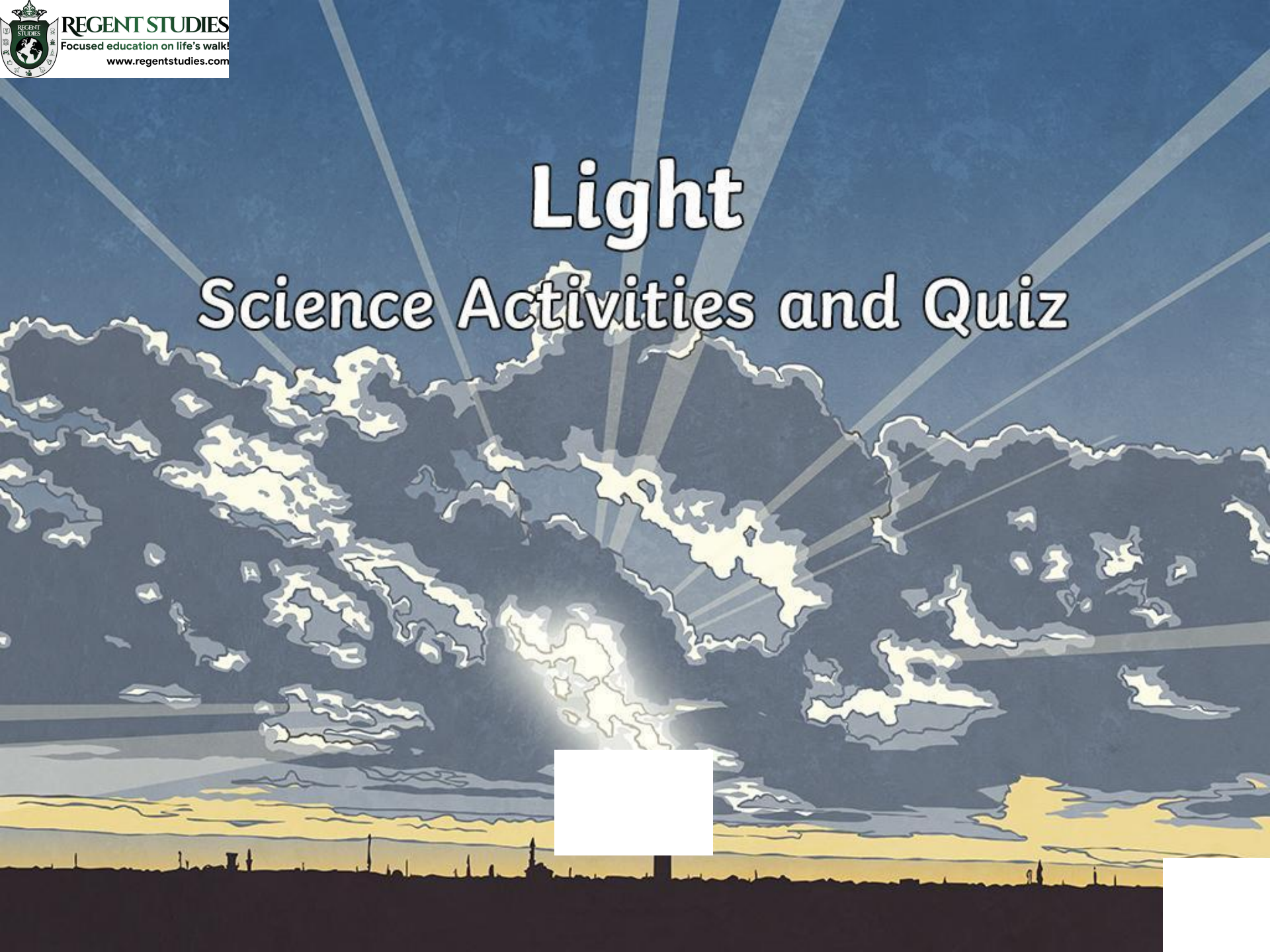
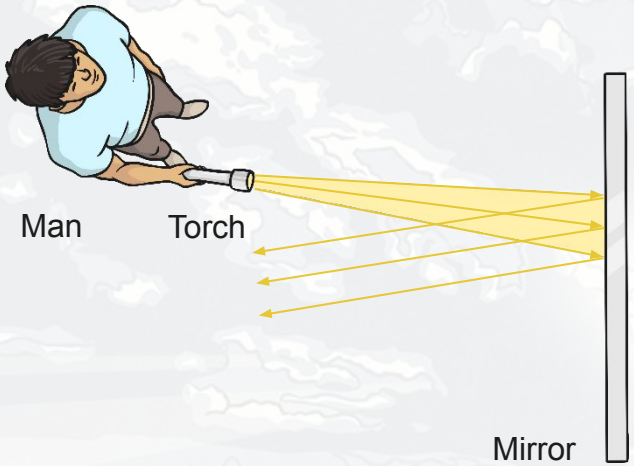


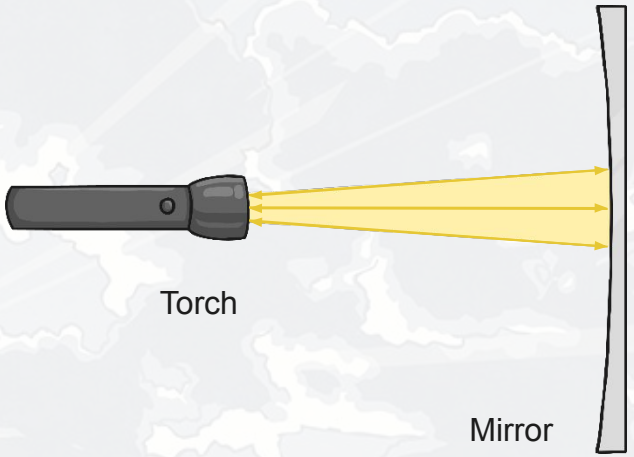
Make a Prediction

What do you think is going to happen next?

What do you think would happen if the mirror was curved?

The man shines the torch on the mirror…





Reveal Answer

Reveal Answer

Shadows

Predict what will happen next. Shadow or no shadow?

A sun → (shines on) wooden bench

B sun → (shines on) window

C sun → (shines on) tissue paper

D sun → (shines on) climbing frame

Decide whether these objects reflect light or not…

mirror

shiny shoes

soil

flowers

jewellery

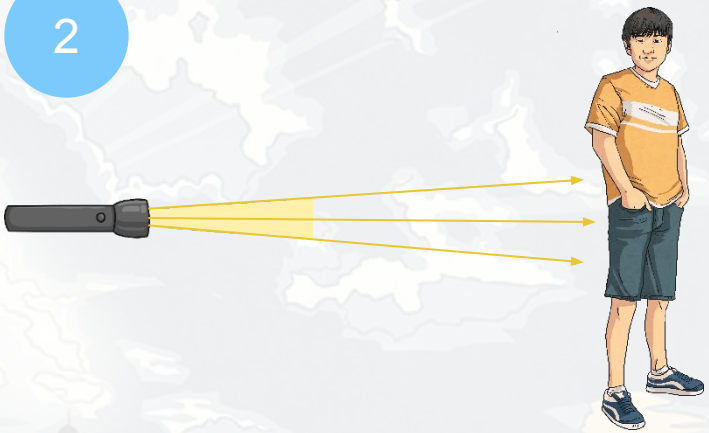
Shadow Behaviour

1. Ralf noticed that when he stood right in front of the torch, his shadow was big, tall and wide.
2. When he stood further away from the torch, his shadow was shorter, thinner and smaller.

Instructions: Draw the shadows for number 1 and 2.

1

2



Can you explain why a shadow might behave like this?

Shadow Size

James did an experiment to find out what happened to a shadow as the light source moved away from it.

Distance from light source (m)	1	1.5	2	2.5	3	3.5	4	4.5	5
Height of shadow (cm)	50	45	40	35	30	25	20	15	10

Instructions

Draw a graph to show the patterns in these results. Write sentences about what you see.

Starter

Finish this sentence…
The closer the light source, the…

Challenge

Predict what might happen if the light source is made dimmer.
Predict what would happen if the light source is tilted upwards.

Find Patterns in Shadows

Here is a table of results for Jenny's class:

Time of Day	Length of Shadow (cm)
9 a.m.	220
10 a.m.	212
11 a.m.	203
12 p.m.	190
1 p.m.	201
2 p.m.	218

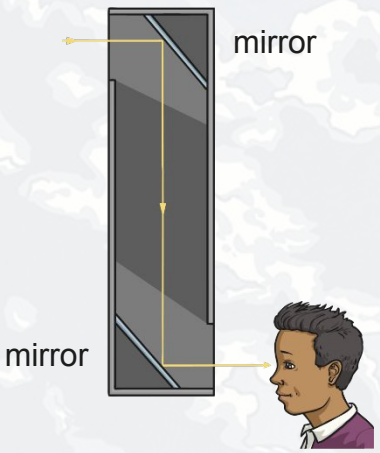
- What patterns do you notice?
- What could these patterns mean?
- If you wanted to find your smallest shadow length, what time should you measure it?

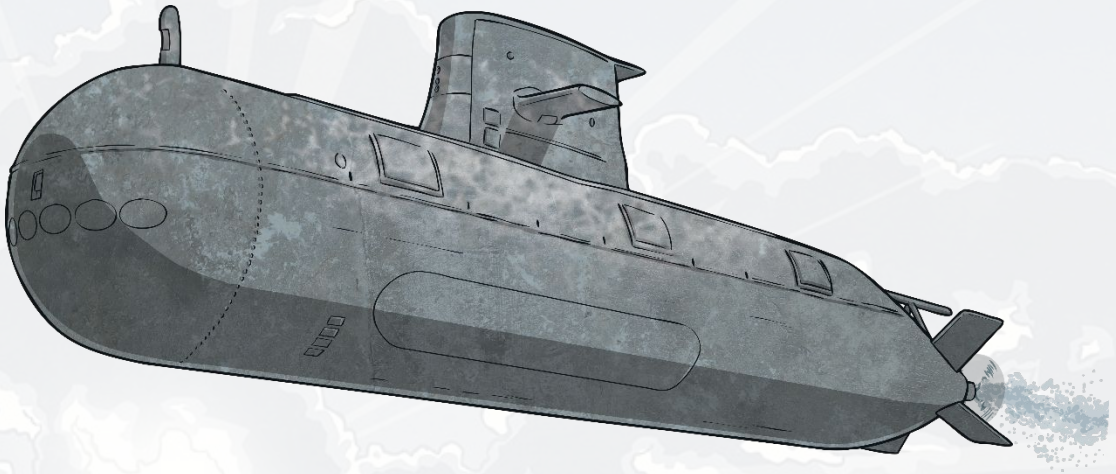
What kind of weather do you need to make really good shadows?

How can you make a shadow longer and taller?

A Submarine Periscope

The Royal Navy wants to design a lighter weight periscope for its submarines.
Its engineers came up with this design.



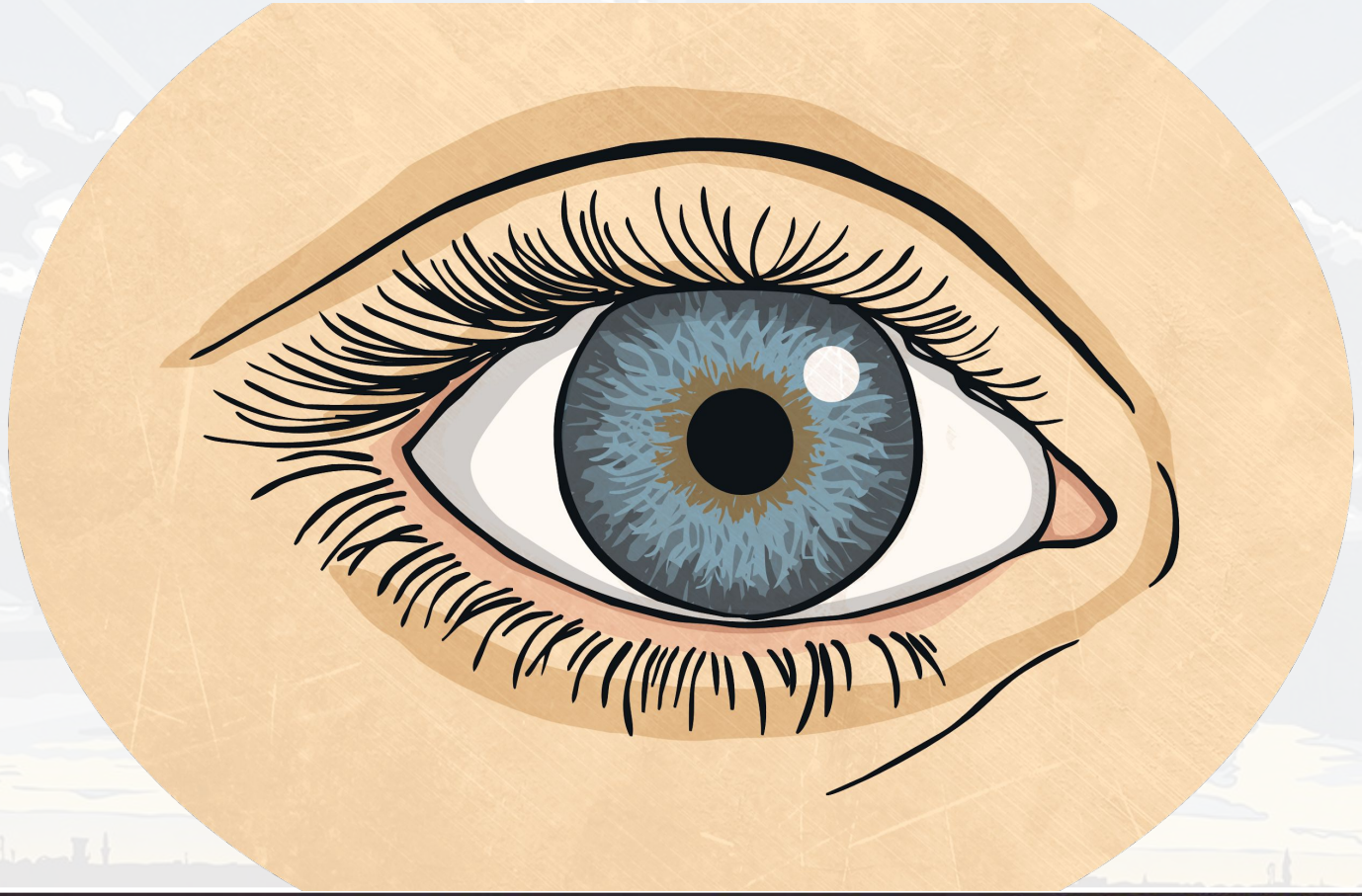


Explain what you think of the design (evaluate it).
Use what you know about how light travels.
Modify (change) the design if you need to.

Starter: Think of four different ways that help people see in the dark.

Creative Thinking

Our eyes can see in the dark.
True or false?

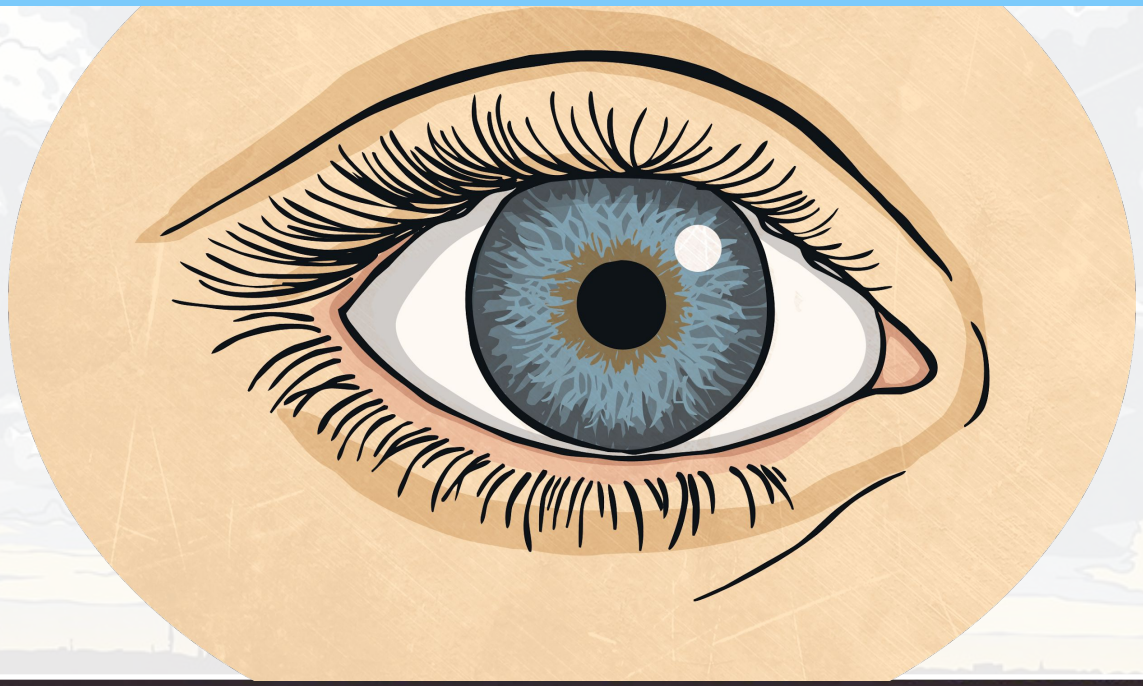


Creative Thinking

True

Seeing in the dark

We can see in very bright light and in darkness. The pupil contracts and expands to adapt. A chemical called rhodopsin is found in rods in the retina which helps us to see in the dark. If you have plenty of vitamin A, you can see in the dark much more easily.



Special Clothing

Our eyes are very precious. We need to keep them safe from harm, especially from too much light. Look at the different clothing that you could use to do this…

Instructions

Match the best clothing to keep your eyes safe to the activity below.

playing football in the sunshine	**going on holiday**	**going skiing**
sunglasses	**goggles**	**baseball cap**

Challenge

Design some sunglasses that you can play sports in.

True or False?

1. Light travels in straight lines.
2. The Moon is not a source of light. It reflects light.
3. When light hits an object, it is reflected best in a dull object.
4. A shadow is caused because light bends round an object.
5. The nearer an object is to a light source, the smaller the shadow.
6. Light can scatter, bounce or be absorbed.
7. Objects that block some of the light are called translucent.

True or False?

1	Light travels in straight lines.	True
2	The Moon is not a source of light. It reflects light.	True
3	When light hits an object, it is reflected best in a dull object.	False
4	A shadow is caused because light bends round an object.	False
5	The nearer an object is to a light source, the smaller the shadow.	False
6	Light can scatter, bounce or be absorbed.	True
7	Objects that block some of the light are called translucent.	True