Limehurst Science Department
Name: _____ Group:_____

Year 8

Developing/Secure Pathway

End of Topic Assessment

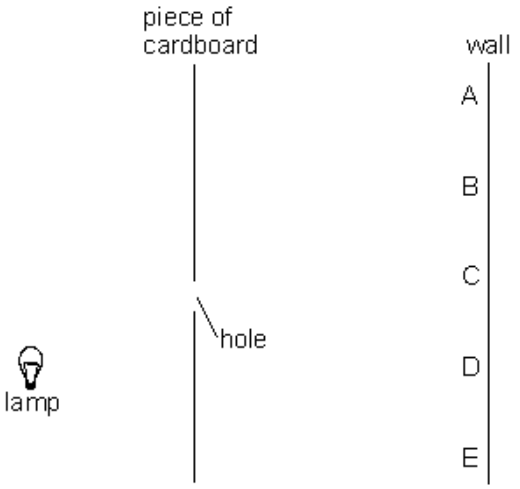
Light

Analysis and Targets

No.	Score	Below/On/Above	Target for next Assessment. How will you achieve it?
1	___/4		
2	___/6		
3	___/4		
4	___/5		
5	___/5		
6	___/6		

Now complete the "Next Step" sheet you've been given and when finished attach it to the back of the paper.

Q1. The diagram shows a lamp and a piece of cardboard. The piece of cardboard has a hole in it. Light from the lamp passes through the hole and forms a bright spot on a wall.



(a) (i) Which point on the wall, A B, C, D or E, is lit up by the lamp?

.....

1 mark

(ii) Explain why the **other** points on the wall are **not** lit up by the lamp.

.....

.....

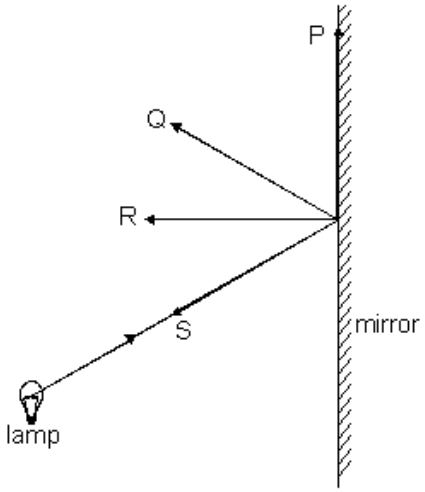
1 mark

(b) A piece of clear green plastic is placed over the hole.
What is the colour of the light which shines on the wall?

.....……

1 mark

(c) The diagram shows a ray of light from a lamp hitting a mirror.



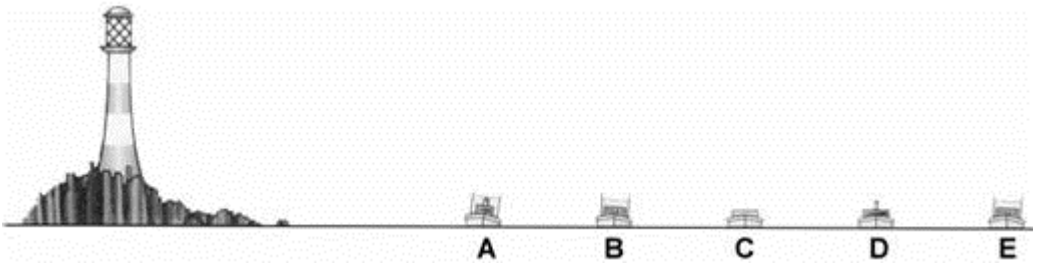
Which arrow, P, Q, R or S, shows the reflected ray?

.....

1 mark

Maximum 4 marks

Q2. The diagram shows a lighthouse on a rock.
It is night-time and there are boats at A, B, C, D and E.



(a) On which boat, A, B, C, D or E, would the light from the lighthouse be brightest?

.....

1 mark

(b) Each boat makes a shadow on the water.

(i) Draw a cross (X) on the diagram to show where the shadow of boat A will be.

1 mark

(ii) Explain why the shadow forms there.

.....

.....

1 mark

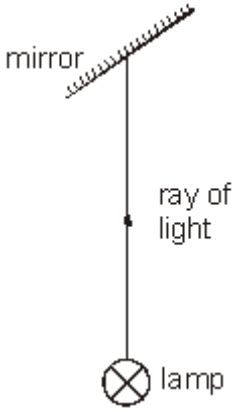
(c) The weather changes and the fog horn on the lighthouse makes a loud sound.
On which boat, A, B, C, D or E, would the sound of the fog horn be quietest?

.....

1 mark

(d) Inside the lighthouse there is a powerful lamp and some mirrors.

The diagram shows the lamp and a mirror. A ray of light from the lamp is shown.
Carefully draw the ray which is reflected from the mirror. Use a ruler.



2 marks
Maximum 6 marks

Q3. James shone a ray of light at a mirror as shown below.

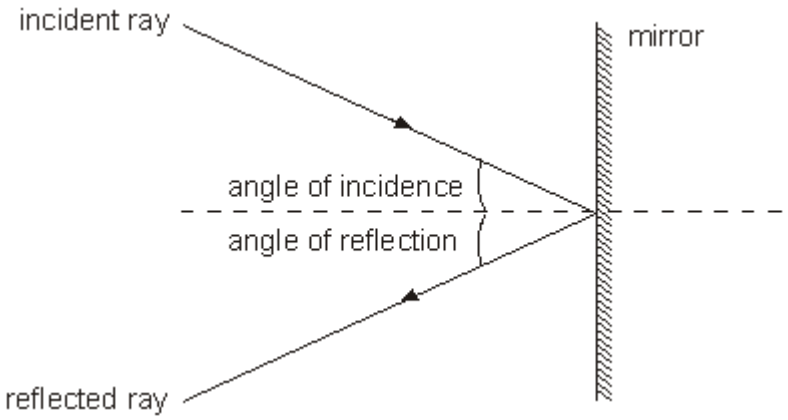


diagram 1

He measured the angle of **reflection** for different angles of incidence.
His results are shown below.

angle of **incidence** (º)	30	40	50	60	70
angle of **reflection** (º)	30	40	50	65	70

(a) Which angle of reflection was **not** measured accurately?

.....°

How can you tell this from the table?

.....

.....

1 mark

(b) James set up a different experiment as shown below.

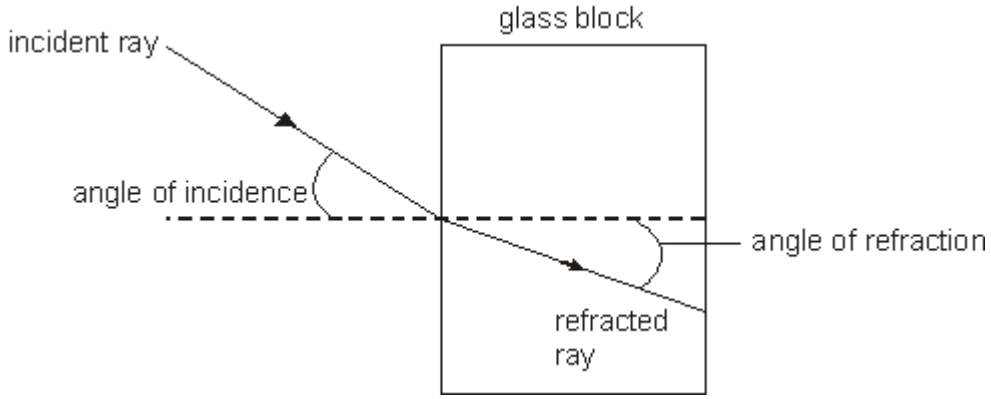
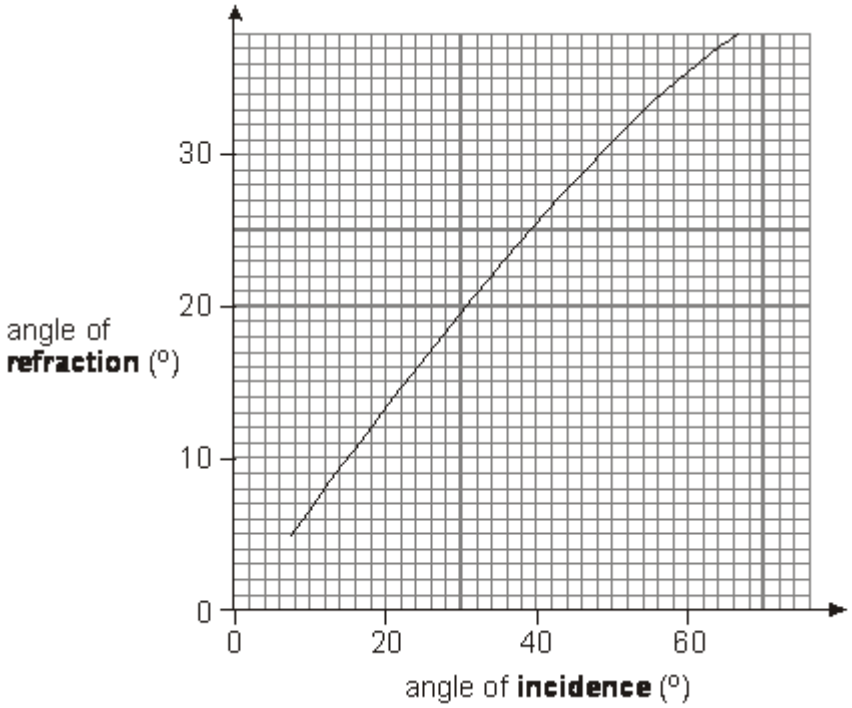


diagram 2

He measured the angle of **refraction** for different angles of incidence.

His results are shown in the graph.



Use the graph to answer the questions below.

(i) When the angle of **refraction** is 20°, what is the angle of **incidence**?

.....°

1 mark

(ii) What conclusion could James draw from his graph?
Complete the sentence below.

When light passes from air into glass, the angle of **incidence** is

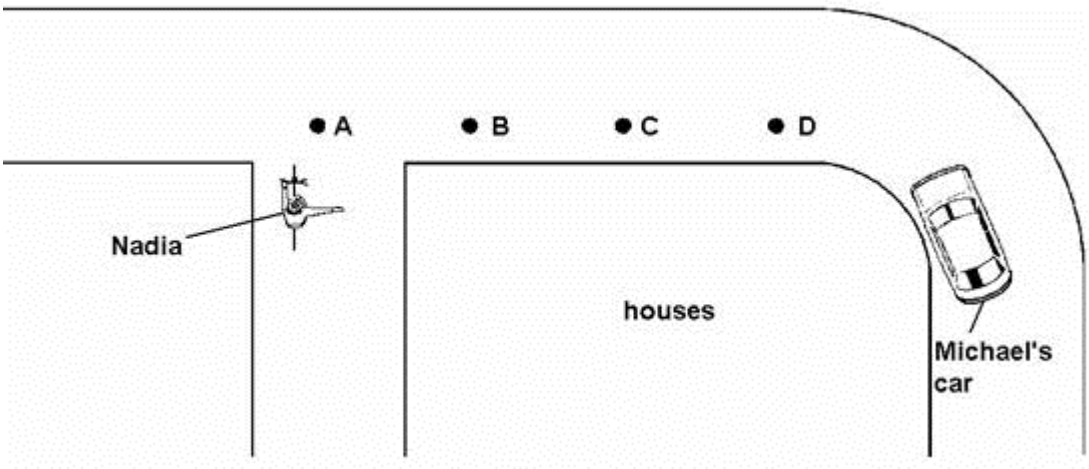
always ..... the angle of **refraction**.

1 mark

(c) **On diagram 2,** draw a line to continue the refracted ray as it leaves the glass block.

1 mark
maximum 4 marks

Q4. Nadia is on her bicycle, waiting to pull out from a road junction.
Michael is driving his car round the bend. A row of houses stops Nadia from seeing Michael's car.



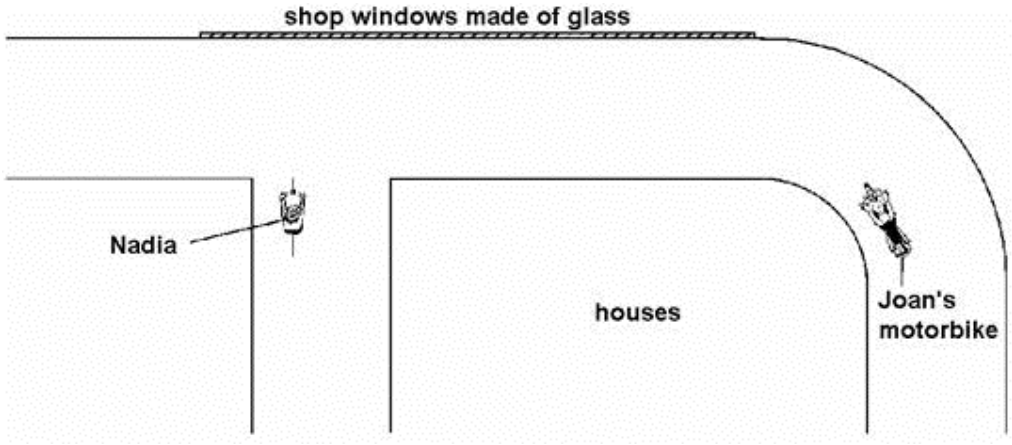
not to scale

(a) At what position will Michael's car be when Nadia first sees it?
Tick the correct box.

A ☐ B ☐ C ☐ D ☐

1 mark

(b) A row of shops was built opposite the junction. The shops have glass windows which act as a mirror.



not to scale

Nadia could see Joan's motorbike reflected in the glass window.

(i) **On the diagram above**, draw a ray of light to show how Nadia can see Joan's motorbike reflected in the glass window.
Add arrows to the ray. Use a ruler.

3 marks

(ii) How does the glass window help to reduce the number of accidents?

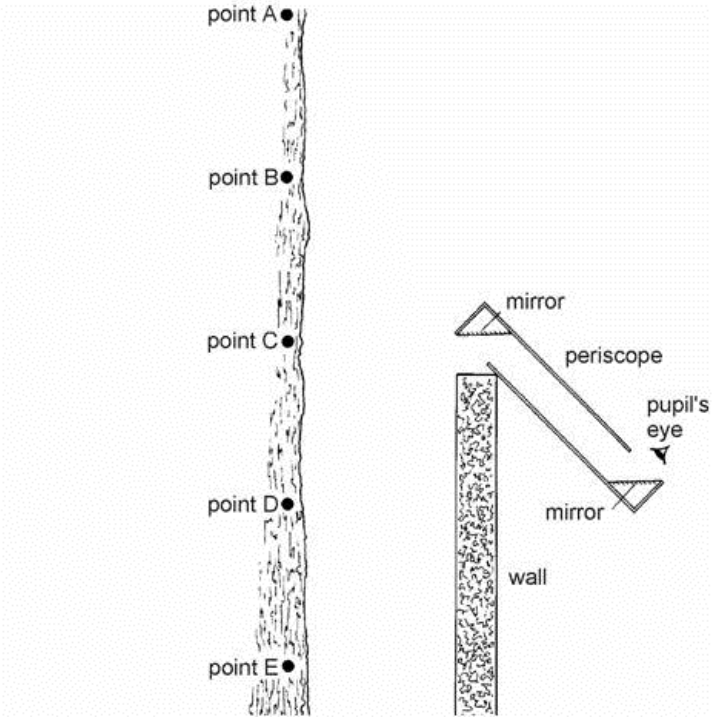
.....

.....

1 mark

Maximum 5 marks.

5. A pupil is observing the behaviour of a woodpecker. He uses a periscope to look over a wall at a tree, and waits for the bird to land on the trunk.



The pupil can only watch one part of the tree trunk at a time.

(a) Tick the box to show the point on the tree trunk which he can see using the periscope in the position shown.

point A ☐

point B ☐

point C ☐

point D ☐

point E ☐

1 mark

(b) Draw the path of the ray of light to show how the pupil sees this point. Use a ruler. Show the direction of the ray of light.

3 marks

(c) What should the pupil do to the periscope to watch point C?

.....

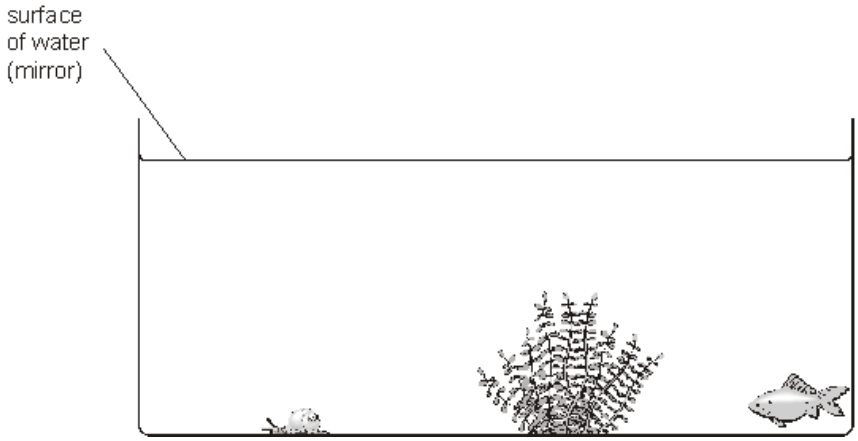
.....

1 mark

Maximum 5 marks

Q6. (a) The diagram below shows a fish tank.

The surface of the water acts like a mirror.
The fish can see the snail reflected in the surface of the water.

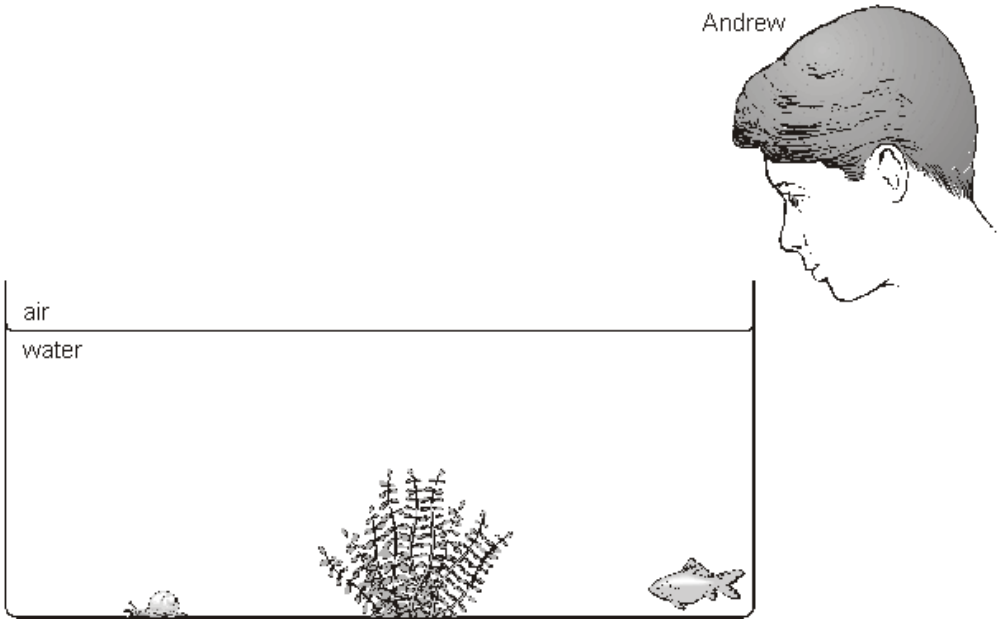


Draw a ray of light which passes from the snail, and reflects from the surface, to show how the fish can see the snail. Use a ruler.

Put arrows on the ray of light.

3 marks

(b) Andrew is looking at the snail.



When a ray of light passes from water to air it changes direction.

(i) Draw a ray of light from the snail to Andrew to show how Andrew can see the snail. Use a ruler.

Put arrows on the ray of light.

2 marks

(ii) What is the name given to this change in the direction of a ray of light?

.....

1 mark
maximum 6 marks

D/S MARK SCHEME

M1. (a) (i) B

1

(ii) any **one** from

- light travels in straight lines
- light will not pass through the cardboard

accept 'the cardboard blocks the light'
***or** 'the cardboard is opaque'*

- they are in the shadow of the cardboard

*do **not** accept 'they are in the shadow'*

1

(b) green

1

(c) Q

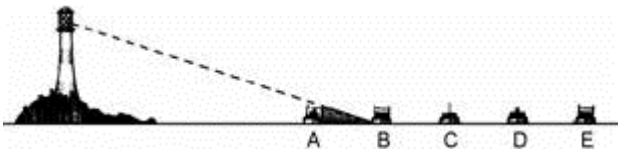
1

[4]

M2. (a) A

1 (L3)

(b) (i) the centre of a cross (X) drawn in the shaded area between boats A and B



*do **not** accept the centre of the cross below the water line*
***or** above the shaded area*

1 (L3)

(ii) any **one** from

- light cannot go through the boat

*accept 'the boat is opaque' **or** 'the boat absorbs*

or *blocks* ***or*** *stops* ***or*** *reflects the light'*

- light travels in straight lines

  accept 'light cannot bend round the boat'

1 (L4)

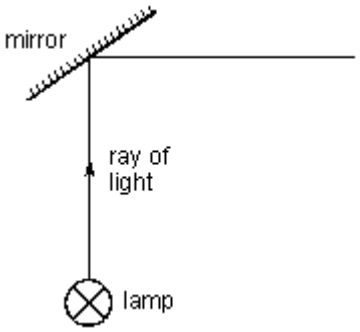
(c) E

1 (L3)

(d) the reflected ray touches the incident ray at the surface of the mirror

1 (L4)

a horizontal line as the reflected ray



if the reflected ray has been drawn without using a ruler, do ***not*** *award this mark*

accept responses in which a normal has been drawn and the angles of incidence and reflection are approximately equal, even if the reflected ray is not horizontal.

1 (L4)

[6]

M3. (a) • 65

it is different from the angle of incidence **or** all the others are the same

accept 'number 4' ***or*** *'the fourth'*

accept 'it is not 60°' ***or*** *'it should be 60°'*

accept 'the angle of reflection and the angle of incidence should be the same'

accept 'it is 5° out'

accept 'they are not the same'

both *the answer and the correct explanation are required for the mark*

award a mark for '60°' if the explanation is correct

'they go up in tens' is insufficient

'it does not fit the pattern' is insufficient

1 (L5)

(b) (i) • a number from 30 to 32

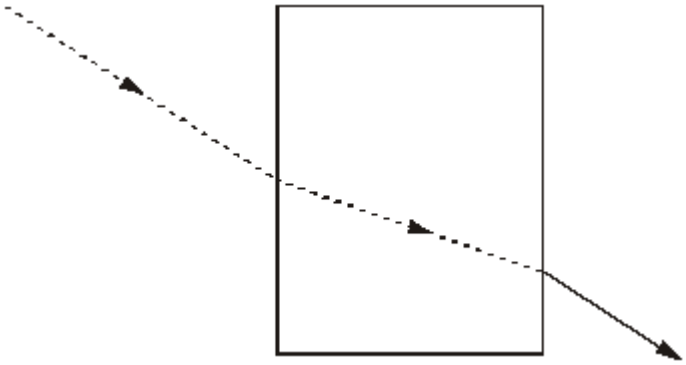
1 (L5)

(ii) • greater than

accept 'greater' or 'bigger'

1 (L5)

(c)



accept a continuous straight line that bends away from the normal
accept a line without an arrow
The ray need not be parallel to the incident ray

1 (L6)

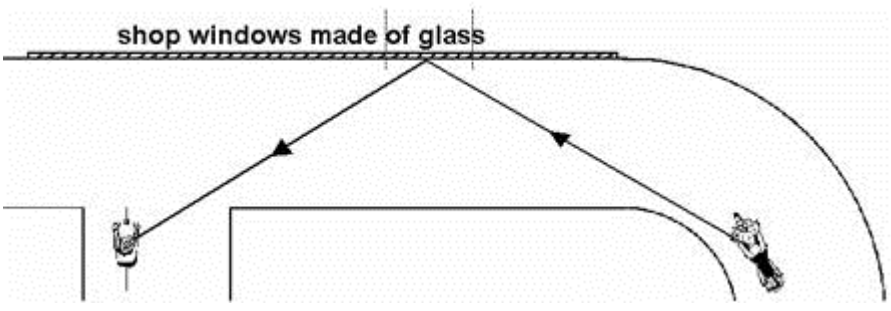
[4]

M4. (a) B ✓

if more than one box is ticked, award no mark

1 (L5)

(b) (i)



a continuous straight line from Joan's motor bike to the glass, and then from the glass to Nadia's head

the incident ray and the reflected ray must touch the glass at the same point

1 (L5)

angle of incidence must be approximately equal to the angle of reflection

the incident ray must hit the mirror within the tolerance shown

1 (L5)

an arrow pointing away from Joan's motor bike on either section of the ray

1 (L5)

(ii) any **one** from

- traffic coming round the bend **or** at the junction will be seen
- Nadia **or** Joan **or** you can see round the bend

1 (L5)

[5]

M5. (a) point E

if more than one box is ticked award no mark

1

(b) continuous ray from point to eye

accept a ray coming either from point E

***or** from the answer to (a)*

1

straight lines to the mirrors at appropriate angles

*reflections must be at the surfaces of the mirrors and lines must **not** extend behind the mirrors*

the angle between the incident and the reflected rays should be approximately 90°

*this mark may be awarded even if the reflection from the second mirror to the eye is **not** given*

1

arrow anywhere along ray pointing from tree to eye

1

(c) any **one** from

- move bottom of periscope towards wall

  *accept 'tilt it' **or** 'change the angle'*

- make it upright

- lift it higher

  *accept 'move it up' **or** 'push periscope further over the wall'*

  *accept 'change angle of top mirror' **or** 'change angle of mirrors*

  *do **not** accept 'move it'*

1

[5]

M6. (a) • a straight line from the snail to the surface and from the surface to the fish

the line must reach the fish within the tolerance shown below the ray must be continuous
ignore an incident ray towards the snail
ignore rays refracted at the surface

1 (L5)

- the angle of incidence should be approximately equal to the angle of reflection

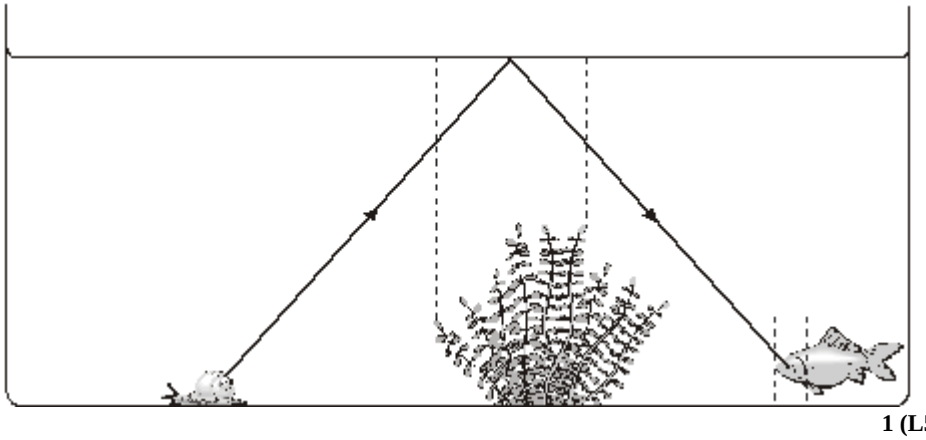
  the line must reach the surface of the water within the tolerance shown below

1 (L6)

- arrow pointing towards the fish **or** away from the snail

  *accept a single arrow in the correct direction on either the incident **or** the reflected ray*

  if two arrows are drawn, they must both be in the correct direction



1 (L5)

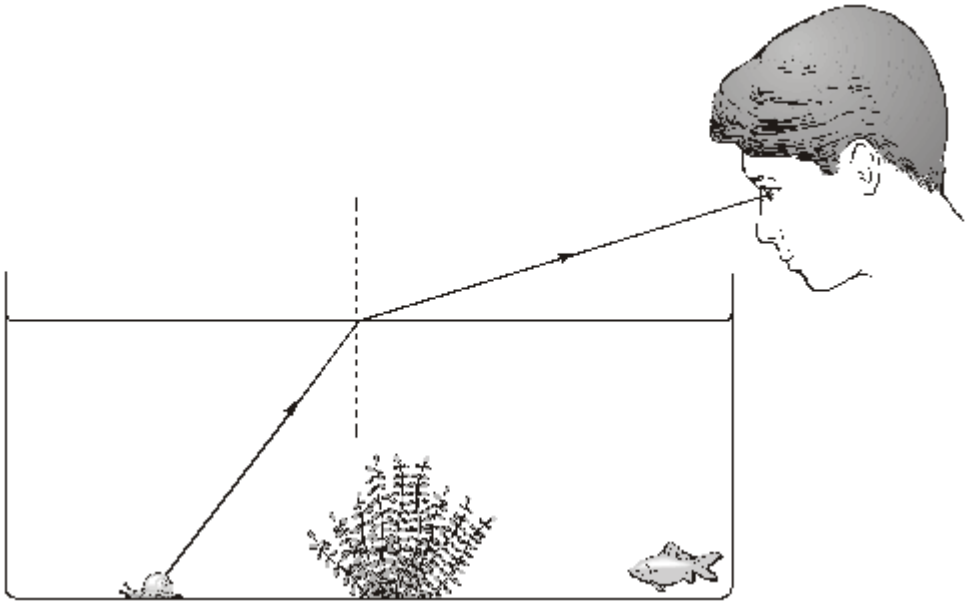
(b) (i) • a ray from the snail to Andrew's eye bending at the surface

both parts of the ray must be straight and must slope upwards and to the right
the ray must be continuous
ignore any incident rays drawn towards the snail
the ray must bend further away from the normal at the surface as it goes from water to air

1 (L6)

• an arrow pointing towards Andrew on any part of the ray

if two arrows are drawn, they must both be in the correct direction



1 (L6)

(ii) • refraction

1 (L6)

[6]