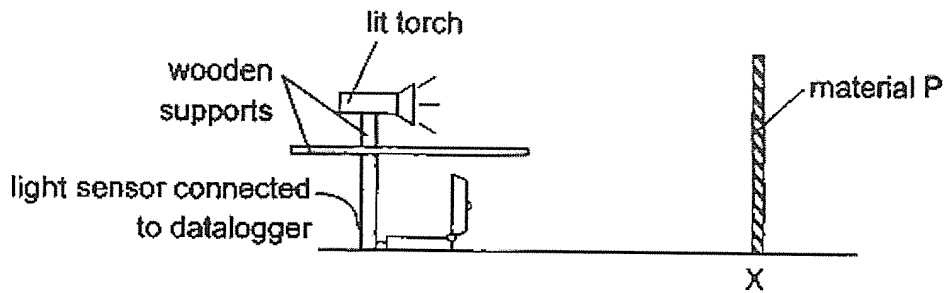
(b) (i) Plant L provides shelter, a hiding place where animal G can escape from its predators. (ii) Plant L provides a place for animal G to lay its eggs and reproduce.

(c) Draw a second line that also slopes downwards over the same period, lying below the plant L line, and label it animal G. As plant L decreases, animal G has less food and shelter, so the number of animal G decreases as well.



- (a) A, the testis, because it produces the male sex cells just as part P produces pollen grains.
- (b) When animal F feeds on the nectar secreted by plant M, some pollen grains from part P, the anther, stick to its body. When animal F visits another flower of plant M to feed, these pollen grains are brushed off onto the stigma of that flower, so pollination takes place.
- (c) The food web has arrows drawn from M to F, from M to T, from F to R, from R to S and from T to S. R building its nests on M is not a feeding relationship, so no arrow is drawn for it.

BOOKLET B, QUESTION 40 (3 MARKS)

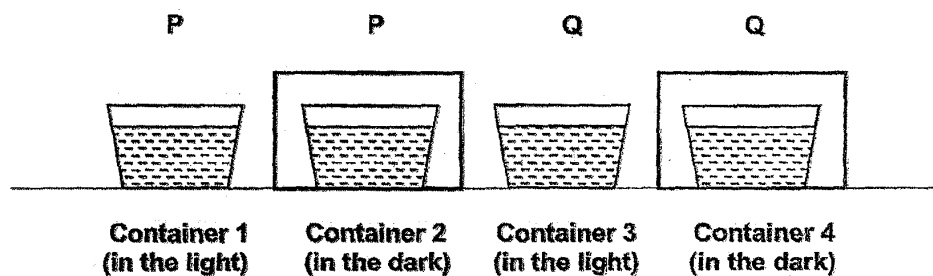


(a) Greatest transparency to least transparency: P, R, Q.

The sensor is placed beside the torch, so it measures the light reflected back from the material. The more transparent a material is, the more light passes through it and the less light is reflected back to the sensor. P reflected the least light, so it is the most transparent, and Q reflected the most, so it is the least transparent.

(b) Material Q should be used. Q reflects the greatest amount of light, so most of the light from the headlamps of oncoming vehicles is reflected off the stripes and into the drivers' eyes, allowing them to spot the police officer easily at night.

BOOKLET B, QUESTION 41 (4 MARKS)



(a) He kept the amount of pond water in each container the same. This ensures that the amount of oxygen and carbon dioxide available in each container is the same at the start, so any difference in the result is caused only by the living thing and the light.

(b) Yes, his conclusion is correct. In container 1, which was in the light, the colour of liquid X was yellow, showing that more carbon dioxide was present. In the presence of light, P could only respire and give out carbon dioxide, and did not make food and give out oxygen, so P is an animal and not a plant.