SCIENCE

Uses of everyday materials

Hello scientists of Year 2,

Question: Why don't we drink water from cardboard cups? Why don't we wear socks made of paper?
This half term in science we are going to be learning about properties of everyday materials and how this makes them useful for us.
This will be a very creative science topic where we will be discovering lots of information about the amazing materials around us.

Miss Wetz and Miss Wilson

Lesson 1 – Introduction to everyday materials and their uses

Think back to your science learning in Year 1. Can you remember learning about everyday materials? Can you remember what kinds of materials you learned about?

Miss Nakkas and Mr Knight taught you about wood, plastic, glass, metal and more! These are all materials. Objects are all made from materials.

Task 1
We are going to go on a scientific scavenger hunt to look for different objects made from everyday materials in your home!

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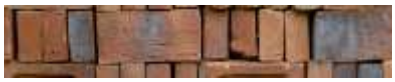
You have 10 minutes to find as many objects as you can in your home made from the 10 different materials below. On your marks, get set, GO!

Material	**Objects in your home**
Wood 	
Plastic 	
Glass 	
Metal 	
Brick 	
Paper 	
Cardboard 	
Fabric 	

Well done, scientist scavengers!

Task 2
Now have a discussion with a partner, or write down some thoughts in response to these questions about the objects made from different materials that you found:

How did you know what materials the objects were made from?
Was it because of how they looked?
Was it because of how they felt?

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Did you know because the object is usually made from a certain material, for example, windows are nearly always made from glass?

Challenge

Toy building bricks used to be made from wood. Why do you think they are now usually made from plastic? Discuss.

Lesson 2 – Properties of materials

Starter

Miss Wilson has received 4 new recycling bins from the council.

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Can you help her sort the items below for recycling according to the material they are made from?

Well done. Now we have recapped some of the different materials we learned about last lesson, it's time to start today's lesson on **properties** of materials.

What are properties of materials?
Properties are adjectives we use to describe materials. For example, comfortable, bendy, waterproof, keeps heat in, easy to clean. These words/phrases are all properties, and they can all be used to describe the plastic material used to make wellington boots.

Here are some of the properties of brick. Miss Wilson used the properties vocabulary list on page 12 to help her.

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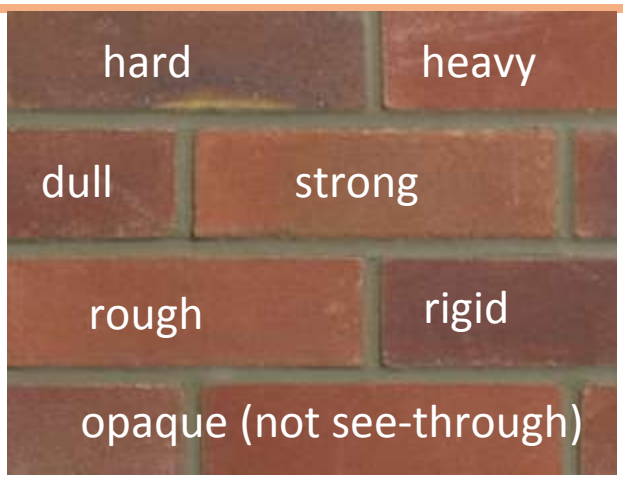

Here is a fun video which describes the properties of some more materials:
https://www.youtube.com/watch?v=xOKr462HLc0

Task 1
Join the **material** to an **object** that can be made from the material, and then to its **properties**. You may want to cut these out or write them down to match them. Miss Wilson has done one for you.

metal	table	gets hot easily, easy to clean
fabric	t-shirt	transparent and waterproof
plastic	toy bricks	soft and stretchy
wood	window	hard and strong
glass	pan	strong, can be chopped into different shapes

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Task 2

Miss Wetz loves chocolate! For her birthday, Miss Wilson bought Miss Wetz a chocolate teapot but Miss Wetz thought this was a rather silly birthday present.

Do you think we should make teapots out of chocolate? Why? Why not?

Some materials are better suited for certain uses than others. The properties of chocolate means that chocolate is not a good material to make a teapot from.

A teapot needs to be made from a material which is fairly strong, doesn't leak, is easy to clean, gets hot easily and would not shatter if accidentally dropped.

Are there any materials you can think of which could be used to make a good teapot because of the material's properties? Discuss with a partner or write down your thoughts using this sentence frame:

I think that _____ could be used to make a teapot from because it is _____.

Now think about the materials that you think should not be used to make teapots. Explain why to a member of your family.

Lesson 3 – All about Charles Macintosh

This is Charles Macintosh. He invented a very helpful material which we use a lot! Can you guess what the material was that he invented?

Task 1
Read through the PowerPoint saved on the online school to learn all about Mr Macintosh and his clever invention.

Task 2
Today, you are going to become the next Charles Macintosh by creating a waterproof coat for one of your toys. You need to find the best material to make the coat.

First of all, think about what properties make a good coat. Miss Wilson says the best coats are soft on the inside but waterproof on the outside. Miss Wetz says she likes coats that are brightly coloured so that she is visible when she crosses the road. What properties do you like in a coat?

Now, test which materials have the properties you want for your toy's coat. Gather some different materials from your home that might make a good coat, like cling film, a tea towel, paper etc. See if you can find around 5 different materials.

Experiment with these materials to see which works best for a coat. Can you think of some ways to test out whether or not your coat is a success?

If you are feeling stuck, watch Mr Brain and his team carry out an investigation on waterproof materials: https://www.youtube.com/watch?v=4nd42ISTOJI&t=

Task 3
Evaluate the materials you used for your toy's coat. Make sure you use words to describe the properties of the materials you used.

My coat is/is not a success because …
The materials I used were … because they are …
If I were to make another coat, I would …

Challenge
Tinfoil is made from a material called aluminium, which is type of metal. Tinfoil is waterproof but it is not a good choice of material for a waterproof coat. Can you think why?

Hint: think about its other properties. If you have tin foil in your home, play around with it to help you.

Lesson 4 – Squashing, bending, twisting and stretching
Some materials are rigid. This is a property which means the material cannot be made to change shape easily.

This is Miss Wilson's pet rock. This rock is rigid.
Can we squash it? Bend it? Twist it? Stretch it?
No! We cannot easily change the shape of this rock. We would need strong tools to do that.

Now, what about Miss Wetz's pet, the slime monster?
Do you think that slime is a rigid material?
No, slime is not rigid – we can squash it, bend it, twist it and stretch it!

Miss Wilson and Miss Wetz's pets are extreme examples. One is totally rigid, and the other changes shape very easily. Can you think of any materials that can squash but not stretch for example?

Miss Wetz says, "I can squash a sponge but if I try to stretch a sponge, it will rip!"

Task 1

See if you can change the shapes of some everyday materials like drinks cans (be careful!) and socks. Fill in the grid below with your results (a larger version of this grid is available on page 13).

Object	Can You Squash It?	Can You Bend It?	Can you Twist It?	Can You Stretch It?
drinks can				
pipe cleaner				
sock				
drinking straw				
playdough				
bath towel				
sponge				
elastic band				

Task 2

Now we know that some materials are more rigid than others, and some are less rigid than others, we can think about why these properties make different materials useful. Discuss the following questions with a partner.

Why is it useful that we can squash an empty drinks can?

Why is it useful that drinking straws have the property of being bendy?

Why is it useful that bath towels can twist?

And why is useful that socks have the property of being stretchy?

Lesson 4 – Engineering the best bridge

When scientists carry out investigations, they must record everything that they do clearly and carefully. That way, their investigation can be shared with other scientists.

A couple of weeks ago, we investigated which materials can be used to make waterproof coats. Today, we will be carrying out another investigation and this time we will be focusing on recording our investigation clearly and carefully.

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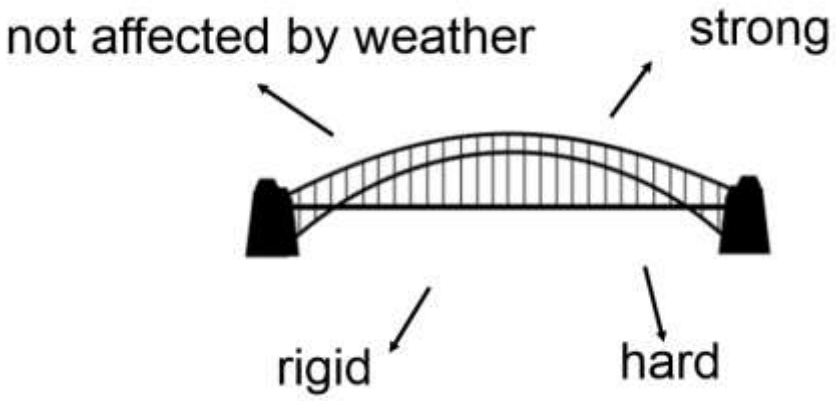
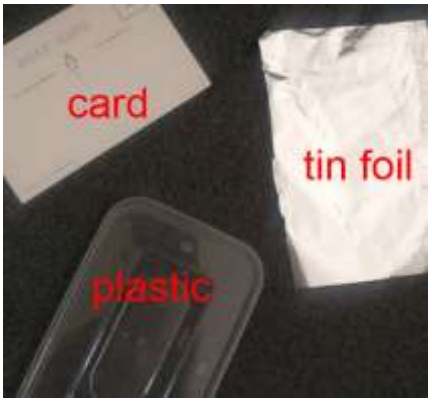
Our investigation today is: **what is the best material to use to build a bridge?**

First of all, let's think about the properties of bridges.



Are there any materials you can think of that might have the properties that the bridge needs? Here are some ideas…

Now let's get to our investigation!

Step 1	Gather some materials that you want to test. These are the materials Miss Wetz is going to test. She has made sure they are all roughly the same size to make sure the investigation is fair. 
Step 2	Make a prediction. Which material do you think will be the best to make a bridge with? Why?

Step 3	Perform a test to see if the bridge is strong and rigid enough to hold weight on it so people can cross the bridge safely. Miss Wetz tested the strength of her materials by balancing them between two chairs with a gap in the middle. She placed objects on the materials to see how much weight they could hold. 
Step 4	Perform more tests! Sprinkle water on your materials – would they survive in heavy rain? Blow heavily on them – are they stable in heavy wind? How else could you test your materials to see if they are suitable to use to build a bridge?
Step 5	Evaluate your results. Which of your materials has the best properties to make a bridge? Were your predictions correct?

Extension

Now that you know which materials are best to use when building a bridge, design your dream bridge on paper. You could research famous bridges to help you with your design, or use your imagination!

If you are ready to become a real engineer, you could then build a miniature version of your design!

Miss Wilson's favourite bridge is the Millennium Bridge in Gateshead. It is only used by pedestrians and cyclists, it can tilt to let ships through and it lights up at night! Miss Wilson is using this bridge to inspire her own design.

Lesson 6 – Sustainability

We know that plastic is bad for the environment if it is not properly recycled. Instead of plastic drinks bottles, lots of companies sell metal or glass bottles as these materials are more **sustainable** (better for the planet).

Out of metal and glass, which is the better material for a drinks bottle? Think about the properties of metal and glass and explain your reasoning.

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This is Miss Wilson's metal bottle. It keeps drinks cool and is very light to carry but it gets scratched and dented.

This is Miss Wetz's glass bottle. It has a lovely design and was very cheap to buy but she is worried that it will smash if she drops it.

Miss Wetz and Miss Wilson have been thinking. Although metal and glass bottles are much better than plastic bottles, there must be a better material which we could use to create sustainable drinks bottles!

Task

Today you are a scientist who must create a new material to make the best drinks bottle yet.

Consider…

What will you call your material? Will you name it after yourself like Charles Macintosh did?

What properties will this material have? Can it keep water very cold? Is it light so that it is easy to carry?

How is this material better than plastic, metal or glass?

How will you let customers know about your water bottle made from this new material? Could you create a poster or a TV advert?

Lesson 2 – Properties of materials vocabulary

hard
not easily broken or pierced

A hard diamond.

squashy
easily crushed or squeezed

The play dough is squashy.

smooth
an even and regular surface

Some smooth pebbles.

absorbent
able to soak up liquid

The sponge is absorbent.

bumpy
uneven, raised patches

This shell is bumpy.

opaque
cannot be seen through

She is hidden by the opaque screen.

dull
lacking shine or brightness

The moth's wings are dull.

brittle
hard, but may break easily

The glass is brittle.

translucent
allowing some light to pass through

The screen is translucent.

rigid
unable to be bent or forced out of shape

Stone is rigid.

transparent
can be seen through

This glass is transparent.

soft
not firm to the touch

The kitten has soft fur.

flexible
able to bend

A flexible spring.

rough
uneven, irregular surface

The log has rough bark.

waterproof
repels water and liquids

A waterproof coat.

elastic
springs back once stretched

An elastic band.

shiny
reflects light, smooth surface

A shiny silver spoon.

conductor
lets heat, electricity or sound to pass through it

Some metals are conductors of electricity.

Lesson 4 – Squashing, bending, twisting, stretching grid

Object	Can You Squash It?	Can You Bend It?	Can you Twist It?	Can You Stretch It?
drinks can				
pipe cleaner				
sock				
drinking straw				
playdough				
bath towel				
sponge				
elastic band				