

Autumn Block 3

Materials

Small steps

Step 1

Explore materials – wood, plastic, glass and metal

Step 2

Explore materials – rock

Step 3

Objects and materials

Step 4

Melt and freeze

Step 5

Float or sink?

Step 6

Does it absorb water?

Step 7

Investigate materials

Key resources

Step 1 – Explore materials – wood, plastic, glass and metal

- selection of objects made with different materials
- large hoops



Step 2 – Explore materials – rock

- selection of rocks for children to sort
- large hoops
- hand lenses
- labels: hard, heavy, light, rough, smooth
- balance scales



Step 3 – Objects and materials

- sorting hoops
- selection of objects made from different materials

Step 4 – Melt and freeze

- ice cubes (enough for children to hold in their hands)
- small toys frozen in blocks of ice
- selection of objects for children to use to melt ice, e.g. hairdryer, blanket, gloves



Step 5 – Float or sink?

- large container filled with water
- selection of objects made from different materials



Key resources

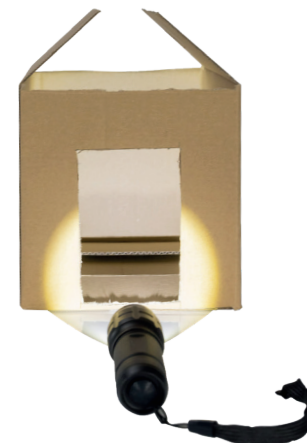
Step 6 – Does it absorb water?

- cardboard
- plastic bag
- foil
- cotton wool roll
- pipette
- tray
- timer



Step 7 – Investigate materials

- cardboard box with cut-outs
- foil
- cling film
- black card
- cotton
- torch
- sticky tape
- scissors



Explore materials – wood, plastic, glass and metal



Notes and guidance

In this small step, children begin to explore materials. They focus on wood, plastic, glass and metal objects and sort them into different categories, such as hard and soft. They should sort the same collection of materials in different ways and should be encouraged to come up with their own criteria when sorting objects into groups.

Encourage children to find simple similarities and differences between materials. They may need support with using correct scientific vocabulary to describe different materials. Build a word bank that children can use throughout the block to address this.

Things to look out for

- Children may think that materials can only be sorted in one way.
- Children may focus on sorting based on the material only. Encourage children to think about other categories for sorting, such as texture, size or mass.

Key questions

- What material is this?
- How could you describe this material?
- What is the same about these materials?
- What is different about these materials?
- How could you sort these materials?
- Which object belongs in this group?
- Which object does not belong in this group?
Why does it not belong in this group?
- How many ways can you think of to sort these materials?

National curriculum links

- Describe the simple physical properties of a variety of everyday materials.
- **Working scientifically** – Identifying and classifying.

Explore materials – wood, plastic, glass and metal

Key vocabulary

- **material** – what an object is made from



- **soft** – a material that feels gentle to touch



- **hard** – a material that does not easily change shape



- **shiny** – a smooth surface that can reflect light



- **dull** – not clear, bright or shiny



Practical ideas

- Put a large pile of objects in front of the children.

There should be objects made from wood, plastic, glass and metal.



Introduce the new key vocabulary and allow children to handle the objects to feel whether they are rough, smooth, heavy, light, soft or hard.



Children can test whether objects are shiny or dull by observing their reflection.

- Use the same large pile of objects and sort them into two groups. Ask children to identify how the objects have been sorted. Put the objects back into one large pile and ask children if they can think of another way they can sort the objects into groups.
- As an extension, play games with children such as “Guess my rule” or “Odd one out” to challenge their understanding of materials.

Factual knowledge

- Objects are made from different materials.
- Materials can have different textures.

Explore materials – rock

Notes and guidance

In Step 1, children sorted different objects into groups based on properties such as shiny or dull. In this small step, children build on this knowledge to explore rocks.

This step lends itself to practical activities such as rock hunts and using simple equipment to observe rocks closely. Children are introduced to using hand lenses in this step. This skill should be modelled by an adult to teach them how to use a hand lens correctly.

Children do not need to name different types of rock during this step as this vocabulary is not introduced until Year 3

Key questions

- Is _____ made from rock?
- How would you describe the texture of this rock?
- Why is rock a good material for _____?
- What is the same about these rocks?
- What is different about these rocks?
- How could you sort these rocks into groups?
- Which rock is heavier?
- Which rock is lighter?
- What can you see when you look at this rock closely?

Things to look out for

- Children may think that all rocks have the same properties, such as colour or texture. Show children a range of examples of rocks to address this misconception.
- Some children may not realise that rocks can be shaped and used as a material in everyday life, such as in buildings.

National curriculum links

- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.
- **Working scientifically** – Observing closely, using simple equipment.

Explore materials – rock

Key vocabulary

- **rock**



- **heavy** – difficult to lift
- **light** – easy to lift



- **rough** – an uneven surface



- **smooth** – an even surface



Practical ideas

- Complete a rock hunt with children.

Walk around the school grounds and ask children to collect rock samples.

Use hand lenses to observe the different rocks closely.

What can they see?

What is similar?

What is different?



- Put five large labels on the floor.

hard

heavy

light

rough

smooth

Ask children to sort the rocks they have found to match the labels.

Discuss the examples that could be placed into more than one category.

Factual knowledge

- There are different types of rock.
- Rocks come in different shapes, sizes and textures.
- Rocks can be used to build things, such as walls or buildings.

Objects and materials



Notes and guidance

In this small step, children explore the difference between objects and the materials they are made from. It is important that children explore objects that are made from wood, plastic, glass, metal, rock and fabric. By the end of this step, children should name common objects and identify the materials they are made from.

Children should have the opportunity to sort a range of objects made from the same material and the same object made from different materials, e.g. a wooden spoon and a metal spoon.

In this small step, children only need to name the materials they identify and not define them.

Things to look out for

- Children may not be able to tell the difference between an object and the material it is made from.
- Some children may think certain objects are always made from the same material, for example, all spoons are made from metal.
- Children may have limited vocabulary to describe objects and materials. This may need to be revised before they complete the practical tasks.

Key questions

- What is this object?
What material is it made from?
- Can you find another object that is made from _____?
- How can we sort these objects?
How else can we sort the objects?
- What is similar about these objects?
- What is different about these objects?
- How have these objects been sorted?
How else could you sort the same objects?

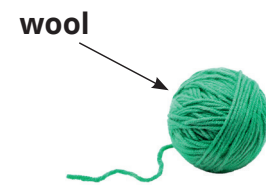
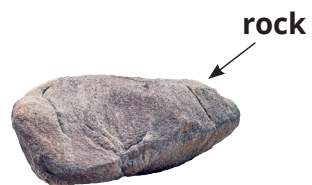
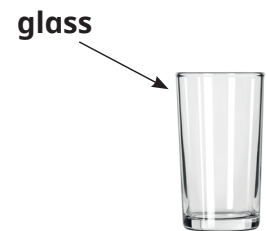
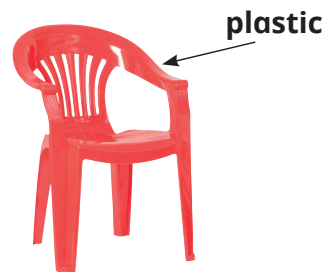
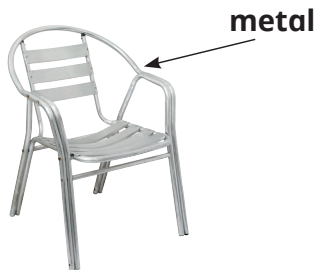
National curriculum links

- Distinguish between an object and the material from which it is made.
- **Working scientifically** – Identifying and classifying.

Objects and materials

Key vocabulary

- **object** – something that can be seen and touched
- **material** – what an object is made from



Practical ideas

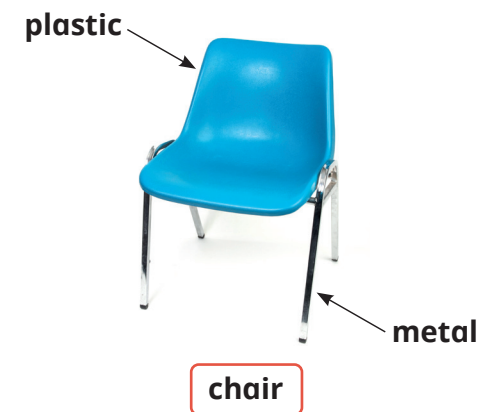
- Provide children with the same object made from different materials.

Ask them to sort the objects based on the material they are made from.

- Complete a material hunt around school.

Ask children to name objects and identify what material they are made from.

Children could draw and label the object and materials.



Factual knowledge

- Objects are made from different materials.
- Objects can be made from different materials depending on what they are used for.

Melt and freeze



Notes and guidance

In this small step, children continue to focus on materials and explore the simple processes of melting and freezing.

Children should be given the opportunity to work practically throughout this small step to observe how some materials melt and freeze. By the end of this step, they should identify that water needs to be frozen to turn to ice and ice needs to be heated up to melt.

Children do not need to be introduced to the term “degrees Celsius” to describe temperature changes, as this is introduced in Year 2. Children should experience melting and freezing through hands-on learning. Wherever possible, link these processes to real-life examples, such as ice cream melting and ice cubes being made in a freezer.

Things to look out for

- Children may not recognise that melting and freezing are reversible changes.
- Children may think that water is not a material as it is not solid like other materials they have explored in this block.

Key questions

- How are water and ice similar?
- How are water and ice different?
- What happens to ice when it is heated?
- What happens to water when it is put in the freezer?
- How could we change this water to ice?
- How could we remove this toy from the ice block?
What could we use to make it easier?
- What other ways can you think of to melt the ice?
- Which would be the quickest way to melt the ice?

National curriculum links

- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock.
- **Working scientifically** – Performing simple tests.

Melt and freeze

Key vocabulary

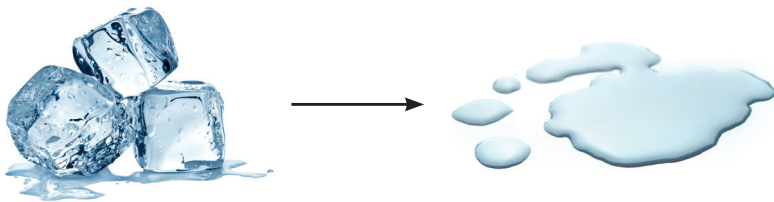
- **solid**



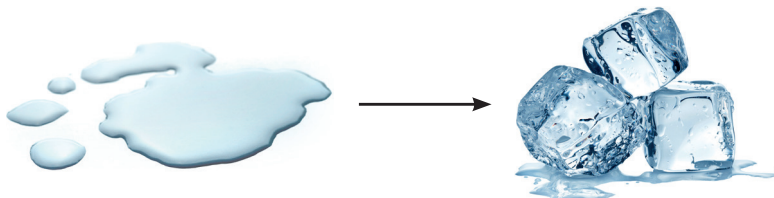
- **liquid**



- **melt** – when a solid changes to a liquid



- **freeze** – when a liquid changes to a solid



- **ice** – water as a solid/frozen water

Practical ideas

- Take some ice cubes and place them onto each child's hand.



Children should observe the ice as it is melting.

Ask children what is happening and why they think it is happening.

- Collect some water.

Ask children how it is the same or different to ice.

Children should pour water into an ice cube tray and freeze it.

Check the ice cube tray at regular intervals over the day so children can observe the water turning to ice.

- Freeze a toy in water.

Ask children to suggest ways the toy could be released from the ice. Have a selection of tools such as a hairdryer, a blanket and a pair of gloves. Children should work with an adult to find a way to release the toy. Which method melted the ice the quickest? Why?



Factual knowledge

- When water freezes, it turns to ice.
- When ice melts, it turns to water.

Float or sink?



Notes and guidance

In this small step, children explore different materials to see whether they float or sink when placed in water. Children should predict which objects will float or sink. They can then carry out a short investigation to see whether their predictions are correct. Children should test a wide range of objects made from different materials. Encourage them to identify both the object and the material it is made from.

Throughout the investigation, children record data in a simple table, using ticks to indicate whether the objects float or sink. At the end of this step, children should sort the objects again and try to spot any simple patterns between the materials.

Things to look out for

- Children may think the larger an object is, the more likely it is to sink. Ensure children test a selection of objects of different sizes and masses to avoid this.
- Some children may think that objects made of the same type of material will all sink or float.

Key questions

- What does “float” mean?
- What does “sink” mean?
- Do you think this object will float or sink?
- Why do you think these objects will float or sink?
- How would you know if an object is floating?
- How would you know if an object has sunk?
- Can you sort these objects into those you think will float and sink?

Was your sorting correct?

- Can you sort the objects again into groups depending on whether they float or sink?

National curriculum links

- Compare and group together a variety of everyday materials on the basis of their simple physical properties.
- **Working scientifically** – Gathering and recording data to help in answering questions.

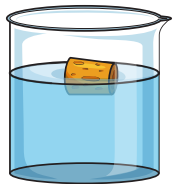
Float or sink?

Key vocabulary

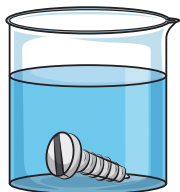
- **heavy** – difficult to lift
- **light** – easy to lift



- **float** – when an object stays on top of the water



- **sink** – when an object falls to the bottom of the water



- **material** – what an object is made from

Practical ideas

- Show children a selection of objects made from different materials.

Include objects of different sizes and masses.



Allow children to hold and feel the objects.

Ask them to predict which objects will sink and which will float and to sort the objects into groups according to their predictions.

Ask them to explain their reasoning.

Place the objects in a bucket filled with water and ask children to identify whether the object floats or sinks.

Encourage children to compare their findings to their predictions.

Factual knowledge

- Some materials float in water. This means they stay at the top.
- Some materials sink in water. This means they fall to the bottom.

Does it absorb water?



Notes and guidance

In this small step, children carry out a simple comparative test to explore which materials are able to absorb water. They rank or sort materials based on whether they would be appropriate to clear up a water spillage. Before the test, it is essential that children have a clear understanding of the term “absorb”. This can be modelled by an adult using a sponge and water.

By the end of this step, children should understand that some materials absorb water and some do not. They should use observations to identify which material has absorbed the most water and the least water.

Use a pipette to measure the amount of water for each material. This will be the first time children have used a pipette, so they will need to practise this before carrying out the experiment. Children will not yet have been introduced to millilitres in maths. Make a visual mark on the pipette so they can clearly see that the same amount of water is being used each time.

Things to look out for

- Children may think that if the water is absorbed by the material, then it has disappeared. Show them that the water can be removed by squeezing the absorbent material.

Key questions

- What material is this?
What does it feel like?
- Do you think this material will absorb water?
- Which material will absorb the most water?
Why?
- Which material will absorb the least water?
Why?
- What will we keep the same each time?
- What is different each time?

National curriculum links

- Compare and group together a variety of everyday materials on the basis of their simple physical properties.
- **Working scientifically** – Using their observations and ideas to suggest answers to questions.

Does it absorb water?

Key vocabulary

- **absorb** – when liquid is taken in by a material

Experiment variables

- **independent variable** (what will change) – the type of material used



- **dependent variable** (what will be measured) – children will observe whether the material absorbs the water or not



- **controlled variables** (what is kept the same) – the size of the material, the amount of water used and the time before checking to see if the water has been absorbed



Equipment needed

- cardboard
- plastic bag
- foil
- cotton wool roll
- pipette
- tray
- timer



Method

1. Cut an 8 cm × 8 cm square from each material.
2. Mark the amount of water to be added each time on the pipette.
3. Ask children to feel the materials and predict which will absorb the most water and which will absorb the least.
4. Put one material into the tray.
5. Slowly add the water on top of the material and start the timer.
6. After one minute, check to see whether the material has absorbed the water.
7. Repeat the test using the other materials.
8. Ensure the tray is dry before testing the next material.
9. Sort the materials based on whether they absorbed water or not.

Investigate materials

Notes and guidance

In this small step, children carry out a comparative test to explore the best material for curtains. They should identify that curtains need to be easily opened and closed without losing their shape and should let only a small amount of light pass through. Children perform simple tests on a range of materials before identifying the most suitable material.

In this investigation, children are introduced to the terms “transparent” and “opaque”. The term “translucent” should not be used in this step as it is introduced in Year 2. Children use torches to explore how much light passes through a material.

Experiment variables are identified for adults. Children do not need to use these terms at this stage. However, children should be able to identify what they will change and keep the same when carrying out an experiment. This should be discussed as a whole group before they begin the experiment.

Things to look out for

- Children may not understand the hazards of using torches. They need to be taught how to safely use this piece of equipment and should be aware that it can damage the eyes if shone directly into them.

Key questions

- What does “transparent” mean?
- What does “opaque” mean?
- Which material will be the best for curtains? Why?
- Which material will be the worst for curtains? Why?
- What was kept the same?
- What was changed?

Enquiry question

- Which material would be the best for a pair of curtains?

National curriculum links

- Compare and group together a variety of everyday materials on the basis of their simple physical properties.
- **Working scientifically** – Using their observations and ideas to suggest answers to questions.

Investigate materials

Key vocabulary

- **transparent** – materials you can see through
- **opaque** – materials you cannot see through

Experiment variables

- **independent variable** (what will change) – the type of material



- **dependent variable** (what will be measured) – the amount of light that passes through



- **controlled variables** (what is kept the same) – the size of the material, the model of the house and the position of the torch



Equipment needed

- cardboard box
- foil
- cling film
- sticky tape
- black card
- black cotton
- torch
- scissors



Method

1. Cut a hole in the front and the top of a cardboard box.
2. Show children the foil, cling film, black card and cotton.
3. Ask children to feel the materials to test whether they are stretchy or stiff.
4. Ask children to predict which material will be the best to use for curtains.
5. Stick the first material across the front cut-out of the house using sticky tape.
6. Shine the torch on one side of the material and ask children to observe through the cut-out on the top of the box.
7. Is the material transparent or opaque?
8. Encourage the use of the terms “transparent” and “opaque” in their observations.
9. Repeat this process with the three other materials.
10. Identify the material that is most appropriate for a pair of curtains.