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Which material is best?

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CHEMICAL SCIENCE

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Lesson One: Good gloves!

YOU WILL NEED

DIFFERENT TYPES OF GLOVES.

FOR EXAMPLE: WASHING UP GLOVES, WINTER GLOVES, GARDEN GLOVES, DISPOSABLE GLOVES ETC.

PAPER

PENS AND PENCILS

A DEVICE FOR TAKING PHOTOS (OPTIONAL)

See slide notes for lesson objectives

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Lesson One: Good gloves!

Observe

Look at each glove carefully

What can you see, smell and feel?

What could you say about each glove?

See slide notes for question prompts

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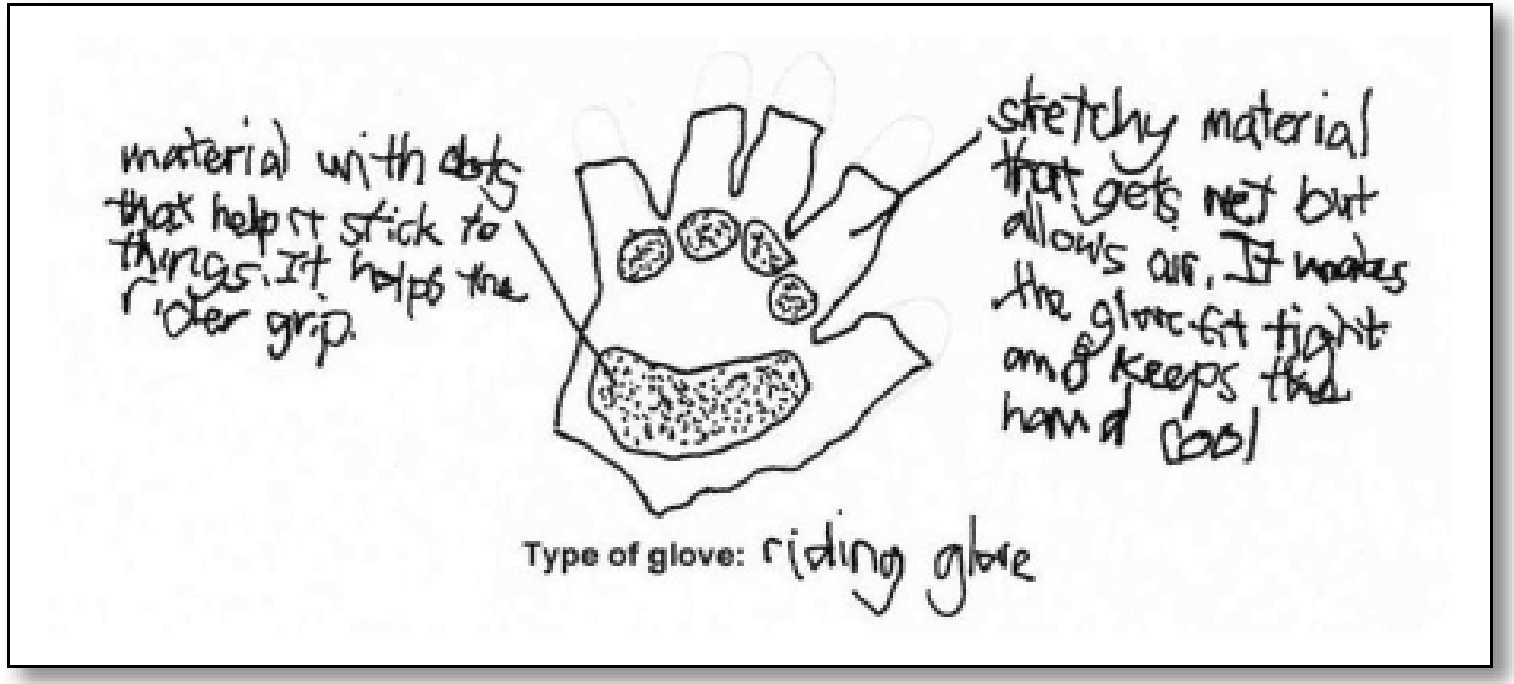
After observing

Draw/photograph the gloves that you observed.

Label the drawings/ photographs with what you noticed about the gloves (see the sample on the right).



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Wondering about materials

Make a list of words to describe what the gloves were made of, the properties of those materials and how they were used.

Complete the sentence

What I think I know about the properties and uses of materials are…

Complete the sentence

What I'm interested in finding out about is…

Share your drawings of gloves and your 'Wondering about materials' with your teacher, classmates and family.

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EXPLORE

Lesson Two: What soaks up water?

YOU WILL NEED

3 MATERIALS TO INVESTIGATE.

FOR EXAMPLE: CLOTH, PAPER, CARDBOARD, PLASTIC, FOIL ETC.

A CONTAINER OF WATER.

A SMALL MEASURING CUP (CAN FIT 20MLS OF WATER)

A DEVICE FOR TAKING PHOTOS (OPTIONAL)

PAPER

PENS AND PENCILS

Make sure your samples are all the same size, shape and thickness.

See slide notes for lesson objectives

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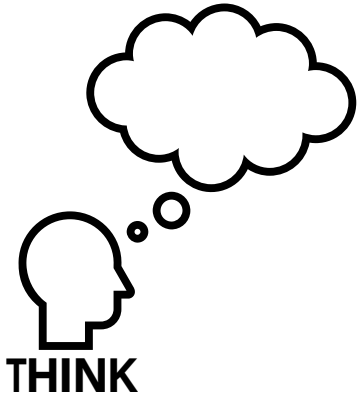
Before the investigation



Why do we wear swimsuits to the beach and not jumpers?

What type of materials do you use to soak up a spill?

What do you think *leak*, *soak* and *repel* mean?

Using the three materials you gathered, predict **if the materials will soak up 20mls of water**, and why you think that.

Record your predictions using the template on the next slide.

See slide notes for discussion prompts

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Lesson Two: What soaks up water?

My predictions

Choose a material, record your ideas in the table.

MATERIAL ONE	MATERIAL TWO	MATERIAL THREE
Type of material?	**Type of material?**	**Type of material?**
What do you predict will happen? Explain why.	**What do you predict will happen? Explain why.**	**What do you predict will happen? Explain why.**

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Lesson Two: What soaks up water?

Doing the investigation

Measure 20mls of water into your measuring cup.

Pour the water in the measuring cup onto a surface like the kitchen bench, a plastic tray or a flat plate.

Place material 1 on top of the water you poured out.

Observe for 1 minute. Record your observations on the table to the right. Take photos or draw pictures too.

MATERIAL ONE

Write about, upload a photograph of a drawing or upload a photograph showing what happened.

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Doing the investigation

Measure 20mls of water into your measuring cup.

Pour the water in the measuring cup onto a surface like the kitchen bench, a plastic tray or a flat plate.

Place material 2 on top of the water you poured out.

Observe for 1 minute. Record your observations on the table to the right. Take photos or draw pictures too.

MATERIAL ONE

Write about, upload a photograph of a drawing or upload a photograph showing what happened.

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Doing the investigation

Measure 20mls of water into your measuring cup.

Pour the water in the measuring cup onto a surface like the kitchen bench, a plastic tray or a flat plate.

Place material 3 on top of the water you poured out.

Observe for 1 minute. Record your observations on the table to the right. Take photos or draw pictures too.

MATERIAL ONE

Write about, upload a photograph of a drawing or upload a photograph showing what happened.

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After the investigation

How do my predictions compare to my observations?

What is my claim?

To help you think about this consider your responses to these questions:

- Which material soaked up water the best?

How do you know?

- Which material soaked up water the least? How do you know?

- What can you claim about what type of materials best soak up water?

How do materials change when they soak up water? Do all materials change when they soak up water? How might you describe these changes?

Share your information about what happened when doing your investigation with your teacher, classmates and family.

See slide notes for discussion prompts

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PrimaryConnections

EXPLORE

Lesson Three: How strong is it?

YOU WILL NEED

3 SAMPLES OF AT LEAST ONE MATERIAL TO INVESTIGATE.

FOR EXAMPLE:

3 PIECES OF CLOTH,

3 PIECES OF PAPER, CARDBOARD, PLASTIC, FOIL ETC.

Make sure your samples are all the same size.

PAPER

PENS AND PENCILS

A DEVICE FOR TAKING PHOTOS (OPTIONAL)

See slide notes for lesson objectives

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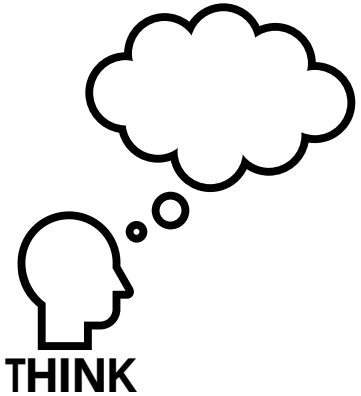
Before the investigation



What happens to different materials when you scrunch, stretch and tear them?

Today you will investigate this using *at least* one material (but you can investigate more if you like.)

Use the template on the next slide to record your predictions about what will happen when you scrunch, stretch and tear the material you're investigating. If you investigate more than one material, you will need to copy the template for each material.

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Lesson Three: How strong is it?

My predictions

Choose a material, record your ideas in the table.

Material being investigated:		
What does it look like?	**What does it feel like?**	**What does it sound like?**
What do you predict will happen to your material when it's scrunched, stretched and torn?		

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Lesson Three: How strong is it?

Doing the investigation

Get a sample of the material you are investigating.

Scrunch it up using your hands.

Observe the material, take notes, photographs and draw what happened.

Record your notes in the table to the right.

Write/ draw/ take photographs to describe what happened when the material was <u>scrunched.</u>

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What could you

EXPLORE

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Lesson Three: How strong is it?

Doing the investigation

Get sample 2 of the material you are investigating.

Try and stretch it by holding both ends and pulling.

Observe the material, take notes, photographs and draw what happened.

Record your notes in the table to the right.

Write/ draw/ take photographs to describe what happened when the material was <u>stretched.</u>

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What could you

EXPLORE

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Lesson Three: How strong is it?

Doing the investigation

Get sample 3 of the material you are investigating.

Test to see if it can be torn.

Observe the material, take notes, photographs and draw what happened.

Record your notes in the table to the right.

Write/ draw/ take photographs to describe what happened when the material was torn.

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What could you

EXPLORE

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After the investigation

How do my predictions compare to my observations?	
What is my claim? To help you think about this consider your responses to these questions: - What makes a material strong? - How do know that? - What materials are strong? - How do you know that?	
Imagine if a blanket was made of foil? Might that work? Why or why not? How can you explain your thinking using what you have discovered from your investigation?	

Share your information about what happened when doing your investigation with your teacher, classmates and family.

See slide notes for discussion prompts

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EXPLORE

Lesson Four: How far can it stretch?

YOU WILL NEED

3 STRETCHY MATERIALS TO INVESTIGATE.

FOR EXAMPLE: CLOTH, RUBBER BAND, A HAIR TIE ETC.

A RULER

PENS AND PENCILS

A DEVICE FOR TAKING PHOTOS (OPTIONAL)

Make sure the materials you are testing are approximately the same length.

See slide notes for lesson objectives

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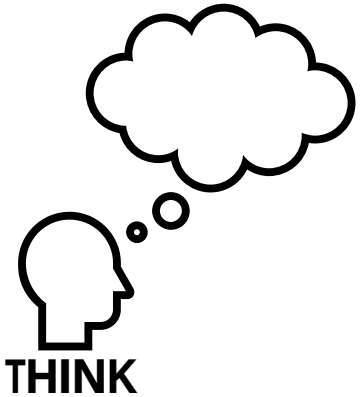
Before the investigation



What happens to the objects when we stretch them?

Why do you think some objects stretch more easily than others?

Are objects made of certain materials more likely to stretch than others? Why do you think that is?

In this investigation you will:

- test and record how far your materials stretch when they're pulled
- Record if the material returns to its original shape after stretching.

Use the template on the next slide to record your predictions.

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Lesson Four: How far can it stretch?

My predictions

Choose a material, record your ideas in the table.

MATERIAL ONE	MATERIAL TWO	MATERIAL THREE
What material is strip one made of?	**What material is strip two made of?**	**What material is strip three made of?**
What do you predict will happen? Explain why.	**What do you predict will happen? Explain why.**	**What do you predict will happen? Explain why.**

EXPLORE

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Lesson Four: How far can it stretch?

Doing the investigation

1. On an A4 piece of paper, use a ruler to measure out a line, marking the start and finish points.

2. Place the first material you're testing on the start line. Mark and label where it reaches to.

3. Hold the 'start' end of your material firmly and use your other hand to stretch the material out as far as it can go.

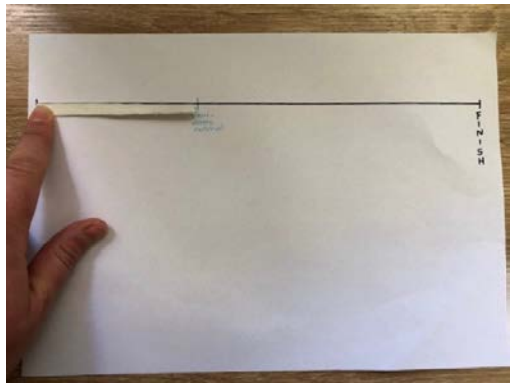
4. Mark how far the material stretched and where it ended when it moved back.

(You might need someone to help you with this part!)

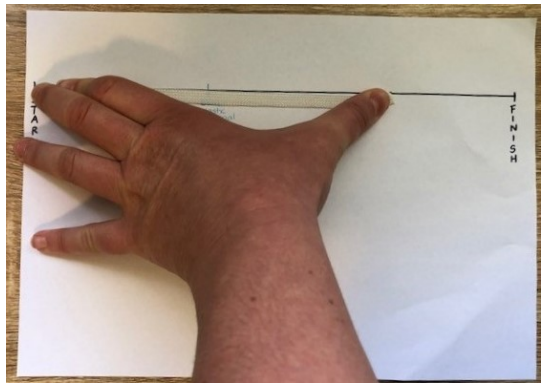
5. Measure all the distances you've marked. Record them in the table on the next slide.

6. Repeat these steps with your other two materials.

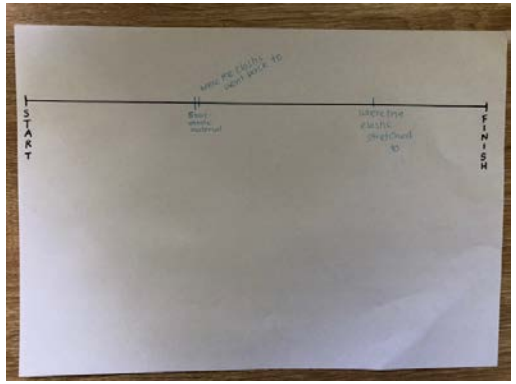
Step 1



Step 2

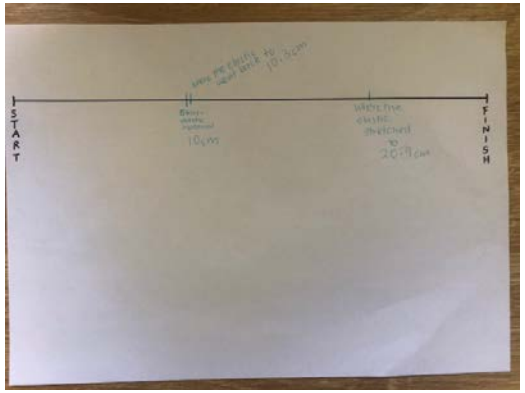


Step 3



Step 4

Step 5a



Step 5b

EXPLORE

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Recording your data

Use the table below to record the data you gathered during your investigation.

Material	Original length	Where it stretched to	How many cm it stretched (original length – where it stretched to)	Length it went back to
For example **Elastic material**	10cm	20.9cm	10.9cm	10.3cm
Your results				
Your results				
Your results				

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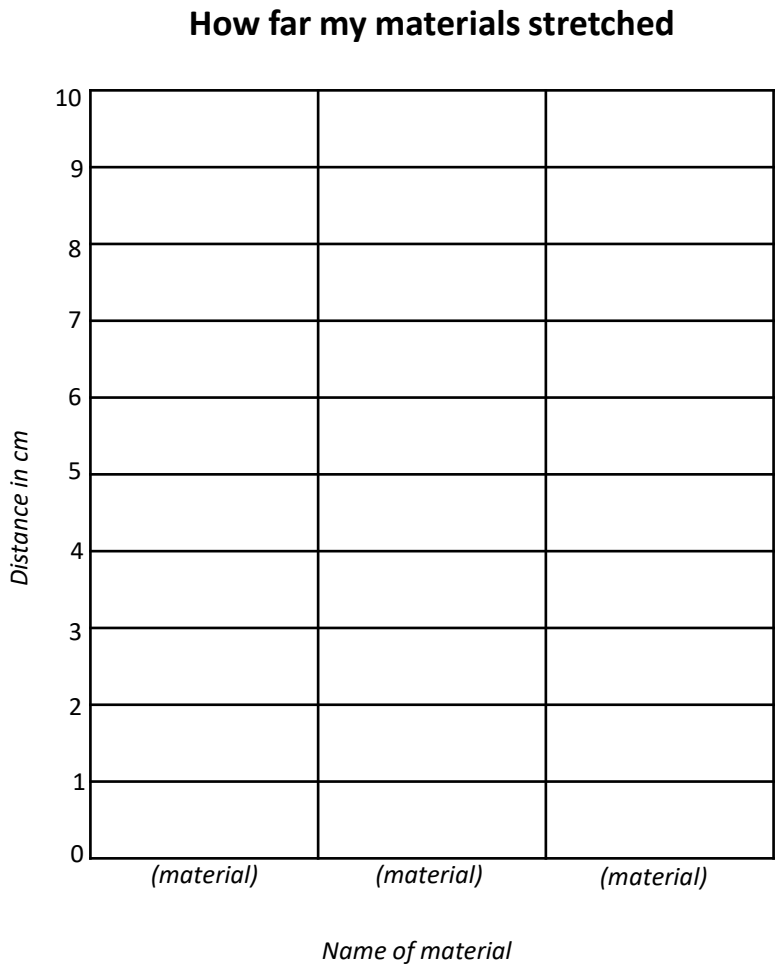
Lesson Four: How far can it stretch?

Graphing your data

Use the table below to create a column graph displaying the data you gathered during your investigation.



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After the investigation

How do my predictions compare to my observations?	
What is my claim? To help you think about this consider your responses to these questions: - What makes a material stretchable? - How do know that? - What materials stretch? - How do you know that? - What does the data you collected tell you?	
What objects/items are made using stretchable material? Why do they use stretchable material?	

Share your and the information about what happened when doing your investigation with your teacher, classmates and family.

See slide notes for discussion prompts

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Lesson Five: It's in the bag!

EXPLAIN

YOU WILL NEED

PAPER

PENS AND PENCILS

See slide notes for lesson objectives

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Lesson Five: It's in the bag!

Which bag is best?

Which bag would be the best choice to carry each item and why? Click and drag to match your thinking; explain your thinking.

You have these three bags

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And these three items

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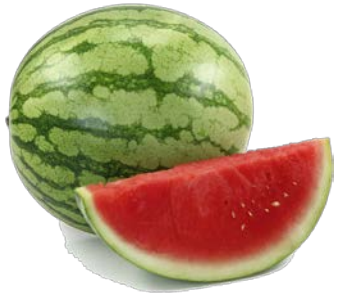

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Object	Bag	Explain: Why did you make that choice?

EXPLAIN

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Lesson Five: It's in the bag!

Puzzling over plastics

Plastics are a processed material used to make things such as bank notes, milk containers, toys and clothing.

Where do plastics come from?
Most plastics today are manufactured from oil which is a valuable, limited resource. Some plastics can be recycled.

Properties and uses of plastic
All plastics are easy to shape. Objects made from plastics are generally lighter than similar objects made of other materials.

Some plastics do not let electricity or heat pass through them, and can be used to keep us safe. Unlike glass, most plastics do not shatter when dropped and so will not break or cut people.

Plastics are waterproof. They will not rot like wood or rust like steel. This means that objects made from plastic last for a long time.

The future
Scientists are researching ways to develop biodegradable plastics that are made from renewable resources such as plants. For example, one Australian company has invented a new type of plastic made from corn starch.

Images © Australian Academy of Science

Optional further reading
How do plastic bags harm our environment and sea life?
https://education.abc.net.au/newsandarticles/blog/-/b/2926988/curious-kids-how-do-plastic-bags-harm-our-environment-and-sea-life
The future of plastics https://www.science.org.au/curious/earth-environment/future-plastics

After reading the text *'Puzzling over plastics'*, and thinking about what you have learned in your investigations, complete the PMI chart.

Plus (+)	**M**inus (-)	**I**nteresting (?)

See slide notes for discussion prompts

EXPLAIN