

Prior learning

Year R – Floating and Sinking – Which materials will make the best boat? Which materials are waterproof?

The Three Little Pigs – Which materials will make the strongest houses and why?

Year 1 – Investigating and exploring a range of materials. Carrying out simple tests to identify which materials are waterproof and not waterproof?

Vocabulary

- Identify/ discuss
- Everyday material
- wood, metal, plastic, glass, brick, rock, paper and cardboard rubber
- smooth, rough, stretchy, bendy, stiff, soft, hard.
- suitable/ unsuitable
- purpose
- developed/invented
- observe/ identify/classify/ record

Snapshot

Identify materials and their properties in class and playground.
Use post it notes.
Spider diagram of

How can you change me?

How can you change my shape?

Have a range of materials you can and cannot manipulate into different

Real life scenarios.
Children as designers.
This is the design specification – what materials could you

Design:

Mrs Corbin has these materials. She needs you to design something useful for the school.

Give them a choice of 3 everyday objects.

Justify which materials they could use

Build

Children build their products, ensuring they link back to properties of materials and how their shapes can be changed. Test products are fit

Evaluate

Did it work/ not work? What went well, what would you do differently?

What made the materials suitable/ unsuitable in relation to their

Medium Term Planning

Year Group: 2

Term: Autumn 2

Topic: Materials

	Learning Objective	Input (including key questions and vocabulary)	Differentiation	Key Learning
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<p>Session 1</p>	<p>I can identify everyday materials and name their properties.</p>	<p>Starter: Teacher to ask children to name a variety of materials that they have learnt about previously (wood, plastic, glass, rubber, paper, metal, brick). What objects can you see in the classroom that are made of a particular material? Why is a material used for a certain object? Can you describe the properties of the materials? Are they waterproof/not waterproof?</p> <p>Next: On tables have sugar paper with the names of different everyday materials (as listed above) Children to add (in spider diagram) different uses of these materials linked to their suitability/properties. Are there any objects that can be made out of different materials e.g. spoon can be made of plastic/metal/wood but not glass? Why?</p> <p>Plenary: show same objects being made by different materials for example a spoon that is plastic, metal, wooden... why have these</p>	<p>Emerging children: Pre-teaching of key vocabulary to children.</p> <p>Mixed ability groupings.</p> <p>Challenge: why has this material been used? What other materials would have worked just as well? How do you know? What materials would not work and why?</p>	<p>To describe 3 different materials using their properties.</p>
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		<p>materials been used? What material do you think is the most suitable and why? What material wouldn't be appropriate for a spoon (e.g. glass) why?</p> <p>Repeat the same but with one material and its many uses e.g. show metal – can we list all the things that are metal e.g. it can be used for coins, cars, cans, table legs – what is the same about these objects and what is different? Does metal always look the same?</p>		
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<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Session 2</p>	<p>I can find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p>	<p>Recap previous learning and materials vocabulary.</p> <p>Starter: have a range of materials (Some that is more malleable one that is less malleable). What's the difference between them? Can you change them? How? Why?</p> <p>Introduce vocabulary: squashing, bending, twisting and stretching. Folding, - use this vocab when doing the starter – I am changing this material by folding etc.</p> <p>Task: Have a range of materials on tables. How can you change me? How can you change my shape?</p> <p>Have a range of materials you can and cannot manipulate into different shapes – children explore, discuss and record findings.</p> <p>Children to complete results table in their books.</p>	<p>Emerging children: To complete activity in a small group with TA to scribe for them.</p>	<p>Identify one or more materials that can have its shape change.</p> <p>Identify one or more materials that cannot have its shape changed.</p>
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		Material	Can you change me?	How can you change me?	Can the change be reversed?	If you can't change me why not?		
		<p>Plenary: what did we find out? What materials can or cannot be changed? Why/why not?</p>						

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Session 3</p>	<p>I can identify and compare the suitability of a variety of everyday materials.</p>	<p>Starter: Introduce idea of people who have developed new materials e.g. Here is a design specification. All the roads are made of dirt and stone and unsuitable for wooden wheels and horses' hooves. We need a new material for the roads. What could we use? What properties do the material/s need? As a class write a list of what would be needed to make an effective road.</p> <p>Introduce John McAdam who developed tarmac. (Can also use John Dunlop or Charles Macintosh.) https://www.bbc.co.uk/bitesize/clips/z7fnvcw</p> <p>PowerPoint: How roads were made.</p> <p>Input: Children as designers! In groups/pairs children are given real-life problems/design specifications on cards that they have to resolve by identifying a suitable material/materials based on their properties. Children to discuss suitable materials fit for purpose and record their ideas in</p>	<p>Mixed-ability groupings</p> <p>Extension: should the roads be made of a flat material? Draw out the discussion around water running off the roads so puddles don't form.</p>	<p>Be able to identify a suitable material to solve at least one real-life scenario.</p>
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a way of their choosing (drawing/diagram/writing/labelling). Children to present their ideas and justify their choices, audience to pose questions about their design and suitability of materials.

Ensure that discussions always come back to materials, their properties and what it is about the material that would make it effective being used this way. Also encourage chn to reflect – have they chosen the best material? Are there any other materials they could choose instead?

On sugar paper – TA to scribe:

Real life problem	Effective material	Why?
Write in the problem as a class in this section	Discuss and choose the most effective	Use the properties to explain why it is effective. Could also

			material and add it here	include why other materials would not be		
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<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Session 4</p>	<p>I can choose and justify appropriate materials for a particular purpose.</p> <p>I can ask simple questions and recognise that they can be answered in different ways.</p>	<p>Recap previous learning and refer back to working wall.</p> <p>Present children with a letter/email from Mrs Corbin. Mrs Corbin has these materials. She needs you to design something useful for the school. Children are given a choice of 3 or 4 possible everyday objects that they could design using the skills and knowledge they have acquired over previous lessons. For example a fruit bowl, a ball, a pencil holder, rain hat /tent for teddy bear, Frisbee, pencil pot, fruit box/container, cushion to sit on outside. (focus is on the properties of the material).</p> <p>Encourage discussion about how these could be created e.g. could use wooden dowel and blue tack to make the structure then cover it with appropriate fabric –e.g. tin foil, plastic (ikea bag), encourage discussion about resources: e.g. spray bottles to test in rain/washing up, could use</p>	<p>Children to work in mixed-ability pairs.</p>	<p>To choose an appropriate material and justify my choice.</p>
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	<p>catfood boxes and cover them with fabric/ plastic for fruit containers.or pencil pots, .</p> <p>Children to choose 1 and plan in groups or pairs. Generate questions about what properties the materials need and why. Then justify which materials they could use.</p> <p>Record questions, ideas and justifications in books – in their chosen format. Model a variety of suitable examples.</p> <p>For example choose one of the everyday objects, model drawing what it will look like and labelling the materials. Model writing why that material is the best one and why.</p> <p>Plenary: share what we will make with what material and why</p>		
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<p style="text-align: center;">Session 5</p>	<p>I can use suitable materials for a particular purpose.</p>	<p>Recap previous learning. Refer to yesterday and give children time in their pairs to look at their plans from the previous day. Children to discuss: What are we making? What materials have we planned to use? Why will we use these materials?</p> <p>Discuss this with the children and discuss how we will know if the material is fit for purpose. For example: If we need it to be strong we could put something on top of it, if we need it to be waterproof it is important that we test it by pouring water on to it.</p> <p>Teacher to have their own design/material examples to demonstrate this with.</p> <p>How will we ensure that we carry out a fair test? Same size materials, same amount of water used, same weight etc.</p> <p>In their pairs, children to identify what they need to test to ensure that their product will be</p>	<p>Mixed-ability pairs.</p> <p>TA to scribe for emerging children</p>	<p>To verbally identify something that needs testing and explain how it can be tested fairly.</p>
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effective and how they will ensure they carry out a fair test.

Children to record this in the table below (first three columns only). Children can use words/pictures to show what they will do. Ask pairs to fill in the table with words or pictures to show what they are doing and what they found out.

My product	What I need to test	How I will test this	Results

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<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Session 6</p>	<p>I can perform a simple test.</p>	<p>Recap previous learning. Refer to yesterday and give children time in their pairs to look at their plans and tables from the previous day. Children to discuss: What is my product? What materials are we testing? How will we do this fairly?</p> <p>In their pairs, children to test the materials are fit for purpose.</p> <p>Plenary: Record their results into the table. Does anything need changing? Have we chosen the best material? Teacher to model different ways to evaluate their products, choices and suitability.</p>	<p>Mixed ability pairs.</p> <p>TA to support emerging children in recording results.</p> <p>Challenge: Children to record reason they know the material is suitable.</p>	<p>To be able to perform a simple fair test.</p>
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<p style="text-align: center;">Session 7</p>	<p>I can use suitable materials for a particular purpose</p> <p>I can use my observations and ideas to evaluate and answer questions.</p>	<p>Recap previous lesson – discuss any changes that needed to be made as a consequence of previous findings.</p> <p>Refer back to plan and model making the final product with the most appropriate material. When making it refer back to why this material is the best one – using vocab about properties.</p> <p>When they have made their products in their groups children can then test the suitability “in real life” e.g. if pencil pot use it to store pencils.</p> <p>Did the product work? Was it fit for purpose – write a sentence in book to describe how the product turned out and whether it was suitable or not. Could draw picture and label more specifics – which parts were very effective, which parts could now do with adapting?</p>	<p>Mixed ability pairings.</p>	<p>To be able to evaluate my product and answer simple questions about it.</p>
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		<p>Plenary: present the product to the class - did your product work? Why? Why not? Why did you choose that material? Were there any other materials that would have also worked? Did it work/ not work? What went well, what would you do differently?</p> <p>What made the materials suitable/ unsuitable in relation to their properties and how their shapes could be changed.</p> <p>Chn to have the opportunity to ask each other questions about their product.</p>		
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- To be able to generate questions.
- To describe that shapes of some materials can be changed and name an example;
- To describe that different materials have different properties and to give an example.
- To describe how two different materials have different properties.
- To be able to test materials for suitability