Science

Light


Changing
Shadows
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Aim

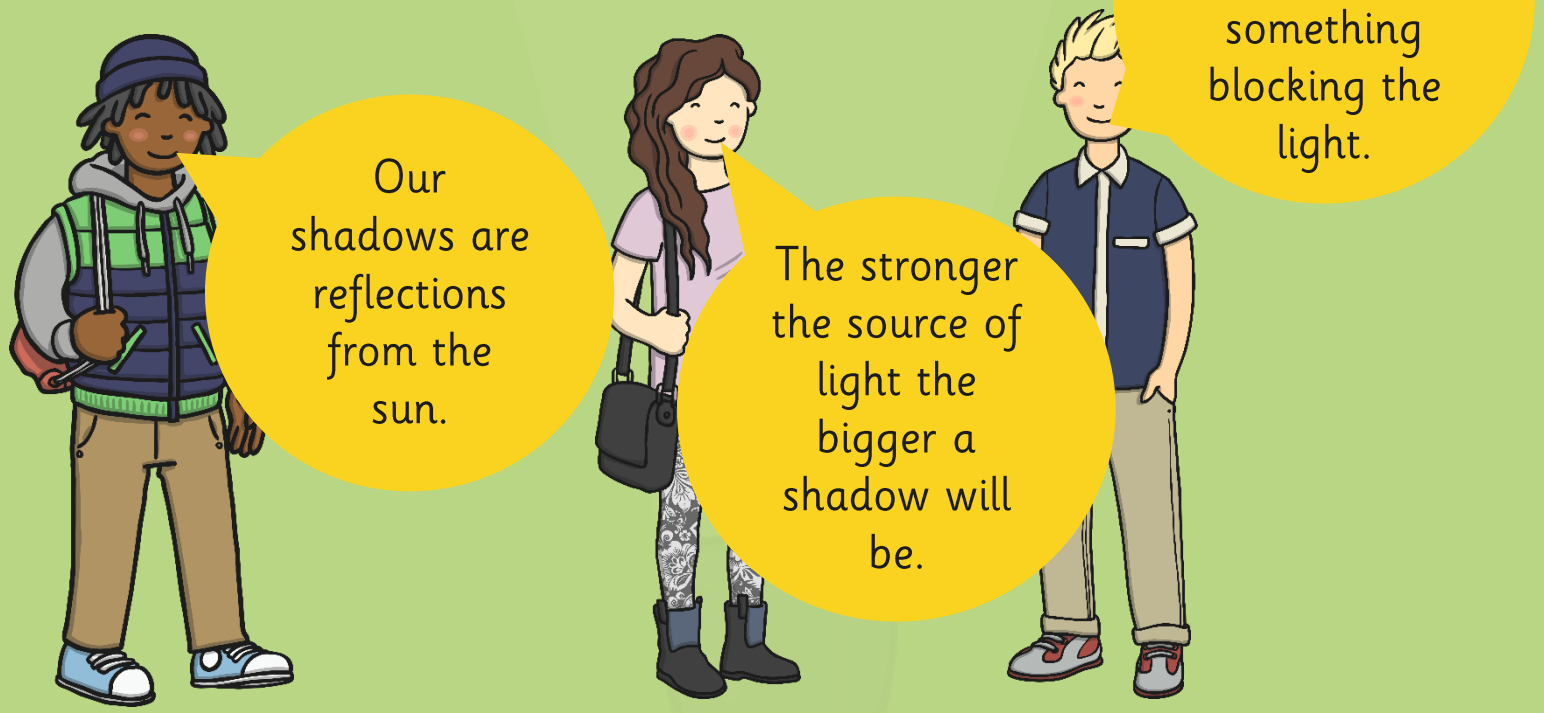
- I can find patterns when investigating how shadows change size.

Success Criteria

- I can explain how a shadow is formed.
- I can plan and set up an investigation into the way shadows change size.
- I can observe patterns in the way shadows change size.
- I can explain the patterns I find.

Shadows and Reflections

These children are talking about shadows and reflections.
Talk to your partner about the children's ideas.
Do you agree or disagree with any of their thoughts?

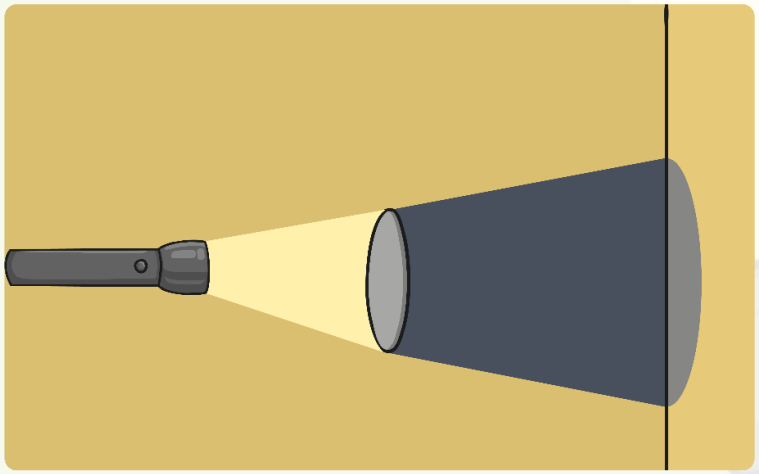


Making Shadows

Shadows are created when an opaque object blocks light.

The light cannot go through or around the object, so a darker patch of less light is created behind the object.

Shadows are not reflections! Reflection is when light bounces off an object. A shadow is caused by light being blocked.



How do shadows change?

Think about how and when they change size, or direction.

Noticing Patterns

You will be investigating how shadows change when the distance between the light source and the object changes.

Click the light bulb to watch the '**How do different materials affect shadows?**' video.

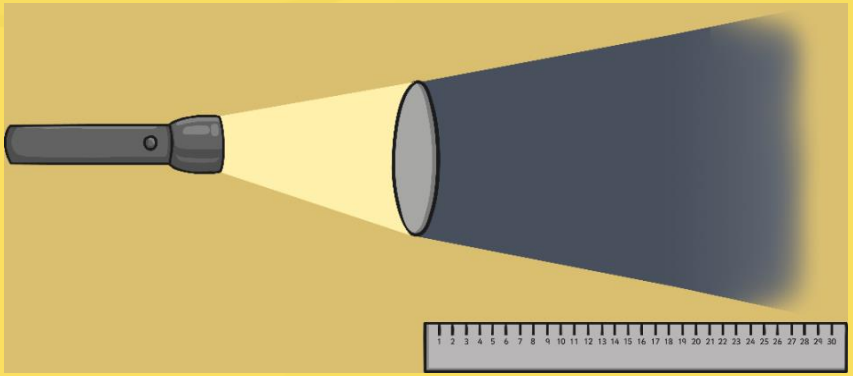
While you are watching, think about how the children are making the shadows change.

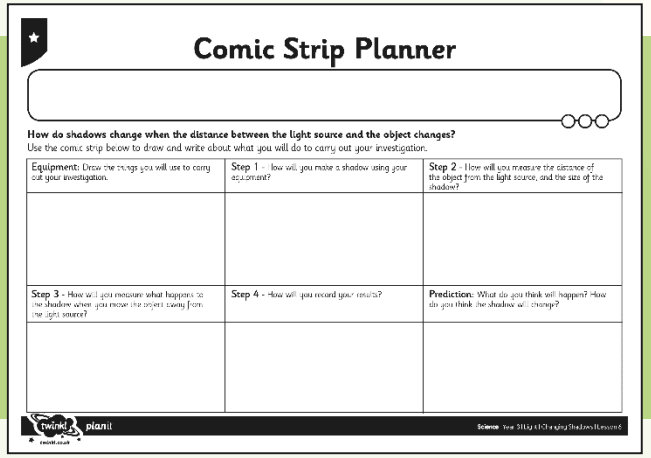
Investigation Planning

You will set up an investigation to find an answer to this question.

You will use a **torch, a ruler** or **metre stick,** and **an object.**

You will measure the shadow of the object at different distances from the torch (the light source).





Comic Strip Planner

How do shadows change when the distance between the light source and the object changes?

Use the comic strip below to draw and write about what you will do to carry out your investigation.

Equipment: Draw the things you will use to carry out your investigation.	**Step 1** - How will you make a shadow using your equipment?	**Step 2** - How will you measure the distance of the object from the light source, and the size of the shadow?
Step 3 - How will you measure what happens to the shadow when you move the object away from the light source?	**Step 4** - How will you record your results?	**Prediction:** What do you think will happen? How do you think the shadow will change?

Think about what you will do to answer the question, and what you think you will find out. Use the Comic Strip Planner Activity Sheet to plan your investigation and make your prediction.

Investigation Planning

Comic Strip Planner

What question are you investigating?

Use the comic strip below to draw and write about what you will do to carry out your investigation.

What equipment will you use?	Step 1	Step 2
Step 3	Step 4	Prediction: What do you think will happen?

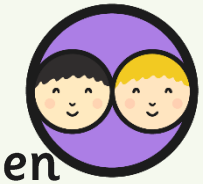
omic Strip Planner

ce between the light source and the object changes?
out what you will do to carry out your investigation.

	Step 1 - How will you make a shadow using your equipment?	**Step 2** - How will you measure the distance of the object from the light source, and the size of the shadow?
Step 3 - How will you measure what happens to the shadow when you move the object away from the light source?	**Step 4** - How will you record your results?	**Prediction:** What do you think will happen? How do you think the shadow will change?

Activity

How Do Shadows Change When the Distance Between the Light Source and the Object Changes?



Results and Patterns

Complete this table with your results as you carry out your investigation.

How do shadows change when the distance between the light source and the object changes?

Distance between the light source and the object.	Size of the object's shadow.
10cm	
20cm	
30cm	
40cm	
50cm	

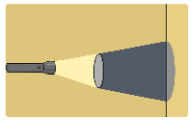
Look at the results you have collected. Do you notice a pattern? Does the size of the shadow ch
when the distance between the object and the light source changes?

Explain what you notice:

The pattern I have noticed is _____

Make a concluding statement to explain what you have found out:

I have found out that the _____ the distance between the object and the light source _____ the object's shadow is.



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Results and Patterns

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20cm	
30cm	
40cm	
50cm	

Look at the results you have collected. Do you notice a pattern? Does the size of the shadow ch
when the distance between the object and the light source changes?

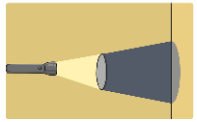
Explain what you notice:

Are there any results that do not fit your pattern? _____

If there are, can you think why?

Make a concluding statement to explain what you have found out:

I have found out that _____



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Results and Patterns

Complete this table with your results as you carry out your investigation.

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Distance between the light source and the object.	Size of the object's shadow.

Look at the results you have collected. Do you notice a pattern? Does the size of the shadow change when the distance between the object and the light source changes?

Explain what you notice:

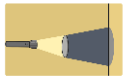
Are there any results that do not fit your pattern? _____

If there are, can you think why? _____

Make a concluding statement to explain what you have found out:

I have found out that _____

Can you explain why the shadow changes in this way? Think about how light travels.



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Is There a Pattern?

Once you have carried out your investigation, look at the results you have gathered.

Do you notice a pattern in your results?

Are there any results that do not fit the pattern? Can you think of a reason for these results?

Complete your Results and Patterns Activity Sheet by explaining the pattern and making a concluding statement.

Why Do Shadows Change Size?

You should have noticed that the smaller the distance between the light source and the object, the bigger the object's shadow is.

Some of you have been thinking about why this happens.

Share your explanations!

The closer an object is to the light source, the more light it blocks. This means the shadow created is bigger. But if an object is far away from the light source, it does not block out much light, so the shadow is smaller.

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