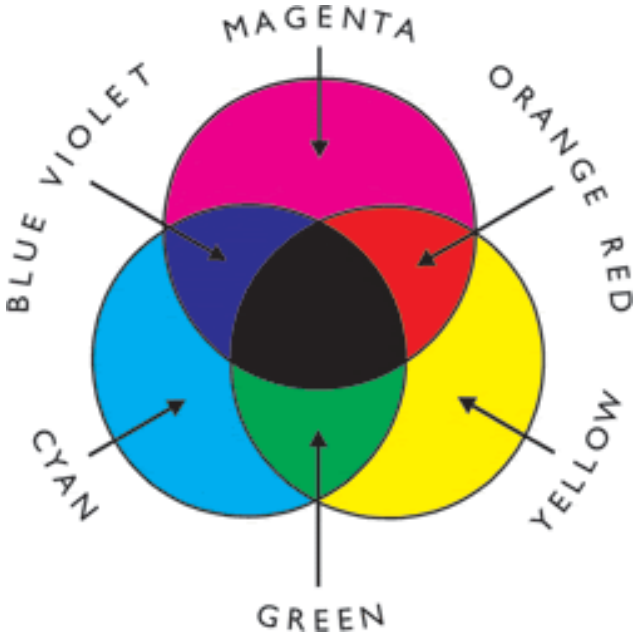
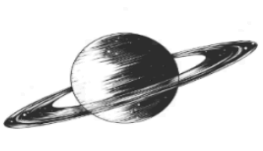
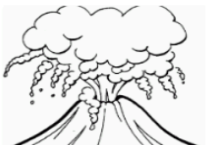
Blwyddyn **Year** **8**	Ysgol Dyffryn Aman	Enw / name : …… Lliw / colour: …… Athro / teacher: ……



GWYDDONIAETH SCIENCE	Biology Bioleg  Chemistry Cemeg  Physics Ffiseg  Geology Daeareg 

Four purposes	Ambitious & capable, enterprising & creative, ethical & informed, healthy & confident

COLOURFUL SCIENCE / GWYDDONIAETH LIWGAR

DESCRIPTIONS OF LEARNING

Thread	Progression Step 3	Progression Step 4	Progression Step 5
Forces and energy provide a foundation for understanding our universe – light & sound waves		I can predict the behaviour of waves in different circumstances – **reflection and diffraction of light waves**	
The world around us is full of living things which depend on each other for survival – biological processes		I can describe the levels of cellular organisationand how cells perform biological processes that ensure the development and survival of organisms - **functions of specialised cells in the eye**	

CROSS CURRICULAR SKILLS

Thread	Progression Step 3	Progression Step 4
Numeracy – collecting data		I can collect both quantitative and qualitative data.- **length of shadow investigation**
Numeracy – representing data		I can construct and interpret graphs and diagrams (including pie charts) to represent discrete or continuous data, choosing an appropriate scale. – **plotting a graph from results**

LESSON 1 – LIGHT & REFLECTION

SUCCESS CRITERIA

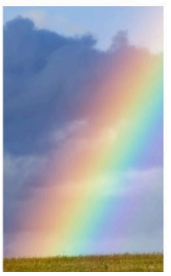
Principles of progression	*In this topic you will learn:*	*RAG*
Increasing knowledge	Tell the difference between luminous and non-luminous objects	
Increasing knowledge	Explain the terms transparent, translucent and opaque	
Deepening understanding	Describe and make predictions about the reflection of light	

Your teacher will show you a demonstration, think about what you are shown and make notes on what you have seen.

My notes on the demonstration.

Seven properties of light

1. Light travels very fast.
2. Light has a dual nature.
3. Light travels in straight lines.
4. Light can vary in intensity.
5. Light interacts with matter.
6. Light is comprised of many colors.
7. Light carries energy and information.



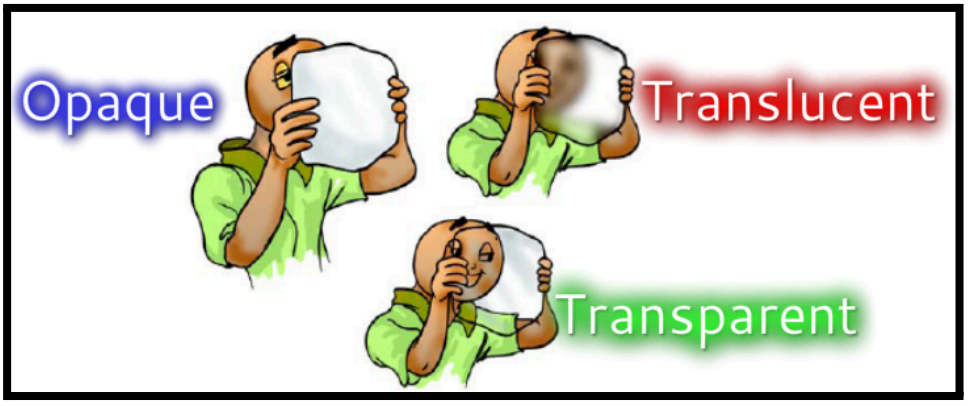
Exercise 1

Complete the paragraph by writing word in the gaps.

There are many things that emit l_ _ _ _. Light will always travel in s_ _ _ _ _ _ _ l_ _ _ _ and travels at 300000000m/s.

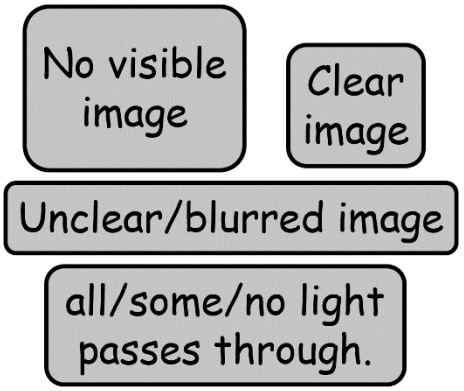
The sun is a l_ _ _ _ _ _ _ object, which means it emits its own l_ _ _ _. Another example of a luminous object is…

The moon is a n_ _-l_ _ _ _ _ _ _ object that does not e_ _ _ its own light. Another example of a non-luminous object is…



Exercise 2

Explain the meanings of the terms below. The words in the boxes will help you.



A transparent object is/will…

A translucent object is/will…

An opaque object is/will…

Reflection

Reflection is when light bounces off an object.

Exercise 3

Draw the path the light takes from the luminous object for it to reach our eye.

Light ray diagrams

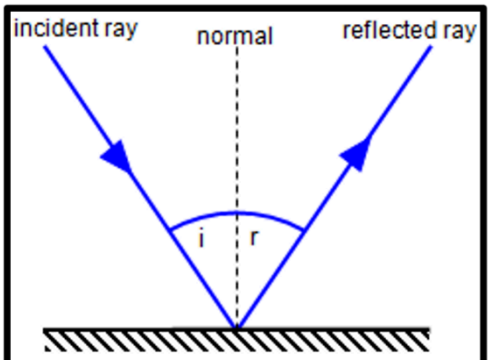
1.

2.

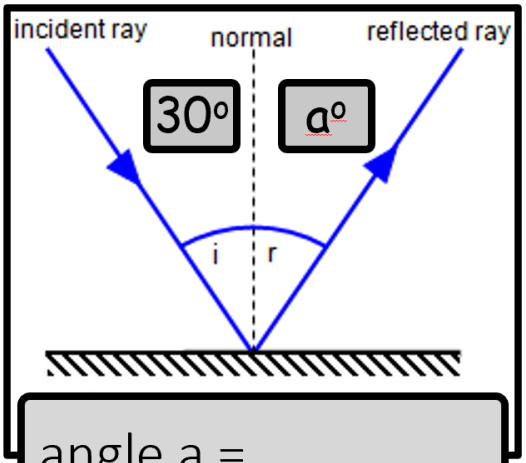
3.

When light reflects, it will always be at the same angle as the 'incoming' ray.

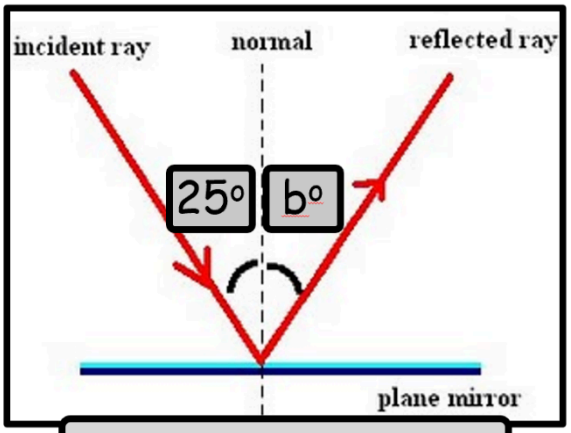
(angle i = angle r)



(angle i = angle r)

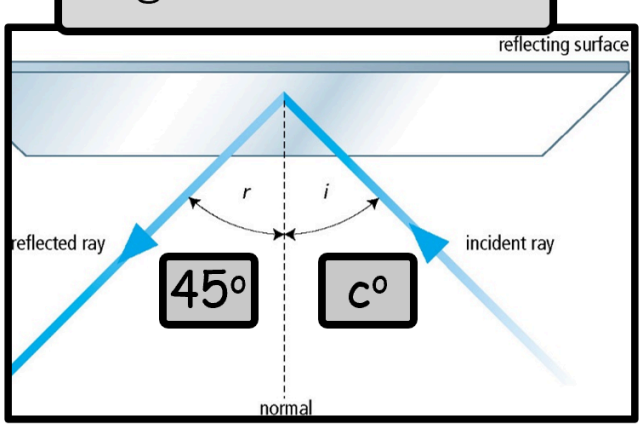


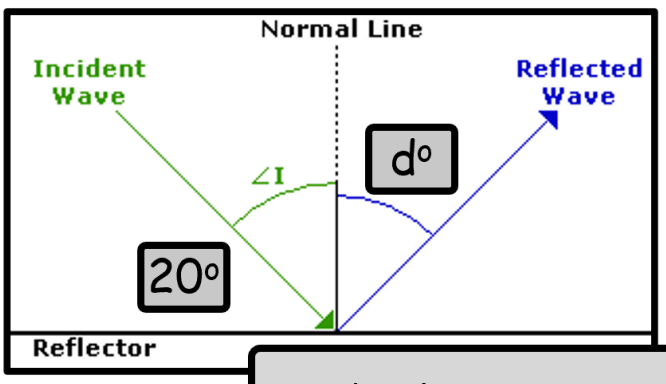
angle a =



angle b =

angle c =

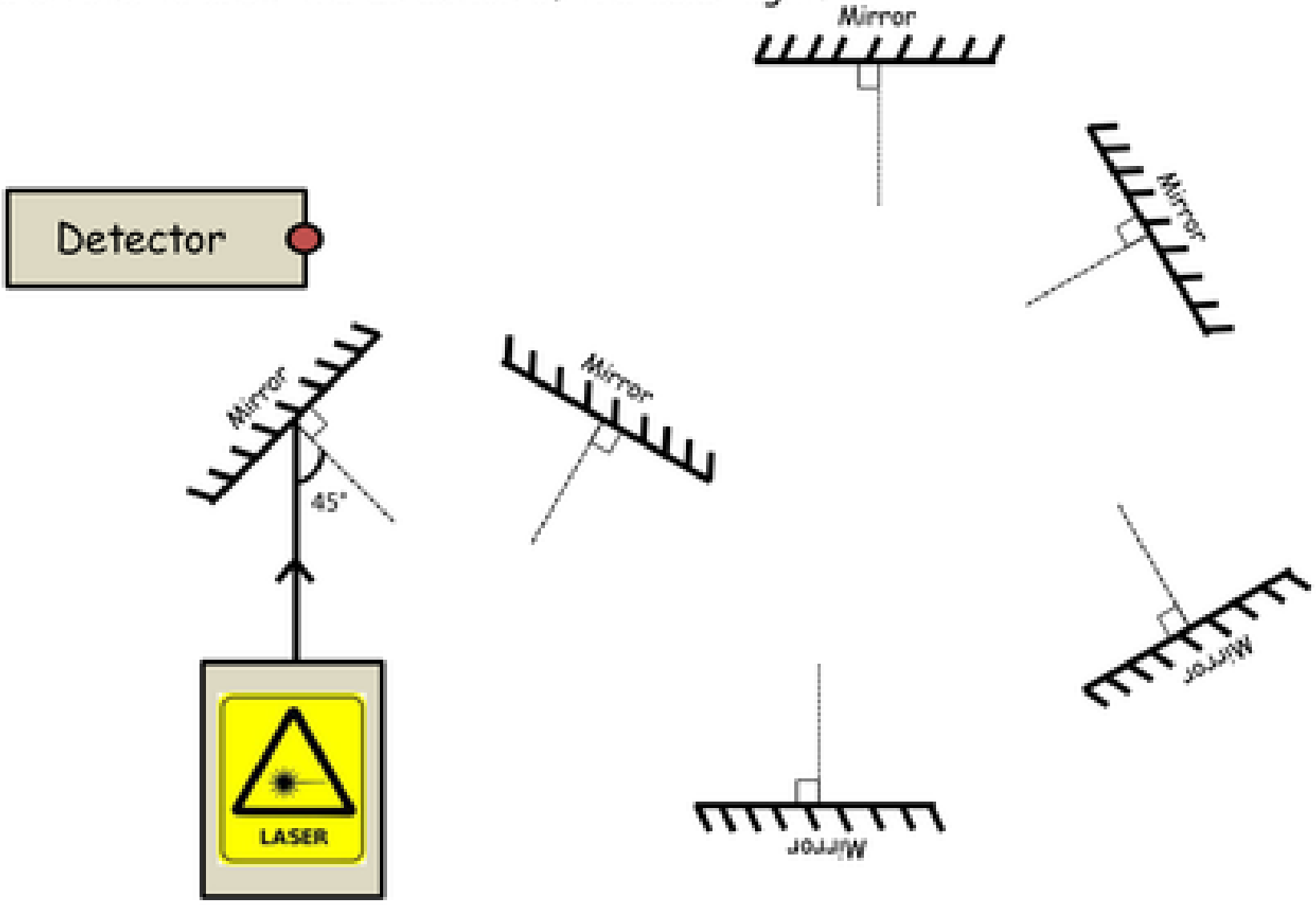




angle d =

Can you work out the reflections and show the path of the laser light to the detector?

- Not all mirrors are used.
- Write on the angles of incidence and reflection
- Use arrows to show the direction of the laser light.



Exit Ticket

1. Give an example of a luminous object

_____

2. Do non-luminous objects give out light?

_____

- If the angle, i, is 40, what would the angle, r, be?

_____

Mark (____/3) Signed. Date.

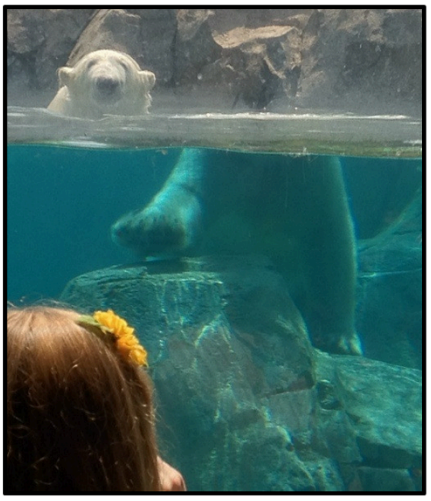
If you did not get 3/3 you need to go to the science website and watch the videos for “Light and Colour”.

LESSON 2 – REFRACTION

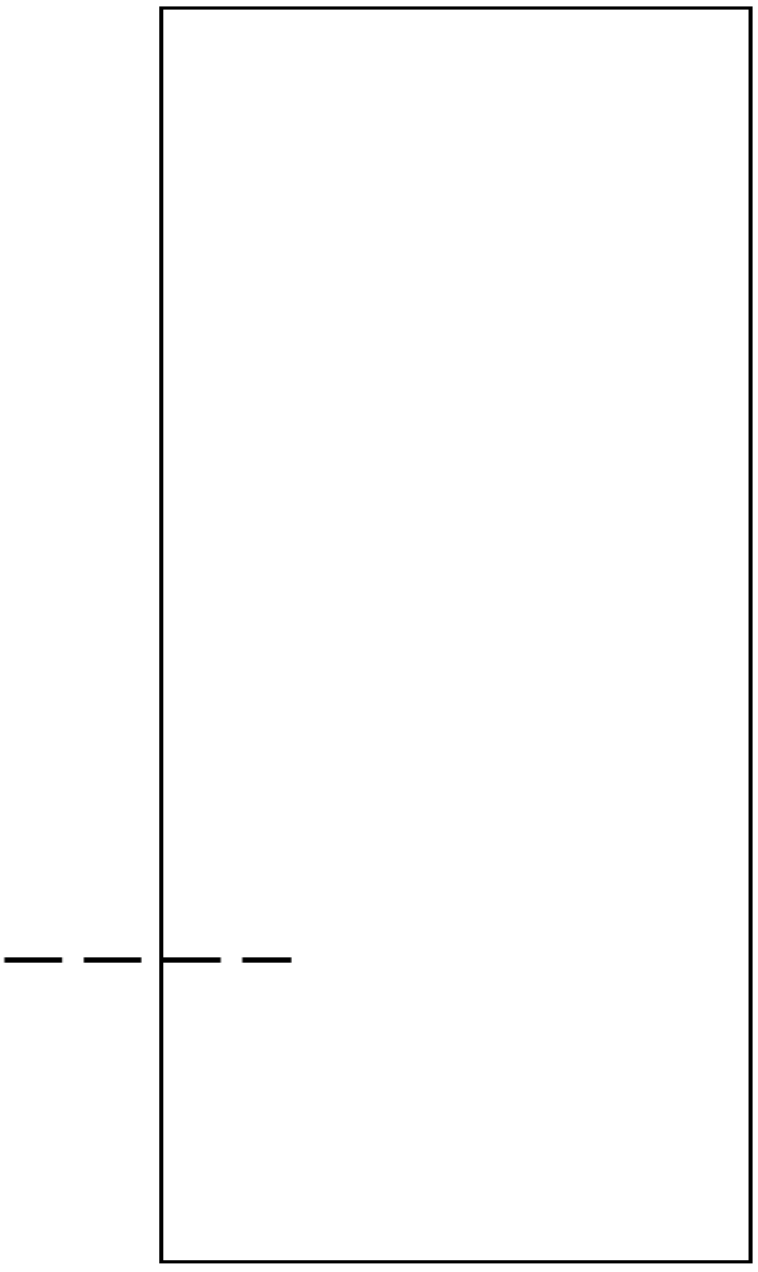
SUCCESS CRITERIA

Principles of progression	*In this topic you will learn:*	*RAG*
Increasing knowledge	Describe what is meant by diffraction	
Use and application of skills	Carry out experiments to investigate diffraction	

What has happened in the images?

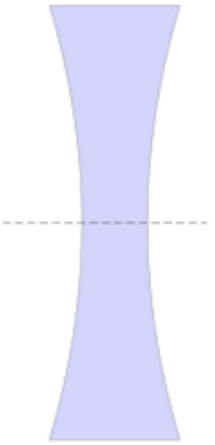


<u>Glass Block</u> – Draw the path the light takes through the glass block.



Lenses – Draw in the path the light takes through the lenses.

Biconvex

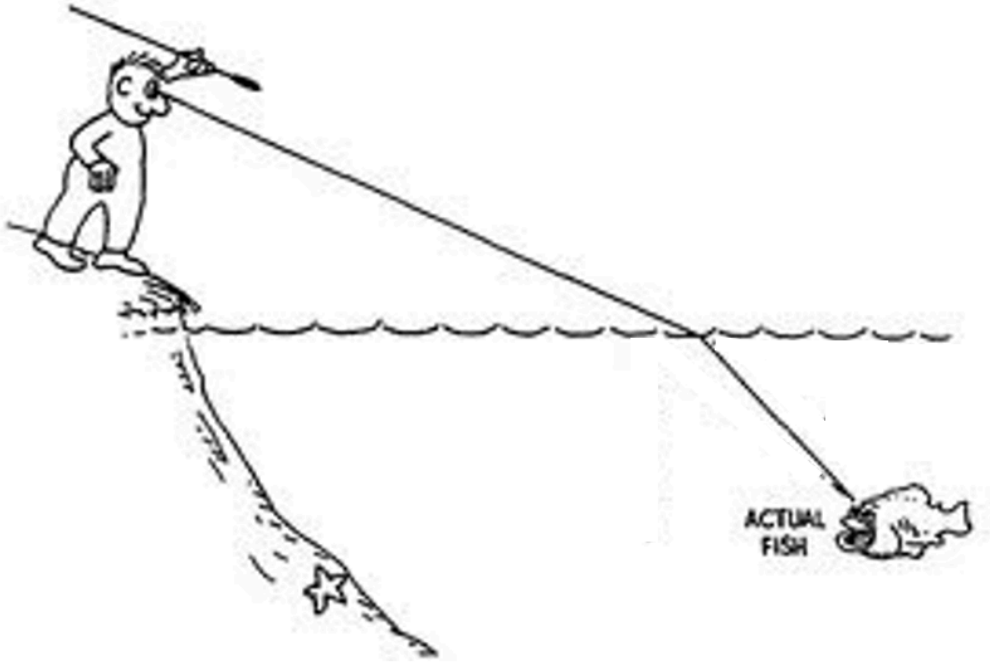


Biconcave

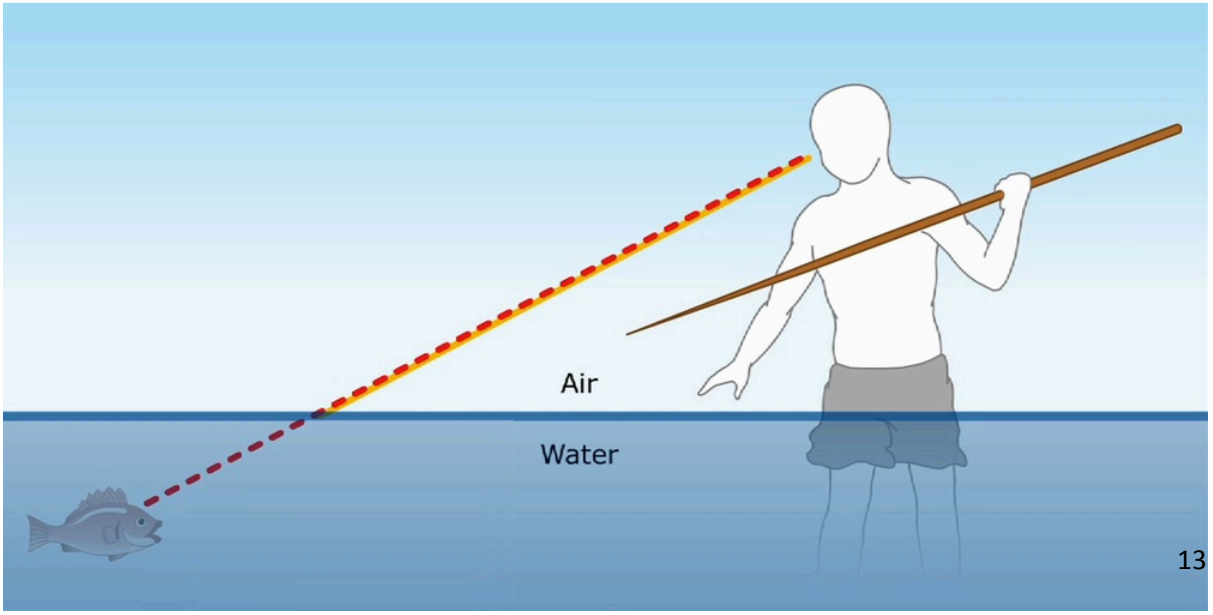
Plano convex

Ray Diagrams

1. Complete the diagram below to show the actual position of the fish.



2. Using the rules of refraction, determine the location of the object and draw it in if the angle of refraction is 40°.



Exit Ticket

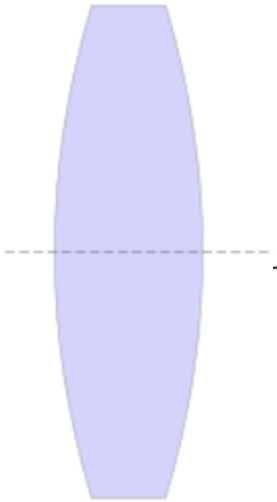
1. When light changes direction as it enters a different transparent medium, we call this…

_____

2. This lens causes the light rays to split apart.

_____

3. Draw the path light takes through a Biconvex lens.



Biconvex

LESSON 3 – THE HUMAN EYE

SUCCESS CRITERIA

Principles of progression	*In this topic you will learn:*	*RAG*
Increasing knowledge	Know the parts of the eye and their functions.	
Use and application of skills	Draw the way in which light rays are focused by the lens in the eye.	

Humans are sensitive to light – we have organs called eyes which are made of specialised cells. Our eyes can detect light energy and our brains convert the signals into an image.

The amount of light entering the eye is controlled by the coloured part called the iris. The iris can make the opening at the front of the eye (the pupil) bigger or smaller.

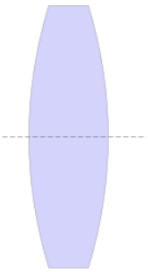
Task – work with a partner. One person should keep their eyes tightly shut for 10 seconds, then quickly open them. The other person looks carefully to see the change in the size of the pupil over the next 5 seconds as the amount of light changes.

Draw a circle in the middle of these, to show the size of the pupil in different light conditions.

Dark (just after opening)

Light (after 5 seconds)

The light waves then pass through the lens which has a biconvex shape. The lens is held in place by ligaments and there are tiny muscles that can change the shape of the lens. The lens focuses the light rays on the retina which is a layer of light sensitive cells at the back of the eye. A signal is sent from the retina to the brain along the optic nerve.



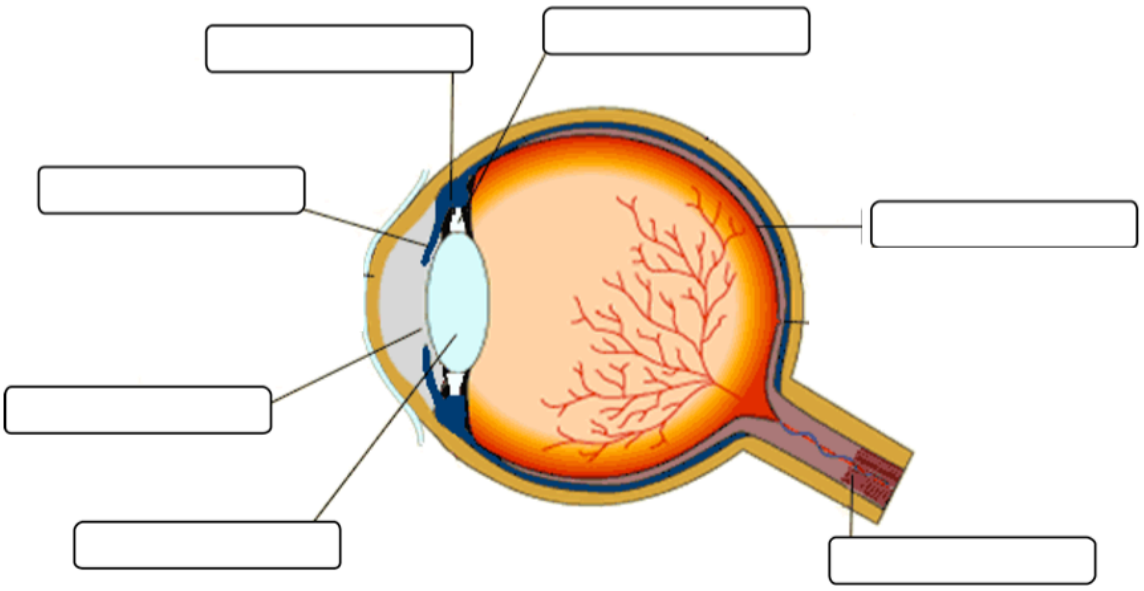
Biconvex

The eye

Exercise 4

Label the eye.

Muscle	Ligament	Pupil	Lens
Iris	Retina	Optic nerve	



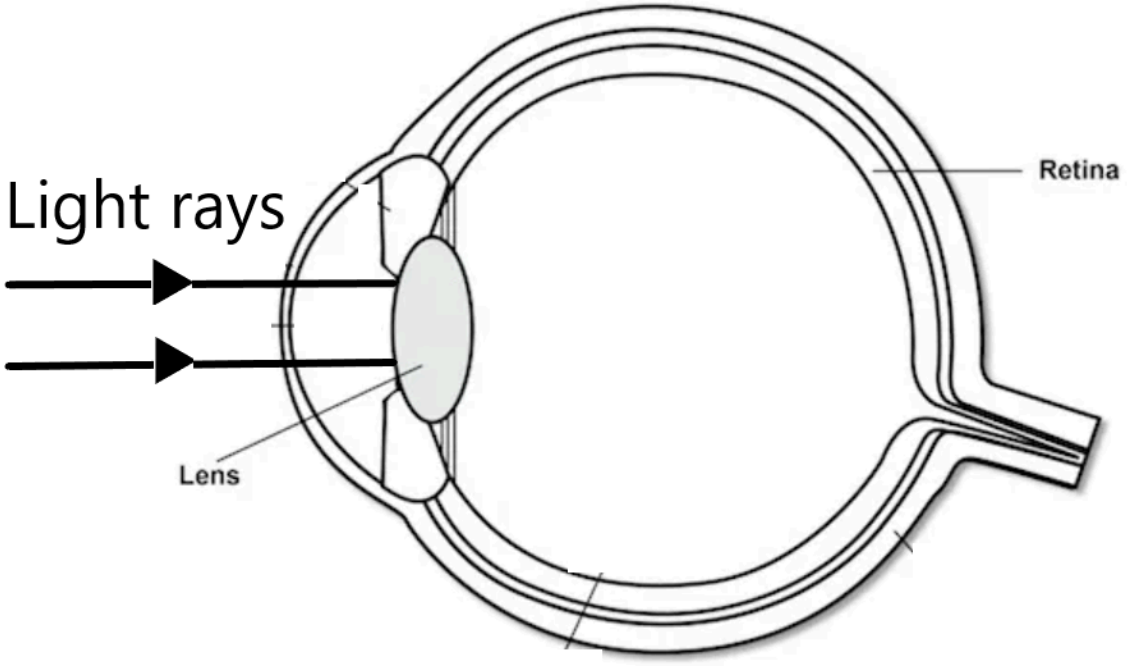
Exercise 5

Identify the parts of the eye which have the following functions:

Part of the eye	**Function**
	Controls the size of the pupil
	Light sensitive layer at the back of the eye
	Focuses the light rays
	Carries signals from the eye to the brain

Exercise 6

Think back to the work you did on lenses. Remember, the lens in the eye has a biconvex shape. Complete the diagram below to show how the light rays are focused by the lens onto the retina.



Colour vision

Humans are able to see different colours. We can do this because there are specialised cells in the retina called rods and cones. Some people have a condition called colour blindness. This means they can't see colours as well as people with normal colour vision.

Exit Ticket

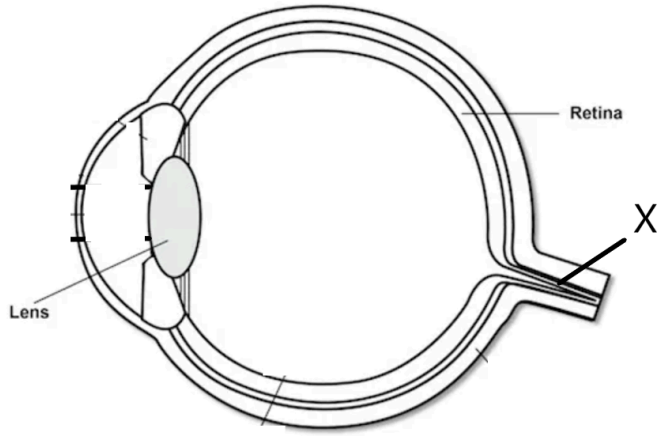
1. The human eye detects light energy using specialised cells in which layer

……..

2. What part of the eye controls the size of the pupil? ……

3. Identify the part of the eye labelled with X.

……



Mark (____/3) Signed. Date.

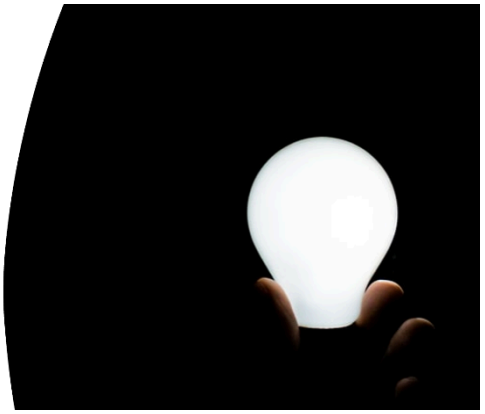
If you did not get 3/3 you need to go to the science website and watch the videos on Light and Colour.

LESSON 4 – COLOUR

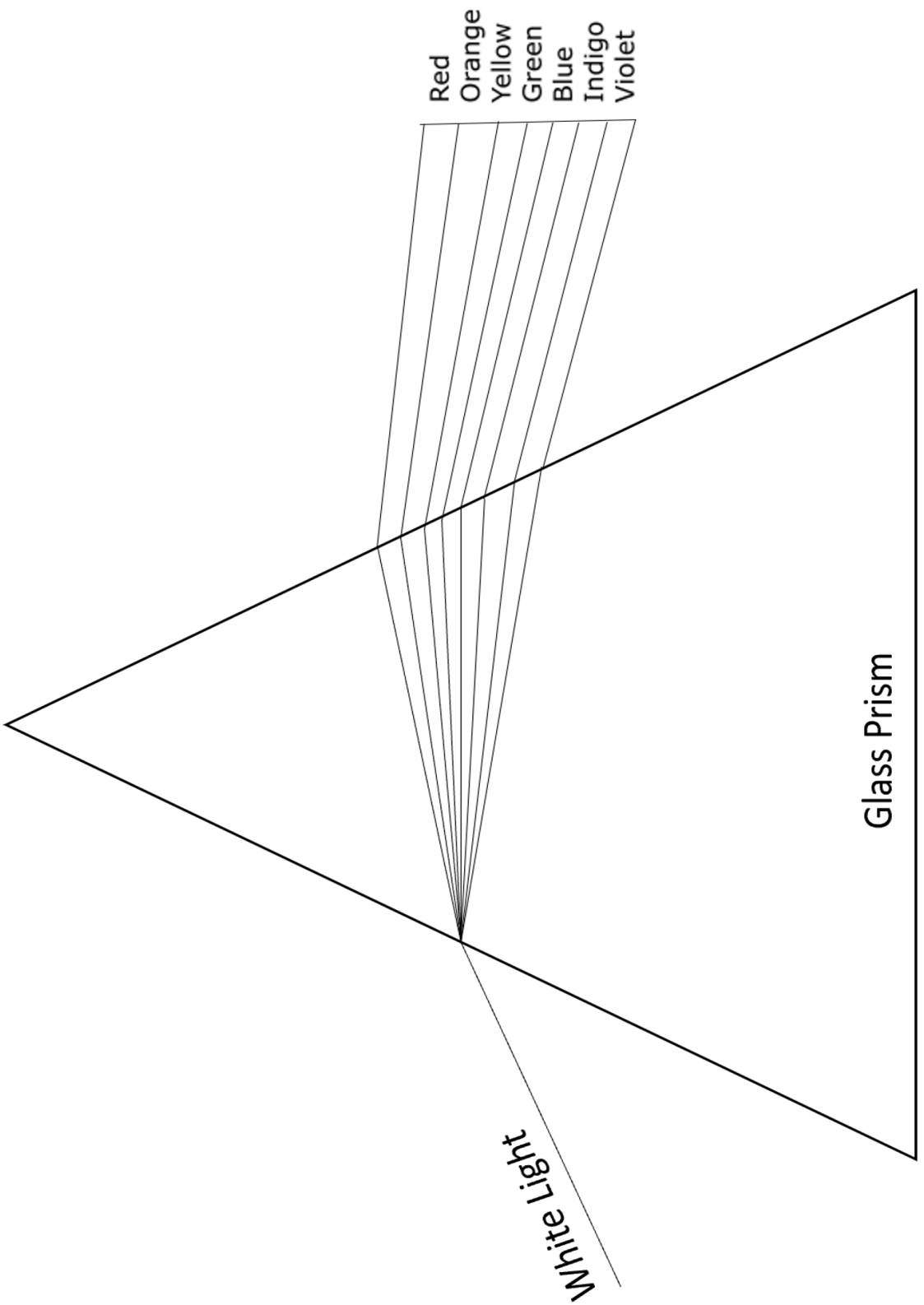
SUCCESS CRITERIA

Principles of progression	*In this topic you will learn:*	*RAG*
Increasing knowledge	How to split up / combine the colours in white light.	
Increasing knowledge	The three primary colours.	
Use and application of skills	How different colours can be made.	

Are white and black really colours?



Diffraction of light Experiment



Exercise 4

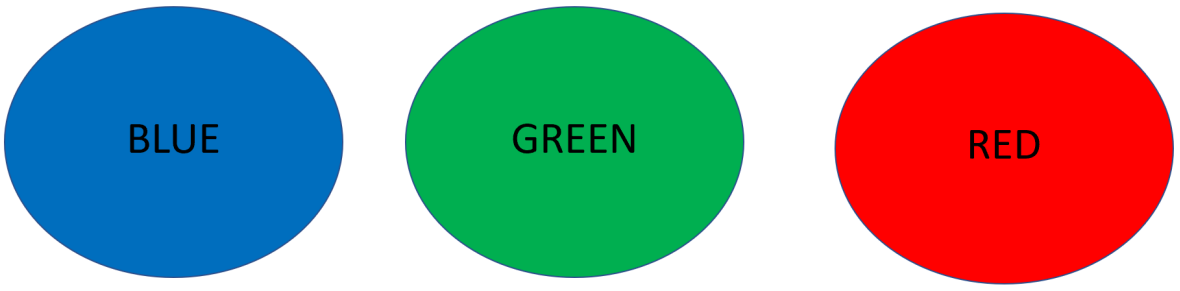
Diffraction

Different colours of light travel at slightly different _____through the glass. Violet is the _____and comes out_____. _____is the slowest and comes out last. This is called_____. A real world example of diffraction is a _____.

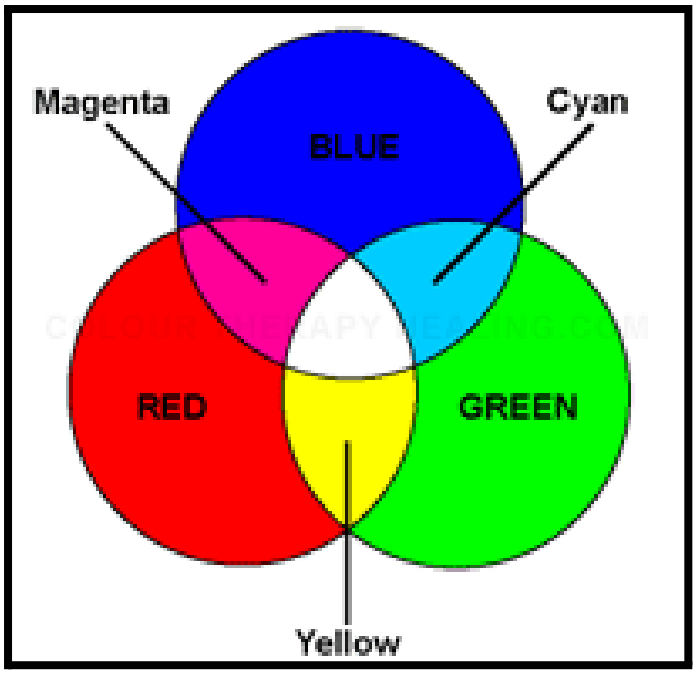
Key words: fastest, Speed, rainbow, red, first, diffraction.

Colour Mixing

There are 3 primary colours



They are known as primary colours because they cannot be broken down into any other colours. Red will always be red, it doesn't matter if you pass it through a prism, it cannot be split up into any other colour. Bule and green cannot be split up either.

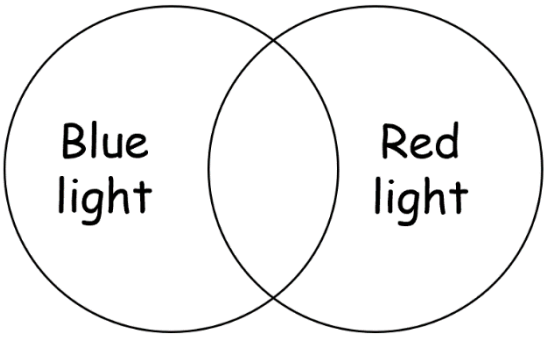


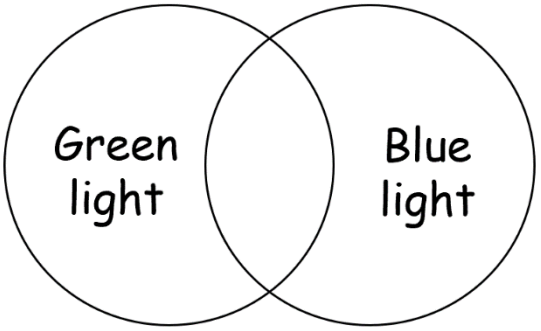
Mixing the primary colours gives us different colours. For example, mixing red and green gives yellow.

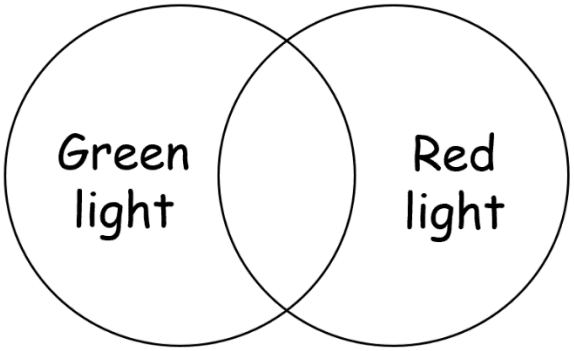
These colours are known as the secondary colours of light.

By mixing these primary and secondary colours you can make any colour you can imagine!

Colour Mixing - Practice







Exercise 5

Complete these sentences to show how the primary colours can be mixed.

B_ _ _ + R_ _ = M_ _ _ _ _ _

B_ _ _ + G_ _ _ _ = C_ _ _

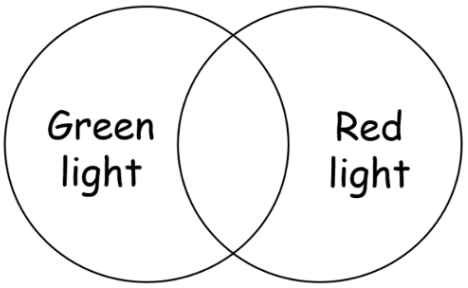
R_ _ + G_ _ _ _ = Y_ _ _ _ _

Exit ticket (self assessment)

1. What are the three primary colours?

2. What is the name of the process by which we can separate white light up into it's colours.

3. What colour is made when these primary colours are mixed?



Mark (____/3) Signed Date

If you didn't get 3/3 you need to go to the science website and…

Curriculum for Wales:

LESSON 5 – SHADOWS

SUCCESS CRITERIA

Principles of progression	*In this topic you will learn:*	*RAG*
Increasing knowledge	How are shadows made?	
Deepening understanding	What affects the length of a shadow?	
Deepening understanding	How are shadows useful to us?	

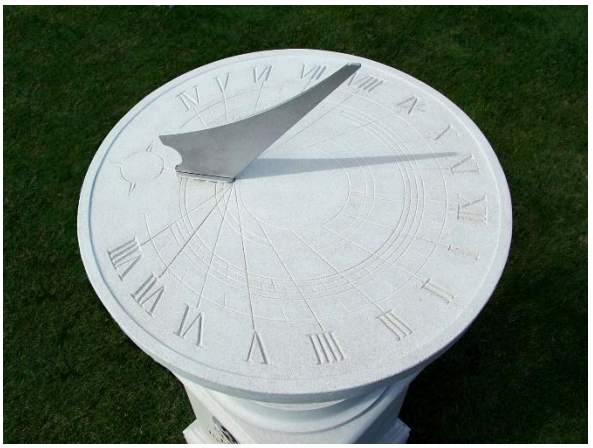
What is a shadow?

A shadow is a _____ area where light from a light source is _____ by an _____ object. It occupies all of the space behind an object with light in _____ of it.

Key words: blocked, dark, front, opaque.

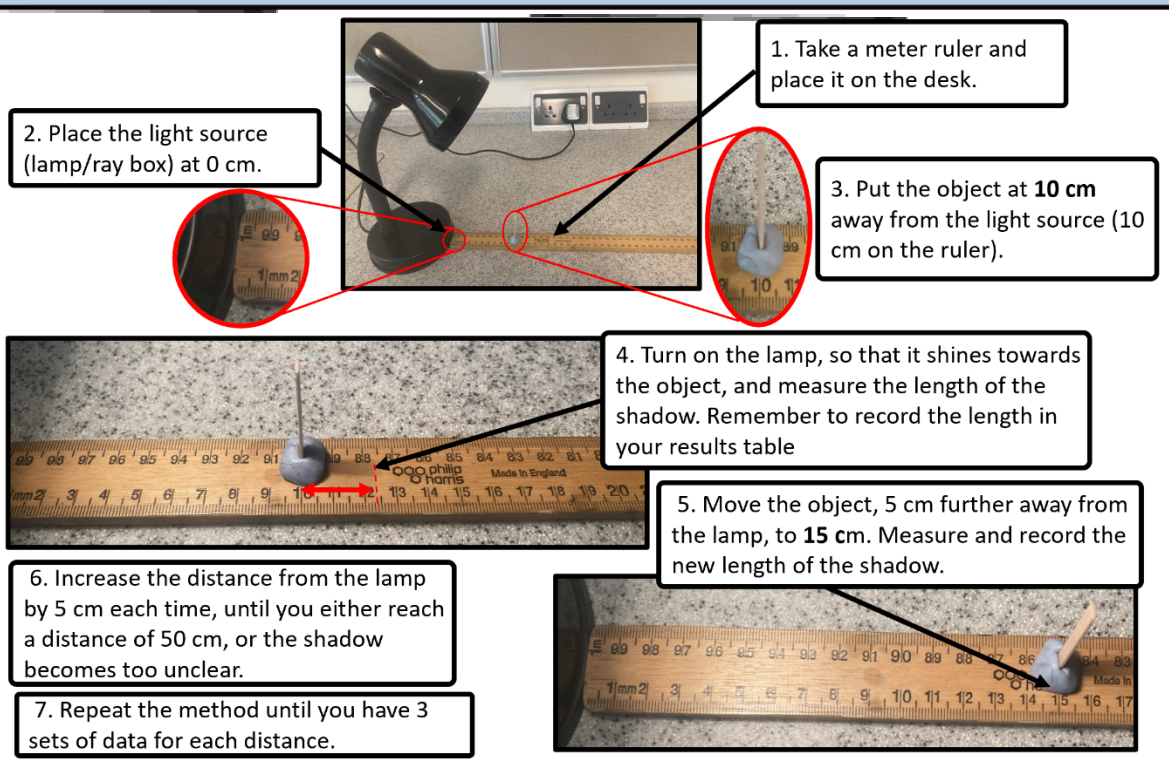
Sundials use _____to tell the time. The gnomon (the sticky up bit) _____the light from the sun and makes a shadow. As the Sun moves through the sky the shadow _____across the face of the sundial.

Key Words: Shadows, moves, blocks



What time are these sundials showing?

How does the distance of a light source affect an objects shadow



Prediction

Results

Distance from light (cm)	Length of shadow (cm)			
	1	2	3	Mean
5				
10				
15				
20				
25				
30				
35				
40				

Space for rough workings

Rules for graphs

Scale

Axis

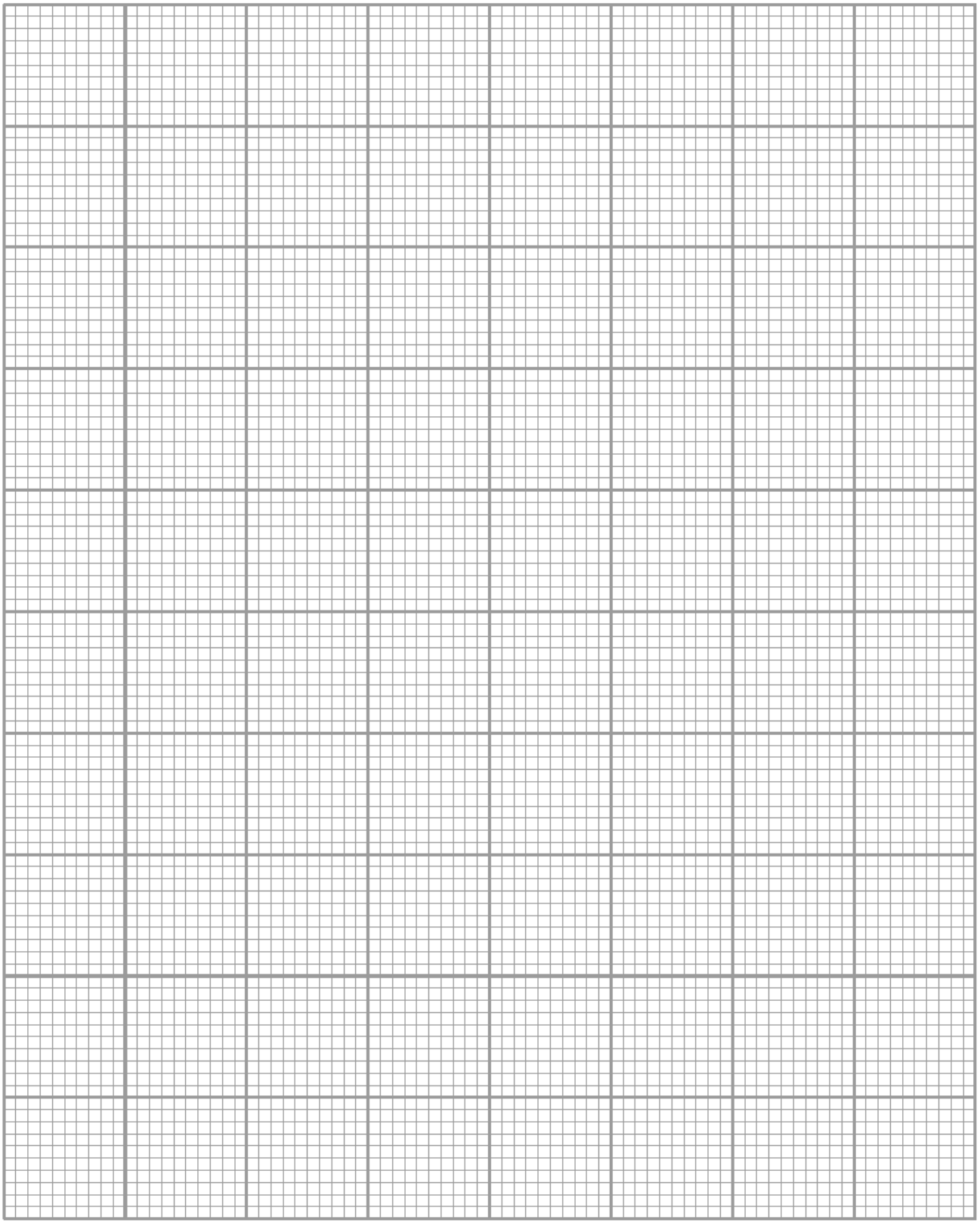
Line

Units

Title

Equipment

Graph



Analysis

Teacher assessment

The same experiment was carried out by a different group of students. They changed the distance of the lamp and measured the length of the shadows. These are their results:

When the lamp was 10 cm away, the first time the shadow was measured it was 8.0 cm long. The second time it was 9.0 cm and the third time it was 10.0 cm.

When the lamp was 20 cm away, the first time the shadow was measured it was 14.0 cm long. The second time it was 15.0 cm and the third time it was 14.5 cm.

When the lamp was 30 cm away, the first time the shadow was measured it was 22 cm long. The second time it was 20 cm and the third time it was 21 cm.

When the lamp was 40 cm away, the first time the shadow was measured it was 29 cm long. The second time it was 30 cm and the third time it was 31 cm.

First, highlight all the numbers in the box and then draw your own results table. Look at the table on page 27 if you need help.

……
……

……
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……
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Teacher assessed

Ysgol Dyffryn Aman

Close the Gap Feedback

Target Grade ☐ Current Grade ☐ Current Progress ☐ ☐

WHAT WENT WELL?	ACT
☐ Your results table has the right number of columns - including the mean..	
☐ You have got the right headings in the table.	
☐ You have used units in the headings.	
☐ You have recorded the numbers and calculated the mean correctly.	
☐ You have left out the anomalous result.	

Even better if...	The results are entered to the same number of decimal places.

Teacher Signature: Pupil Signature:

Date: Date:

ParchRespect GwytnwchResilience CaredigrwyddKindness UchelgaisAspiration

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Exit ticket (self assessment)

1. What is formed behind an object, if the object is blocking the light source?

2. What is the time shown on the sundial.

3. What are the rules for graphs?

S_____
A_____
L_____
U_____
T_____
E_____

Mark (____/3) Signed Date