

### Investigating How Shadows Change

For these experiments you will need: a torch, a lamp, a candle (if your parents agree and supervise), an opaque object, some card, pencil, scissors and sticky tape.

- What happens to the shadow when you change the width of the light beam?

Position your opaque object near a wall or surface so that when you shine the torch on it, it casts a shadow. Look at the shadow. Make some notes about the size and sharpness of the shadow.

Next, put the torch head down on the paper/card.

Draw around the head of the torch and cut out the shape.

Insert a small hole in the middle of the cut out shape.

Stick the card over the head of the torch.

Making sure the opaque object is in the same place - shine the torch to cast a shadow. What is different about the shadow?

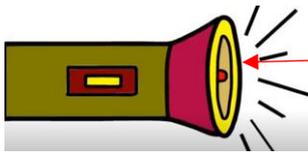
Now, make the hole in the card a bit bigger - repeat your experiment and see what has happened to the shadow.

Keep going making the hole bigger each time.

What do you notice?

Why do you think the shadow has changed?

Can you explain what is happening?



Change the size of the hole in the cardboard cover.

- What happens to the shadow when you change the source of light?

Position a light source near an opaque object so that it casts a shadow.

Look carefully at the shadow, jot down some notes about the size of the shadow and how clear/sharp it is.

Leave the opaque object in the same position and then replace the light source.

Look at the shadow again. How has it changed? Why do you think that is?

If you have a third light source, change it again and note the differences?

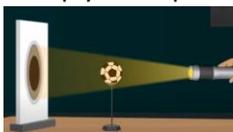
Can you think of why it might be useful to be able to cast different types of shadow? Give some examples if you can.



Observe how the shadow changes with the different light sources,

- What happens to the shadow when you move the light source nearer to the object?

Set up your experiment a bit like this:



Observe how the shadow changes as you move your torch closer and further away.

Can you explain what is happening and why?