

# ACET Junior Academies'

## Scheme of Work for Science

### Big Idea - Materials

#### Year 2 – Uses of Everyday Materials



#### About this unit:

##### PoS – Uses of everyday materials

This unit builds on the Y1 'Everyday materials' unit. There the students should have learnt to differentiate between an object and the material from which it was made, and to be aware that different materials have different properties. Some students will have developed the ability to describe the properties of materials. This ties in with other work in Y1 – Identifying animals, and work that has been done in Y2 when looking at habitats. In all of these cases, the focus has been on identifying features of living things, or properties of materials, and using key terms to describe them.

Students are now going to move to the next level, which is to look at the different ways in which we use materials. In Y5, they will move on to *link* the properties and uses of materials; in Y2 they don't need to say 'why' we use a material in a particular way, but they need to develop an awareness of all the possible uses, and be constantly reminded that different materials have different properties, and that we can use key terms to describe them. Use opportunities to remind students where they have done this before, to illustrate that this is a particular way of working in science.

There are lots of opportunities to develop investigative skills in this unit.

The students will need to go outside to gather information for their year book, and continue the study of the habitats that they began in Autumn.

#### Unit structure

This unit is structured around seven science enquiries:

1. What do you remember about materials?
2. What are materials used for?
3. Is it fit for purpose?
4. How can we find out more about properties?
5. Are materials always the same?
6. Investigating the differences between materials
7. What about wood?

#### Links to previous and future National Curriculum units

Y1 – Everyday materials – the entire units link together

Y1 – Identifying animals – concept of identifying features

- Y5 – Properties of materials

Enquiry 1: What do you remember about materials?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y1 – Everyday materials	EA – Identifying, grouping and classifying	<b>Can your children:</b> - Describe the properties of a material - State which material an object is made from	<b>Horizontal:</b>  <b>Vertical:</b> Y5 – Properties and changes of materials
	Asking questions Making predictions <b>Observing</b> and measuring		
	<b>Key concepts:</b>		
	Students should become familiar with the word 'property', and understand that they are describing the properties of materials.		
Key terms		Common misconceptions	
Wood, metal, ceramic, plastic, rock, fabric, glass, hard, soft, shiny, waterproof, strong, flexible/bendy		Students often associate the word 'material' with fabric. They should be aware of 'materials' as the substances from which things are made.	
Suggested activities		Resources	Useful links
Reviewing materials – Y1 information		Examples of different materials – fabric, rock, plastic, metal, wood, ceramic, glass	
Show the students examples of different materials – fabric, rock, plastic, metal, wood, ceramic, glass – preferably real examples rather than pictures.			
What words do we use to describe these materials? Students should volunteer words and descriptions of the different materials.			
They should start using the key words confidently.			
Use the word 'property' when describing the materials. Students should be aware that when they are using key words, they are describing the properties of materials. Reinforce this as much as possible – 'what <i>properties</i> does this material have?'			

Enquiry 2: What are materials used for?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y1 – Everyday materials	EA – Comparative/fair testing	<b>Can your children:</b> <ul style="list-style-type: none"> <li>- Identify objects which are made from two or more materials</li> <li>- Suggest a material for a certain purpose</li> </ul>	<b>Horizontal:</b>  <b>Vertical:</b> Y5 – Properties and changes of materials
	Asking questions		
	<b>Making predictions</b>		
	Observing and measuring		
	<b>Key concepts:</b>		
	Most objects are made from two or more materials.		
	Each material has a different job to do for the object.		
Key terms		Common misconceptions	
Wood, metal, ceramic, plastic, rock, fabric, glass, hard, soft, shiny, waterproof, strong, flexible/bendy			
Suggested activities		Resources	Useful links
<p>Spot different materials in the room. Now look at different objects around the room – how many are made from only one material, and how many are made from two or more materials?</p> <p>Most objects are made from two or more materials, and each material does a specific job.</p> <p>Show the students a pan (it should be metal, with a wooden handle). Why is it not all made of wood? Why is not all made of metal? Why isn't it made of plastic?</p> <p><i>You could show videos of wood and plastic burning/melting to illustrate why making a pan out of these materials isn't a good idea.</i></p> <p>Demonstration – why is the handle made of wood, not metal? Prepare three spoons – plastic, metal, wood – of a similar size, and short, if possible, with a small blob of butter on the top of the handle. Place the spoons into a bowl of hot water. Which butter melts first?</p> <p>If we made the handle of a pan from metal, we would burn our hands! Use the demonstration to reinforce the idea of scientists using evidence. The spoons in hot water <b>proves</b> that metal carries heat along it faster than wood and plastic.</p> <p>Students could survey outside, or around the school buildings – to find other objects which are made from two materials, each doing a different job.</p>		<p>Metal pan with wooden handle</p> <p>3 spoons of similar size – wood, metal and plastic</p> <p>Butter</p> <p>Bowl of hot water</p>	<p><a href="https://www.youtube.com/watch?v=pVwWjsabDXE">https://www.youtube.com/watch?v=pVwWjsabDXE</a> Spoons and butter</p>

Enquiry 3: Is it fit for purpose?														
Links to previous learning		Scientific skills		Assessment criteria	Curricular links									
Y1 – Everyday materials		EA – Identifying, grouping, classifying		<b>Can your children:</b> - Find an object made from a particular material - State a property of a material that is linked to its function	<b>Horizontal:</b>  <b>Vertical:</b> Y5 – Properties of materials									
		Asking questions Observing and measuring <b>Recording data</b>												
		<b>Key concepts:</b> Some materials can be used in lots of different ways. Different materials are good at different jobs												
Key terms			Common misconceptions											
Wood, metal, ceramic, plastic, rock, fabric, glass, hard, soft, shiny, waterproof, strong, flexible/bendy														
Suggested activities			Resources	Useful links										
<p>Show a hammer hitting a nail into wood – it's important to show this to students rather than just a picture. Why is the hammer made from metal? Why isn't it made from jelly?</p> <p>Show a piece of carpet – why don't we make clothes from this? Why do we put it on the floor?</p> <p>Students should be encouraged to use key words about a material's properties in order to describe its function – 'we use metal for a hammer because it is hard'.</p> <p>Survey the classroom – find an object, or part of an object, made from each type of material (<i>Teacher to choose appropriate materials that are identifiable in the classroom</i>)</p> <table><tr><td>Place</td><td>Material</td><td>Use</td></tr><tr><td>Window</td><td>Glass</td><td>Lets light in and people can see through it</td></tr><tr><td>Window frame</td><td>Wood</td><td>Holds the glass in place</td></tr></table> <p>Task – can you make a tally chart of how many times each material is used? What is the material that is used most often in the classroom.</p>			Place	Material	Use	Window	Glass	Lets light in and people can see through it	Window frame	Wood	Holds the glass in place	Hammer, nail, wood		
			Place	Material	Use									
			Window	Glass	Lets light in and people can see through it									
			Window frame	Wood	Holds the glass in place									

Enquiry 4: How can we find out more about properties?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y1 – Everyday materials	EA – Pattern seeking	<b>Can your children:</b> - Suggest how to find out whether a material has a certain property - Identify some actions which will inform you about the properties of a material	<b>Horizontal:</b>  <b>Vertical:</b> Y5 – Properties of materials
	Asking questions Making predictions Observing and measuring <b>Interpreting and communicating data</b>		
	<b>Key concepts:</b>		
	Scientists find out about properties by investigating materials, and trying to change them. Scientists try and use key terms to tell people what they found out.		
Key terms		Common misconceptions	
Material, hard, soft, strong, stretchy, brittle, stretch, twist, squash,			
Suggested activities		Resources	Useful links
Elastic band, balloon, sock, aluminium foil, sponge, modelling clay.  Demonstrate pulling an elastic band. What happens when you stop pulling? What happens when you blow up a balloon? And when you let the air out? Students to investigate sock, foil, sponge and clay. <i>Before you start, get the class to consider how they will record their results. THEY DO NOT NEED TO DO THIS INDIVIDUALLY, however it's a good discussion to have. Make sure each group has a way of recording their results before they start – they don't need to have designed, or even drawn, a table themselves.</i>  Can you stretch it? Does it go back to its original shape when you stop? Can you twist it? Does it go back to its original shape when you stop? Can you squash it? Does it go back to its original shape when you stop? Choose a material to make a model with – you can use a combination if you like.  Make a model by using a combination of the materials you have been given. You need to explain how you made your model – which bits did you squash, squeeze or twist to make the shapes you want?		Elastic band, balloon, sock, aluminium foil, sponge, modelling clay.	

Enquiry 5: Are materials always the same?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y1 – Everyday materials	EA – Pattern seeking	<b>Can your children:</b> <ul style="list-style-type: none"><li>- Describe a way which a scientist might use find out about the properties of a material</li><li>- Tell you what they found out in today's investigation</li></ul>	<b>Horizontal:</b>  <b>Vertical:</b> Y5 - Properties and changes of materials
	Asking questions Making predictions Observing and measuring Recording data <b>Interpreting and communicating data</b>		
	<b>Key concepts:</b>		
	A material, e.g. metal, can have different properties depending on the shape it's in. When scientists have carried out an investigation, they need to be able to clearly tell someone else what they found out.		
Key terms		Common misconceptions	
Hard, strong, shiny, conduct, carry heat, carry electricity, heavy, light, scratch, change shape, break		'Hard' means how difficult it is to scratch. Strong means it doesn't get broken easily.	
Suggested activities		Resources	Useful links
Similar metal of different sizes – foil, wire, block (any kind of 'chunk', even a substantial spoon will do). Also some different types of metal.  Are they all metal? How do you know? Review Y1 – what makes a metal?  The focus of today's lesson should be to <b>communicate a conclusion</b> . In order to do this, students need to have discussed 'What we're trying to find out', and 'What we think the answers will be'. These <b>do not</b> need to be recorded in any way – just that students have an awareness of them when presenting their conclusions.  Are all metals the same? Things to investigate: Hardness – how difficult it is to scratch Strength – how difficult it is to break Shiny Mass (how heavy it is – it may be difficult to compare this if the size of the objects are different) *Conducting heat (see the demonstration with spoons in hot water) *Conducting electricity (set up a circuit with a lamp and two crocodile clips)		Similar metal in 3 forms – foil, wire, block (any 'chunk' of metal will do for comparison – even a substantial spoon).  Also some metals that are obviously different – steel, copper, iron  A circus of stations to investigate different properties – see left	

Property	Type of metal					
	Foil	Wire	'chunk'	Copper		
e.g. hardness						
<p>Pupils could record ticks/crosses, or a description of the property 'not very hard', or they could make a scale 1-5 of the property.</p> <p>Conclude – do all metals have the same properties?</p> <p>*Students do not need to use or understand the term conduct, they can say that an object 'carries' heat, or 'passes heat along it'.</p>						

Enquiry 6: Investigating the differences between materials			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y1 – Everyday materials	EA – Comparative/fair testing  Asking questions Making predictions <b>Setting up tests</b> Observing and measuring	<b>Can your children:</b> <ul style="list-style-type: none"><li>- Give you an example of how they made this test fair</li><li>- Tell you which kitchen towel is best</li></ul> <i>GD – can they tell you how many more marbles/blocks one KT can hold than another.</i>	<b>Horizontal:</b>  <b>Vertical:</b> Y5 – Properties and changes of materials
	<b>Key concepts:</b>		
	When we compare things, we have to keep lots of things the same, to make the test fair. When we are investigating, it's good to be able to <b>measure</b> something to get an answer. <i>They should be aiming to say how many more marbles/blocks one kitchen towel can use compared to the other.</i>		
Key terms		Common misconceptions	
Strong, break, more, less, the same, constant, change, measure			
Suggested activities		Resources	Useful links
Show an advert for kitchen towel, advertising how strong it is, even when wet.  Give the students three types of kitchen towel, a bowl (that the KT will fit over), elastic band, and some weights (e.g. marbles, small wood blocks) – try this first to ensure that the weights are appropriate.  Investigate which paper towel is the strongest. The kitchen towel will need slightly wetting, then weights placing on top.  Consider how to make this test fair – focus on all the things that need to be kept the same. Students should be made aware that each time you do the test (each time you use a different piece of towel), <b>ONLY</b> the towel is different.		Kitchen towel – 3 different types Bowls/beakers/containers that the kitchen towels will fit over the top of Elastic bands to secure the kitchen towel to the containers Small masses – e.g. marbles, small wood blocks	<a href="https://www.youtube.com/watch?v=NWdMS3wEnMI">https://www.youtube.com/watch?v=NWdMS3wEnMI</a> <ul style="list-style-type: none"><li>- Kitchen towel advert</li></ul>



Enquiry 7: What about wood?			
Links to previous learning	Scientific skills	Assessment criteria	Curricular links
Y1 – Everyday materials	EA – Pattern seeking	<b>Can your children:</b> - State 3 or more ways in which wood can be used  - Match the use of wood to a property	<b>Horizontal:</b>  <b>Vertical:</b> Y5 – Properties of materials
	Asking questions Making predictions <b>Observing</b> & measuring		
	<b>Key concepts:</b>		
	One material may have lots of different properties. You can link a material's properties to its uses		
Key terms		Common misconceptions	
Wood, strong, hard, flexible, splinters, smooth, flammable			
Suggested activities		Resources	Useful links
Show the different uses of wood – to include floors - perhaps the hall floor? or some other floor in the school; matches; telegraph poles; table top; cricket bat; climbing frames;  Collect together as many key terms and phrases about the properties of wood as you can.  Match the terms/phrases to the different uses of wood. As students do this they may think of more words or phrases – keep adding as you go along.  Students should conclude that different properties are important for different uses.			