



Year One Science: Materials



Scientific enquiry types covered in this topic

	Classifying, identifying and grouping
	Comparing and Fair Testing
	Pattern Seeking
	Research
	Observing over time

Knowledge of working scientifically covered in this topic

	Making predictions	Children consider in advance what might happen or what they might find
	Asking and answering questions	Raise questions about the world around them and begin to recognise that they can be answered in different ways
	Observing	Use simple equipment to observe closely
	Measuring	Make simple measurements using non-standard units (big, small, bigger, smaller, louder, faster, steps etc)
	Recording data	Gather data to help answer questions
	Performing simple tests	Perform simple tests
	Presenting results	<i>Not covered in Year One</i>
	Drawing conclusions	Tell others what they did and what they found out

Lesson Structure

- Build on **prior learning**
- Encourage students to **recall** that prior learning
- **Make** the new **learning** in each lesson succinct, **clear** and meaningful
- **Share/model/instruct** the new knowledge to students in small manageable steps
- **Check** they are with you throughout and are grasping the knowledge
- Provide opportunity to recall and **practise** the knowledge
- Provide live **feedback** during practise
- Provide opportunity to **apply** that new knowledge in a slightly different context
- Encourage students to **deepen** their understanding with challenging tasks that requires thinking, reasoning and explaining.
- **Check** students have secured the new knowledge with a quiz





Prior learning: In Reception, children used their senses to explore the world around them and begin to understand that there are different materials with different uses.

Meet some brilliant scientists...



John Dunlop was a scientist who invented inflated tyres made out of rubber.



Charles Macintosh was a Scottish scientist who invented a waterproof rubber fabric.

1. What is the difference between objects and materials?

We will learn about the difference between an object and materials by searching for and investigating a variety of objects in our classroom, for example, marbles, paper clips, socks, rubber bands, comics, cups, pencil sharpeners, lolly sticks.



Brilliant scientists know what 'objects' and 'materials' are

2. What are the properties of materials?

We will learn about the properties of materials, using our senses to describe how objects in a feely bag feel, then using our sight to describe. We will play a memory game, each adding an item and using a word to describe its property, saying all of the words that were said before.



Brilliant scientists can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock

3. How do brilliant scientists group objects by their properties?

We will recap our learning about the properties of materials and use this to help us group objects by their properties, and recording our results by photographing our groups.



Brilliant scientists can group materials by their properties

4. What is the best material for a crash mat?



Humpty Dumpty will challenge us to find the best material to make him a crash mat. We will carry out a comparative investigation to find how successful each material is as a crash mat, predicting first and then testing how successful they are to protect Humpty.



Brilliant scientists can compare and group materials by their properties

5. Which objects will float or sink?



We will learn to make predictions about which objects will float or sink, then carry out our own simple test to sort objects by whether or not they float.



Brilliant scientists can compare and group materials by their properties

6. Which objects are the stretchiest?

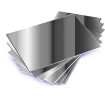
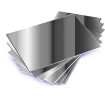
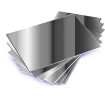
We will carry out a comparative investigation to answer the question 'Which objects are the stretchiest?'



Brilliant scientists can compare and group materials by their properties

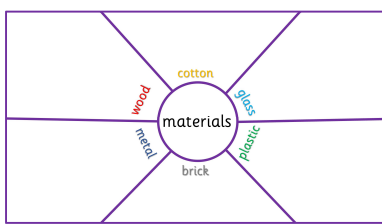
Key vocabulary: Glossary

classify	to sort things into groups	materials	what objects are made of
predict	make a sensible guess about what might happen	observation	using our senses to discover what is happening
compare	to describe how things are similar or different	object	a thing which you can see or touch
investigation	a test to find out the answer to a question	properties	something about an object that we can measure, see or feel

	Year One Science: Materials	Session 1: What's the difference between objects and materials?															
Learning Objective		Brilliant scientists can identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock															
	'Sticky' Substantive Knowledge	I know what 'objects' and 'materials' are															
	'Sticky' Disciplinary Knowledge	I can record using a table															
	Scientific Enquiry Type	Classifying, identifying and grouping															
Recap / Retrieval		Introduce key materials scientists – Charles Macintosh and John Dunlop.															
Share knowledge and vocabulary		Introduce key word 'object' orally and in text. Explain it as a thing that you can see and touch. Show some objects, e.g. fork, cushion, lolly stick, beaker, jug. Play Kim's game, asking what is missing. When they know, ask what the object is made of. Introduce key word 'material' orally and in text. Explain that materials are what objects are made of.															
Model		Introduce disciplinary knowledge of 'tables', ensuring they understand that it is a method or organising data. Explicitly model how tables work. Model adding labels to pictures of the objects in a table e.g.:															
		<table><tr><td>object</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>material</td><td>metal</td><td>cotton</td><td>wood</td><td>plastic</td><td>glass</td></tr></table>		object						material	metal	cotton	wood	plastic	glass		
object																	
material	metal	cotton	wood	plastic	glass												
Do and Check		Children to complete own table add labels to pictures of things within the classroom.															
Including scaffolding		<table><tr><td>object</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>material</td><td>wood</td><td>plastic</td><td>glass</td><td>metal</td><td>cotton</td></tr></table> <i>Scaffolding:</i> Some children could work in a group with an enlarged table between them, with sound buttons with labels on top and place labelled sound buttons in the correct place. Check children have added the correct label to each Picture and address any misconceptions before moving on.		object						material	wood	plastic	glass	metal	cotton		
object																	
material	wood	plastic	glass	metal	cotton												
Apply in context		Children to work in groups. Photograph objects around classroom and school. Teacher to print photographs out and place in pre-constructed table under correct labels (consider time management for printing photos and placing in table), e.g.:															
Including scaffolding		<table><tr><td>material</td><td>wood</td><td>plastic</td><td>glass</td><td>metal</td><td>cotton</td><td>brick</td></tr><tr><td>object</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> <i>Scaffolding:</i> Support children with reading labels as appropriate.		material	wood	plastic	glass	metal	cotton	brick	object						
material	wood	plastic	glass	metal	cotton	brick											
object																	
Reflect and review		Recap what an object is. Recap what a material is. What materials have we seen today? Play memory matching pairs game matching words (e.g. wood, plastic, glass, metal, cotton) to pictures of objects.															

	Year One Science: Materials	Session 2: What are the properties of materials?	
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Learning Objective	Brilliant scientists can describe the properties of materials		
 'Sticky' Substantive Knowledge	I know the properties of some materials		
 'Sticky' Disciplinary Knowledge	I can use my senses to observe carefully		
 Scientific Enquiry Type	Classifying, identifying and grouping		

Recap / Retrieval	 Children to have diagram of materials. Children to work in small groups to write as many objects as they can in each part of diagram. Scribe for children where needed. Children to feed back to share ideas. (Alternatively, you could do this as a whole class exercise)
Share knowledge and vocabulary	Introduce the word ‘properties’, explaining that it is something about an object that we can see, feel or measure. Use RWI flash card approach (my turn / your turn) to introduce key vocabulary of properties. Use flash cards with images to support afterwards. Discuss any words as necessary
Model	 Have an object (a glass jug) in a feely bag. Explain that you are going to describe the object by feeling, using your sense of touch (recapping previous science learning on senses). Describe e.g. smooth, hard, heavy.  Take the object out of the bag and place on the table. Explain that you are going to describe the object by observing, using your sense of sight. Describe e.g. shiny, see-through, clear.
Do and Check	Put children in 5 groups, each with a feely bag. Place e.g. a feather in the bag ask children each to feel without looking and describe, using the vocabulary practiced, or other words. Take it out of the bag and describe further using sight. Repeat for a number of objects, e.g. sandpaper, a coin. Each time, as a class create a spider diagram for the object, with a photo of the object in the middle of the flipchart, adding appropriate vocabulary to describe, either from the list previously practiced or new vocabulary.
Apply in context	Children to work in small groups with a variety of objects on their table a glass / cotton wool / a log / elastic band / metal spoon. Children to have a photo of one of the objects in the middle of sheets of paper. In small groups they add labels as a spider diagram to their sheets to describe. Provide a word bank of the vocabulary. hard  stretchy  shiny  rough  bendy  absorbent  soft  stiff  dull  smooth  not bendy  not absorbent  <i>Scaffolding</i> – provide labels to add, supporting with reading Copy sheets for children’s books.
Reflect and review	Recap what properties are. Can children name an object that is... bendy / hard / shiny / soft etc...?

	Year One Science: Materials	Session 3: How can objects be grouped by their properties	
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Learning Objective	Brilliant scientists can describe the properties of materials		
 'Sticky' Substantive Knowledge	I can group materials by their properties		
 'Sticky' Disciplinary Knowledge	I can record using photographs		
 Scientific Enquiry Type	Classifying, identifying and grouping		

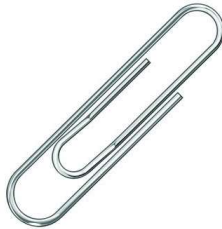
Recap / Retrieval	Play memory matching pairs game to find the opposite pairs of the properties of materials. <table><tr><td>hard </td><td>stretchy </td><td>shiny </td><td>rough </td><td>bendy </td><td>absorbent </td></tr><tr><td>soft </td><td>stiff </td><td>dull </td><td>smooth </td><td>not bendy </td><td>not absorbent </td></tr></table> Recap last session where children used their senses to describe the properties of materials.	hard 	stretchy 	shiny 	rough 	bendy 	absorbent 	soft 	stiff 	dull 	smooth 	not bendy 	not absorbent 
hard 	stretchy 	shiny 	rough 	bendy 	absorbent 								
soft 	stiff 	dull 	smooth 	not bendy 	not absorbent 								
Share knowledge and vocabulary	Discuss the meaning of the vocabulary: Grouping Properties												
Model	Have a selection of objects. Take one of the property cards at random and find an object that has that property. Repeat for another.												
Do and Check	Children to have a tray of objects on their table and the properties cards. In pairs, children take a card and find an object that has that property, as modelled.												
Including scaffolding	Place children in mixed pairings to aid reading the card (however, they should be familiar with these following the modelling in the recap and the accompanying pictures).												
Apply in context	 Explain that we are going to be carrying out a grouping enquiry to group objects by their properties. Children to work in groups of 2 or 3, each with a camera, a tray of items and two set rings. Choose an opposite pair of properties cards. Sort the objects into the sets according to their properties, drawing on last week's lesson on describing properties. Children to photograph their completed set rings.												
Including scaffolding	Repeat for another set of properties if time.												
Reflect and review	Children to walk around the room looking at each other's set rings. Children to describe how they sorted.												



Recap / Retrieval	Recap vocabulary – objects, materials, properties
Share knowledge and vocabulary	Explain that today we are going to carry out a comparative investigation, examining the properties of different materials. Explain that a comparative investigation is where we compare different ‘variables’ to answer a question. Introduce key words: properties (something about an object that we can measure, see or feel) observation (looking closely using magnifying glasses) n.b. consider children with allergies
Model	Introduce the idea of Humpty Dumpty falling off the wall and breaking. How could we protect him? Explain that we are going to find which material (e.g. paper towel, cotton wool, bubble wrap, cardboard) would be the best to create a crash helmet. Model wrapping a hard boiled egg in e.g. paper towel and dropping it from a given height. Once dropped, unwrap and use a magnifying glass to observe – show the egg on the IWB. Model drawing the crack lines. Repeat for another material.
Do and Check	Use another material to wrap the egg in. Ask a child to help drop it. Unwrap and show on the IWB. Children to observe closely and draw the crack pattern. Repeat for the other material.
Including scaffolding	Check children’s understanding before moving on.
Apply in context	Introduce the idea of testing the best crash mat for Humpty Dumpty. Children to work in small groups dropping hard boiled eggs from a consistent height (e.g. from the top of a cereal box decorated to look like a wall) onto different materials in a tray (e.g. paper towels, shredded paper, water, carpet, sand).
Including scaffolding	Children to carefully observe the eggs after each drop and record by drawing the cracks
Reflect and review	Reflect on which material was the best for the crash mat. Which protected Humpty the best? Why do you think that is?

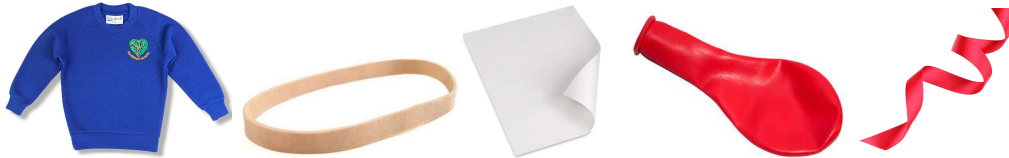
	Year One Science: Materials	Session 5: Which objects will float or sink?	
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Learning Objective	Brilliant scientists can investigate the properties of materials		
 'Sticky' Substantive Knowledge	I can compare and group materials by their properties		
  'Sticky' Disciplinary Knowledge	I can predict what might happen I can carry out simple tests		
 Scientific Enquiry Type	Comparative and fair testing		

Recap / Retrieval	Recap previous work so far.		
Share knowledge and vocabulary	Share key vocabulary – orally, written and with images: float sink buoyancy prediction		
Model	Discuss things that float and why this is useful, e.g. a life ring. When is it useful for things to sink, e.g. an anchor. Model predicting if things will sink or float – explain this is where we can make a sensible guess, drawing on what we know already.		
Do and Check	Children to select photographs items which they think will float or sink. (lilo, boat, rubber duck, metal plug, sand, stone)		
Including scaffolding	Children to predict if they think a stone would float or sink. Model placing in water bath to investigate. Repeat for a cork. Were their predictions right?		
Apply in context Including scaffolding	Children to be given a simple table in which to initially predict the objects they think will float and which will sink. Ask children to explain (orally) to a partner why they have grouped them the they they have. Choose some children to feed back to the class.       Children then carry out their investigation, carefully placing the objects on top of the water bath (e.g. a deep tray full of water). Children to place each object in the correct part of the table.		
Reflect and review	Children to reflect on their predictions. Were they right? Did any surprise them? Why do the children think items floated or sank? Address any misconceptions. This cbeebies video looks at floating and sinking: https://www.bbc.co.uk/cbeebies/watch/messy-goes-to-okido-why-do-things-sink-and-float		

	Year One Science: Materials	Session 6: Which objects are the stretchiest?	
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Learning Objective	Brilliant scientists can investigate the properties of materials		
 'Sticky' Substantive Knowledge	I can compare and group materials by their properties		
 'Sticky' Disciplinary Knowledge	I can ask and answer questions by carrying out a scientific enquiry		
 Scientific Enquiry Type	Comparative and fair testing		

Recap / Retrieval	 Recap prior learning. Ask children to 'talk like an expert'. Write the key vocabulary (properties, materials, float, sink, objects, prediction) on talk like an expert grid, and children to discuss in pairs, ticking off once they are confident they have explained it. Take feedback from each pair.		
Share knowledge and vocabulary	Share and discuss key vocabulary. Write on cards with associated image. <i>stretchy</i> <i>stiff</i> <i>compare</i>		
Model	Explain that today we are going to investigate whether objects have the properties of being 'stretchy' or 'stiff'. Show some images and model, taking two of the images, sorting whether they think they are stretchy or stiff. 		
Do and check	Children to work in small groups to sort the images into groups of objects which are 'stretchy' or 'stiff'. This can be photocopied and put in children's books.		
Including scaffolding	Check children have a sound understanding before moving on.		
Apply in context	Ask children which object might be the stretchiest. How would we know? Draw out we could investigate ourselves by comparing them. Children to complete investigation into which objects are the stretchiest. Compare two items at a time. Teacher to model, for example, comparing aluminium foil with cling film and string, comparing them two at a time, then ordering by placing pictures on a line labelled stiffest – stretchiest. Children then to compare two items at a time, ordering and placing pictures of them from stiffest to stretchiest by drawing on a line 		
Including scaffolding			
Reflect and review	Reflect on the question we asked – Which object is the stretchiest? What are the children's answers to the question? Recap on the work over the past weeks - carry out a quiz to match the properties to the object.		