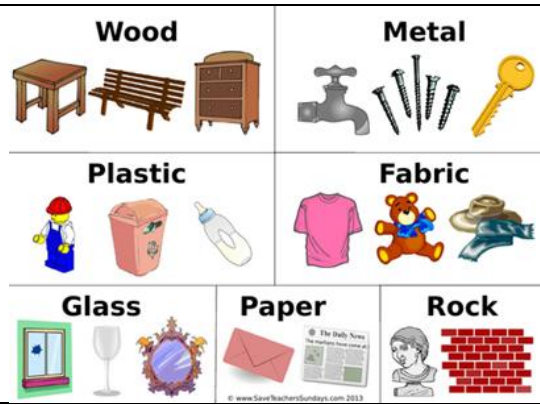
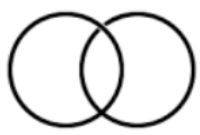


Materials - Chemistry						
Observe Changes over time	Group and classify	Research Using Secondary Sources	Carrying out comparative and fair tests	Seeking patterns	Asking questions	Reason and explain
Science coverage NC	<ul style="list-style-type: none"> <li>Distinguish between an object and the material from which it is made.</li> <li>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</li> <li>Describe the simple physical properties of a variety of everyday materials.</li> <li>Compare and group together a variety of everyday materials on the basis of their simple physical properties.</li> </ul>					
Science coverage Working Scientifically	<ul style="list-style-type: none"> <li>asking simple questions and recognising that they can be answered in different ways</li> <li>observing closely, using simple equipment</li> <li>performing simple tests</li> <li>identifying and classifying</li> <li>using their observations and ideas to suggest answers to questions</li> <li>gathering and recording data to help in answering questions.</li> </ul>					
Links to previous learning	Use all their senses in hands-on exploration of natural materials. Explore collections of materials with similar and/or different properties. Talk about the differences between materials and changes they notice.					
Links to future learning	Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials) Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials) Magnets – year 3 Light – year 3					
Misconceptions	Some people think that plastic is only one property, but it can be transparent, translucent or opaque. Some people think that material is another word for fabric but materials means what objects are made from.					
Key vocabulary	<b>material</b> - what objects are made from <b>flexible</b> – can bend or change shape easily. <b>rigid</b> – can't bend or change shape. <b>shiny</b> – a smooth glossy surface. <b>dull</b> – not shiny. <b>smooth</b> – No lumps or bumps. <b>rough</b> – It feels or looks bumpy or uneven. <b>transparent</b> – all light passes through <b>opaque</b> – no light passes through <b>translucent</b> – some light passes through					
Key knowledge	An object can be made from different materials. Examples of materials are: plastic, glass, metal, wood, fabric, rock and paper Shadows are made when the light is blocked. You have to put the correct material in the correct bins. Mixed recycling is sorted in a factory and then taken to different factories to be turned back into materials we can use again. Some materials are man-made, and some are natural. Plastic is man-made in a factory. Wood and paper are natural materials and comes from trees. Rock and metal are natural materials and come from underground.					



What is it made from?



**materials** - what objects are made from

An object can be made from different materials.

Examples of materials are: plastic, glass, metal, wood, fabric, rock.




Some people think that material is another word for fabric but materials means what objects are made from.

**Retrieval task:**  
Tell me about the life cycle of a butterfly.

Activate task: <https://explorify.uk/en/activities/odd-one-out/fascinating-forks>

**ODD ONE OUT**

### Fascinating forks

Save
Mark as done?
Classroom view

1. Show the three images above and ask everyone to come up with as many similarities and differences as they can. If they get stuck, prompt them to think about:

- appearance
- what they do
- where they might be found

2. Then, everyone needs to decide which one is the odd one out and why. Encourage a reason for every answer and there is no wrong answer!

Background information

These images show three different kinds of forks each used for a different purpose: a household fork, a BBQ fork and a wooden chip fork.

When designing products, materials are selected based on their properties and how they behave in different conditions.

Metal has been used to make the prongs of the household and BBQ forks because of its strength and durability; both items need to be able to withstand repeated use. They have handles made from other durable materials. The plastic handle of the household fork and the wooden handle of the garden fork both provide a comfortable grip whilst continuing to meet the design brief. Both forks are waterproof, the household fork will need washing after each use and the BBQ fork must withstand repeated contact with the juices of cooking meats. The heat resistance of both forks means they can be in contact with hot foods and remain usable. This means the BBQ fork prongs will not melt when they come into contact with an open flame and are very long to protect the user from the fire.

The wooden fork can afford to be less durable. It has a significantly shorter lifespan as it is designed for single use. Whilst single-use items are not ideal, being a natural material, it is a slightly more sustainable alternative to using disposable plastic forks.

Clarify that the same object (fork) can be made from different materials.

An object can be made from different materials.

Lesson plan

What is a material? **materials** - what objects are made from

<https://www.youtube.com/watch?v=xOKr462HLc0>  
<https://www.youtube.com/watch?v=2td5mfqf1O>

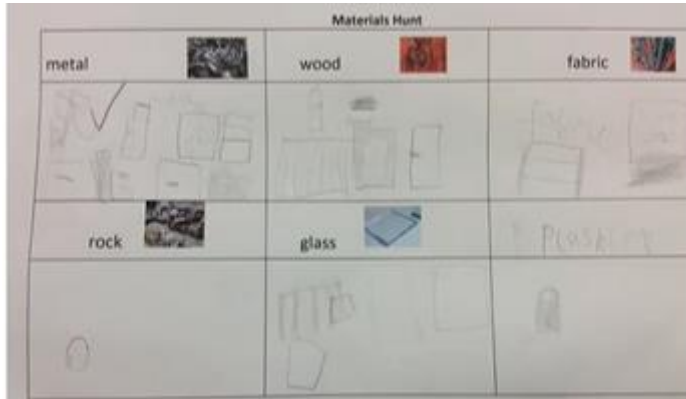
Whole class - Show some examples of different materials and discuss what the name of each is. Use metal, wood, fabric, rock, glass, plastic.

Examples of materials are: plastic, glass, metal, wood, fabric, rock and paper.

Address the following misconception

Some people think that material is another word for fabric but materials means what objects are made from.

Materials hunt around school to identify the materials that objects are made from. Record materials from the materials hunt around school using drawings and classify into a prepared table.



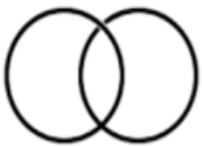
**Review task** – how many materials can you name?

**Teacher assessment**

**Still need more depth of learning**

**Shows strong understanding**

Can you describe the properties of material?



**flexible** – can bend or change shape easily.

**rigid** – can't bend or change shape.

**shiny** – a smooth glossy surface.

**dull** – not shiny.

**smooth** – No lumps or bumps.

**rough** – It feels or looks bumpy or uneven.

**Retrieval task:**

Thinking about types of weather – what is sleet?

**Activate task:**

<https://explorify.uk/en/activities/odd-one-out/write-away>

📷 ODD ONE OUT

## Write away



Save  Mark as done?

Classroom view

1. Show the three images above and ask everyone to come up with as many similarities and differences as they can. If they get stuck, prompt them to think about:

- appearance
- what they do
- where they might be found

2. Then, everyone needs to decide which one is the odd one out and why. Encourage a reason for every answer and there is no wrong answer!

Background information

These images show three different types of writing tool: a pencil, a ballpoint pen and a quill.

Pencils are made in a factory. They have a 'lead' (a mixture of graphite, clay and water) running through the centre of a wooden outer case and a coating of paint to make them comfortable for the user to hold, a great example of natural and synthetic (human-made) materials coming together. Pencils require sharpening to remain usable and this produces a disposable layer of pencil shaving. Pencils can be sharpened again and again until they become too small to use.

The ballpoint pen or biro is also factory made and entirely synthetic. It has a plastic ink reservoir running through the middle of a hollow tube called the barrel. This outer case is made from smooth, transparent plastic so that it is comfortable to write with at the same time as allowing the user to see how much ink is left. Pens like the one pictured are disposable and need replacing once the ink runs out. Some ballpoint pens have replaceable ink reservoirs.

Quills were popular up until the 19th century when the biro was invented. They were made using a natural material, the moulted flight feathers of large birds such as geese, swans and turkeys. The hollow shaft acted as an ink reservoir and was shaped at the tip using precise cutting tools to provide a sharp point to write with. The tips occasionally needed re-sharpening with a special knife meaning there was eventually very little left, and a replacement was needed.

**Lesson plan:**

Look at the that's not my books and the words that are used. Describe how the [pages feel].



Task: Look at the following vocabulary with the children. Can they identify objects that are:

- Shiny- a smooth glossy surface
- Dull- Not shiny
- Rough- it feels and looks uneven or bumpy
- Smooth - no lumps or bumps.
- Flexible – able to bend or change shape easily.
- Rigid – not able to bend or change shape.

Children to collect items with these properties in pre-made sorting tables and take photos.

shiny	dull	flexible	rigid	rough	smooth
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**Review task** – List some properties of materials

<b>Teacher assessment</b>	<b>Still need more depth of learning</b>	<b>Shows strong understanding</b>
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What is it?



**materials** - what objects are made from

**flexible** - can bend or change shape easily.

**rigid** - can't bend or change shape.

**shiny** - a smooth glossy surface.

**dull** - not shiny.

**smooth** - No lumps or bumps.

**rough** - It feels or looks bumpy or uneven.

Retrieval task: Define key vocabulary

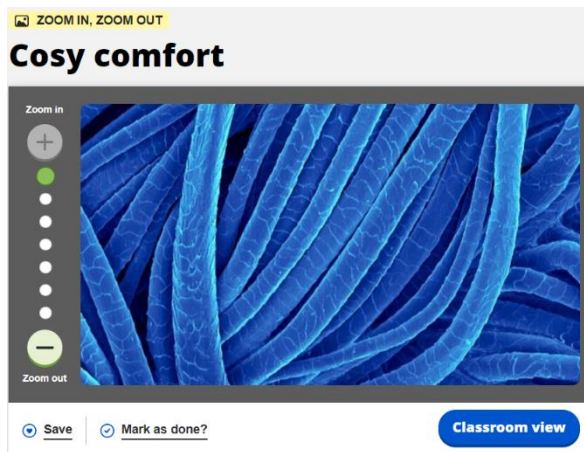
**materials** - what objects are made from

**flexible** - can bend or change shape easily.

**rigid** - can't bend or change shape.

Activate task:

<https://explorify.uk/en/activities/zoom-in-zoom-out/cosy-comfort>



You will be zooming in and out of the image above - starting very close and stepping back slowly.

1. Start by asking everyone:

- What do they think the image is and why?
- What does the image remind them of and why?

2. Every time you zoom out, ask the class:

- Can they describe the colours, shapes and textures?
- What do they think the image is now - have they changed their minds?

Background information

Wool is excellent at keeping people (and sheep) warm because it is a good **insulator**. That means that it is harder for heat energy to pass through this material than some other materials that are poor insulators. One of the reasons that it provides good **insulation** is that it has lots of small air pockets within it, and 'trapped' air that cannot move easily. This is increased even more when it is knitted, as the fabric produced has spaces for air to be trapped within it.

<https://explorify.uk/en/activities/zoom-in-zoom-out/fuzzy-friend>



# Fuzzy friend



Save

Mark as done?

Classroom view

You will be zooming in and out of the image above – starting very close and stepping back slowly.

1. Start by asking everyone:

- What do they think the image is and why?
- What does the image remind them of and why?

2. Every time you zoom out, ask the class:

- Can they describe the colours, shapes and textures?
- What do they think the image is now – have they changed their minds?

## Background information

Farnell was a teddy bear manufacturer founded in London, who started making bears in 1906-8 – when they would have been a popular toy choice for children. This teddy bear is around a hundred years old and is part of the Science Museum's collection. These traditional teddy bears would have been made by hand, using a sturdy cotton fabric, which had shiny, soft mohair fibres woven into it. Mohair comes from the angora goat and is also used to make jumpers.

Describe this material – Go and find something soft, hard, etc

## Task:

Make some tubs which you can't see through and add some different objects made from different materials. The children need to shake the tubs and make predictions about what it might contain using their learning about materials and their properties.

## Review task –

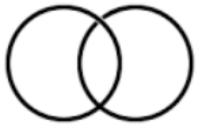
List some properties of materials

### Teacher assessment

### Still need more depth of learning

### Shows strong understanding

Does light travel through it?



Shadows are made when the light is blocked.

**transparent** – all light passes through  
**opaque** – no light passes through  
**translucent** – some light passes through

Some people think that plastic is only one property, but it can be transparent, translucent or opaque

**Retrieval:** Define the vocabulary:

Flexible – able to bend or change shape easily.

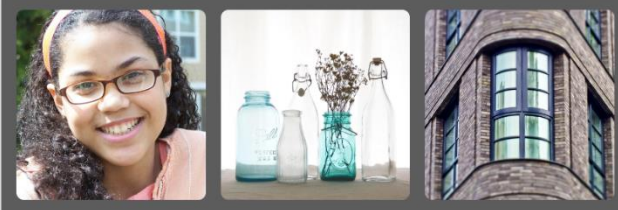
Rigid – not able to bend or change shape.

**Activate task:**

<https://explorify.uk/en/activities/odd-one-out/through-the-looking-glass>

📷 ODD ONE OUT

### Through the looking glass



Save  Mark as done? [Classroom view](#)

1. Show the three images above and ask everyone to come up with as many similarities and differences as they can. If they get stuck, prompt them to think about:

- appearance
- what they do
- where they might be found

2. Then, everyone needs to decide which one is the odd one out and why. Encourage a reason for every answer and there is no wrong answer!

#### Background information

The images show glass being used in three different objects: a window, bottles and spectacles (or glasses). Glass has many useful properties – it's transparent, waterproof, hard and strong; especially when toughened.

Each use of glass shows at least one of these properties. Glass is used to make windows because it is transparent, hard and waterproof. It is used to make bottles, as it is waterproof and can be moulded into different shapes. Glass can also be shaped into lenses, which focus light to form images. Lenses are used in spectacles, telescopes and microscopes.

#### Lesson plan

Discuss the 3 key words

**transparent** – all light passes through

**opaque** – no light passes through

**translucent** – some light passes through

Children to sort a range of materials into these 3 groups on a pre-made sorting table, using a torch.



transparent

translucent

opaque

Discuss the misconception that some people think that plastic is only one property, but it can be transparent, translucent or opaque. Show an example.

Discuss the material properties needed for a window and discuss bathroom windows and why they might not be transparent.

Children to use a range of materials and a torch to try and create shadows to explore that shadows are formed when light is blocked. Investigate the shadows when using translucent, transparent and opaque materials. This will link to future work in year 3 on light and shadows.

**Review task**

What do the words transparent, translucent and opaque mean?

**transparent** – all light passes through

**opaque** – no light passes through

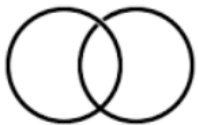
**translucent** – some light passes through

**Teacher assessment**

**Still need more depth of learning**

**Shows strong understanding**

Why is it important to know what material it is made from?



You have to put the correct material in the correct bins.

**Retrieval task**

Match up the key word to its definition:

**transparent** – all light passes through

**opaque** – no light passes through

**translucent** – some light passes through

**Activate task:** What do you know about this image?



**Task**

<https://www.bbc.co.uk/bitesize/articles/z9w26sg>

Children to match up the bin colours for Tameside to what materials can go in them.

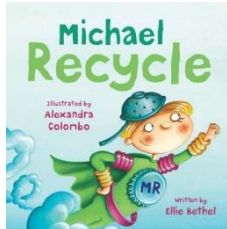
You have to put the correct material in the correct bins.





Children to sort a range of rubbish into the correct bins.

Read this book Michael Recycle



**Review task**

What are the colours of bins and what are they for?

**Teacher assessment**

**Still need more depth of learning**

**Shows strong understanding**

What happens to our rubbish?



Mixed recycling is sorted in a factory and then taken to different factories to be turned back into materials we can use again.

**Retrieval task**

Match up the key word to its definition:

**transparent** – all light passes through

**opaque** – no light passes through

**translucent** – some light passes through

**Activate task:** What is this image? What is it making you think?



<https://recycleforgreatermanchester.com/what-happens-to-my-waste/>

<https://recycleforgreatermanchester.com/education-and-learning/virtual-sessions/>  
take part in a virtual tour

### Our virtual classroom sessions delivered by our Education Officer include:

- A virtual tour of the Materials Recovery Facility where mixed recycling is sorted
- Right Stuff, Right Bin interactive activity
- A chance to ask your recycling questions and get expert answers

**Give or display the following selected items to each group:**

- Steel can
- Aluminium can
- Plastic bottle PET (Clear)
- Plastic Bottle HDPE (opaque)
- Glass jar
- Foil

**Display the clue sheets on the whiteboard or wall:**

- Magnet
- Hammer
- Sieve
- Bellows/bike pump
- Torch



Encourage the children to think about the materials and properties of each item:

- Light or heavy
- Transparent or opaque
- Breakable
- Magnetic - This will link to work in year 3 on magnets

Ask the group to discuss how the items in the bag could be separated mechanically. The clues should prompt some ideas.

The aim at this stage is to keep it simple and allow creative problem-solving ideas. It would be unlikely that they would know how to separate aluminium.

To sum up – The MRF does have a series of machines to carry out each method of separation. Watch our Education officer explaining the answer. <https://youtu.be/byDYzybupCQ>

Watch this video about putting the wrong items in the recycle bins <https://www.youtube.com/watch?v=dvidNOX4uPU&t=5s>

Children to use the magnets to explore which materials are magnetic.

### Review task

Mixed recycling is sorted in a factory and then taken to different factories to be turned back into materials we can use again.

Give a way that mixed recycling is sorted.

### Teacher assessment

### Still need more depth of learning

### Shows strong understanding

Where do materials come from?



Some materials are man-made, and some are natural.

Plastic is man-made in a factory.

Wood and paper are natural materials and come from trees.

Rock and metal are natural materials and come from underground.

### Retrieval task:

Match up the key word to its definition:

**transparent** – all light passes through

**opaque** – no light passes through

**translucent** – some light passes through

### Activate task:

<https://explorify.uk/en/activities/listen-what-can-you-hear/material-world>

LISTEN, WHAT CAN YOU HEAR?

## Material world

01:40

Save Mark as done? Classroom view

1. You're going to listen to a short sound clip then 'reveal' a matching image. The aim isn't to find right answers, it's to explore ideas and find out what they know.

- Do they know what they are listening to?

2. After you've listened to the sound clip, lead a discussion with your class:

- Have they heard these sounds before? What was going on when they did?
- Do you ever hear sounds like these in school? Do you make them yourself?
- What is it about the sounds in the clip that gives you a clue to each material?

3. Reveal the matching image – is it what they expected to see? Does it change their ideas?

The sounds you can hear are being made by a variety of different materials: a glass window smashing, heavy crockery being laid on a wooden table, metal sheets crashing together and a piece of sandpaper being folded and then used to sand a piece of wood.

Materials have different properties - their physical characteristics, e.g. a material might be flexible or rigid, absorbent, hard, soft, transparent or opaque.

The particular properties of a material – which can be seen, felt and (as this activity shows) also heard – helps us identify it. They also help us decide which materials are best suited for a particular object or purpose. For instance, you wouldn't want to make a teapot out of chocolate or a raincoat out of sponge!

### Task

Ask the children - How is wood made?

[The Woodshop: Where does wood come from? - YouTube](#)

Ask the children – where does paper come from? (trees)

<https://www.bbc.co.uk/teach/class-clips-video/primary-science-how-paper-is-made/zryb92p>

Where does metal come from?

<https://www.bbc.co.uk/teach/class-clips-video/primary-science-how-is-steel-made/zfnyrj6>

See if the children have any questions about other materials – what are they curious about? What questions do they have:

**Review task –**  
 Some materials are man-made, and some are natural.  
 Plastic is man-made in a factory.  
 Wood and paper are natural materials and comes from trees.  
 Rock and metal are natural materials and come from underground.

<u>Teacher assessment</u>	<u>Still need more depth of learning</u>	<u>Shows strong understanding</u>

Common strengths	Common weaknesses	Notes for subject leader	Pupils who still need more depth of learning	Shows strong understanding