Northfield Road Primary School
Science

Year 2 **Autumn Term**	At Northfield Road Primary School, Science is based around the 3 main areas: Biology, Chemistry and Physics. Building blocks of knowledge are an important aspect of our Science provision, as we ensure topics are planned to build upon previously taught knowledge. This gives our pupils the opportunity to make links to other topics they have been taught and also to reinforce their understanding.

Properties and Changes of Materials – Chemistry
Why are different materials important?

This unit is structured around sequential enquiries:

Enquiry 1: How do we use everyday materials?

Enquiry 2: How are properties of materials and their uses linked?

Enquiry 3: Are all materials fixed in shape?

Enquiry 4:

Enquiry 5: How can mixtures be separated?

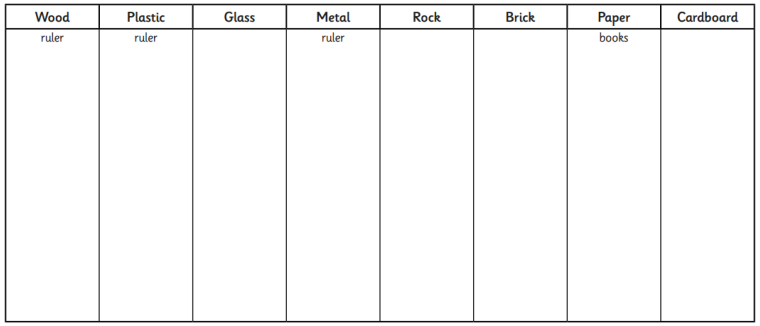
Enquiry 6: Why can some changes not be reversed?

National Curriculum Knowledge and Understanding

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

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	Learning Objective:	Key content and suggested lesson ideas	Suggested resources	Focus question
Enquiry 1: How do we use everyday materials?				
Unit 1	LO: To identify the uses of everyday materials	**Retrieval Practice** – List as many everyday materials as you can. Introduce the children to the unit – Everyday Materials. Share definition of a material, 'the substance something is made of.' Each table to then be given an array of various materials: wood, metal, glass (e.g. milk bottle), brick, rock, paper and cardboard (ensure materials are safe for children to handle). Can children correctly identify the material? A possible misconception will be with the milk bottle – can children determine material from the object? Children will then be given time to explore the materials and collate information about the various properties of the materials. Add to working wall for children to use throughout the unit of work. Teacher support where needed to elicit the correct scientific vocabulary.	**Learning resources:** Various everyday materials (metal, wood, glass, plastic, etc) http://www.bbc.co.uk/education/clips/zkj8q6f https://www.bbc.co.uk/bitesize/topics/zrssgk7/articles/z9pgcdm	Can the children identify everyday materials that have been used to make various classroom objects?

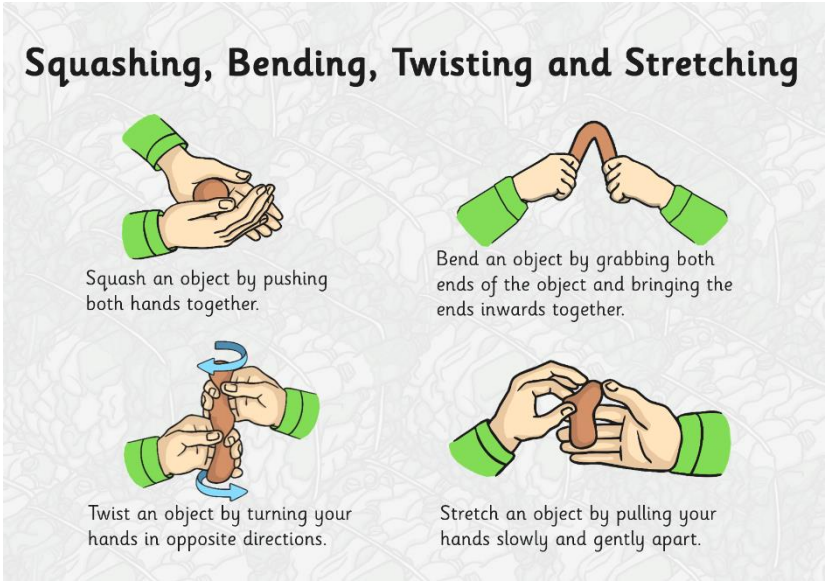
		Explain to the children that many of the objects we use on a daily basis are made from everyday materials. Can the children think of any? Are objects only made from one material? Start to identify objects in the classroom that are made from everyday materials. **Activity –** Children to identify objects in the classroom that are made from various everyday materials. This is to be recorded in books in a table. This could look similar to the table below:  Once complete, the children can start to identify the properties of these everyday materials. To begin this could be a class discussion where the class teacher adds scientific vocabulary to the working wall (hard, soft, transparent, flexible, etc). Children to then record this in their books.		

Wood	Plastic	Glass	Metal	Rock	Brick	Paper	Cardboard
ruler	ruler		ruler			books	

		Plenary – Start to discuss why certain materials are used for some of the objects they have identified in the classroom.		
Enquiry 2: How are properties of materials and their uses linked?				
Unit 2	LO: To understand the suitability of materials	**Retrieval Practice** – Identify three objects in the home and the everyday materials they are made of. Introduce the children to the unit – Everyday Materials. Share definition of a material, 'the substance something is made of.' Each table to then be given an array of various materials: wood, metal, glass (e.g. milk bottle), brick, rock, paper and cardboard (ensure materials are safe for children to handle). Can children correctly identify the material? A possible misconception will be with the milk bottle – can children determine material from the object? Children will then be given time to explore the materials and collate information about the various properties of the materials. Add to working wall for children to use throughout the unit of work. Teacher support where needed to elicit the correct scientific vocabulary.	**Learning resources:** http://www.bbc.co.uk/education/clips/zkj8q6f https://www.bbc.co.uk/bitesize/topics/zrssgk7/articles/z9pgcdm	Can the children identify why a material has been used based on its suitability?

		Discuss with children that some objects can be made from a variety of materials – what are these objects made from? (Model a stained-glass window and a plastic window). Which is best? Why? Children to identify those objects are made from the best material for the job. A chocolate teapot would be no use – why? It would melt. Inform children that this is suitability – properties which are right for a specific purpose. Model to children Fit for purpose? - Explorify to demonstrate this further. http://www.bbc.co.uk/education/clips/zkj8q6f Watch the clip of Cinderella's fairy Godmother identifying which material to make Cinderella's shoes from – discuss the video. • Was she right to base her decision on the weight of the shoes? • What are the problems with glass shoes? • Why is glass such a poor choice as a material for making slippers? • Which materials would you suggest as a better choice? • Can you say why? **Activity -** Children to be given various problem cards and will be asked to identify why the material may have been used initially,		

		but then they will be asked rectify the problem based on a more suitable material to use. Children to provide an explanation for their choice using the key vocabulary of the lesson and the suitable properties of the materials. Problems may include: Front door that does not give any privacy (made of glass). Metal wheely bin is too heavy to move. Broken window has been covered with cardboard. Fancy dress outfit 'a knight in shining armour' that is too heavy to wear (metal) Paper plates that cannot be washed and reused. Raincoat is not waterproof. **Plenary** – Recap materials and their properties using https://www.bbc.co.uk/bitesize/topics/zrssgk7/articles/z9pgcdm		
Enquiry 3: Are all materials fixed in shape?				
Unit 3	LO: To understand that a force can be added to a	**Retrieval Practice:** Give the children a range of materials. Which one material would be best suited to making a cup to hold a hot drink? Pose the question, are all materials fixed in shape? Can children give examples to support their thinking? Scribe examples children may give e.g. I can shape playdough by squashing, I can shape paper by folding and twisting.	**Learning resources:** Objects to be manipulated: play dough, pipe cleaners, tea towels, socks, plastic bottle, elastic bands, drinking straws and sponges.	Do children understand that applying forces to objects can change their shape by squeezing,

	material to change its shape	Extend the line of questioning so that children identify how materials can be changed so it can be used for something else (e.g. squashing, bending, twisting and stretching). Explain that the change of shape due to a force is called deformation. If materials deform easily, they are soft. Examples of soft materials include sponge, some plastics, modelling clay and fabrics. The opposite property of soft is hard. Metal and rock are hard. Some of the materials will return to their former state after they have been squashed – these are elastic materials.  **Activity** – Children will be given a variety of objects (examples listed in the resource section) that can be manipulated in some or all of the ways listed above. Children to test the materials and complete observations about their findings. A variety of recording methods can be used from a tick/cross exercise		stretching, bending and twisting?

		to written explanations. This must be recorded in books. Photographs should also be taken of children manipulating the objects to add to working wall or aid as support for their written explanations. Once completed, children to conclude their findings as a class. What have they noticed about the materials that could be manipulated the most and the least? Are there any common properties? Can they find any examples of materials that cannot be manipulated in shape? **Plenary –** display the image of a tennis ball, 'Does a tennis ball change shape?' Identify predictions and discuss reasoning.  Explain that a tennis ball needs to be made out of a material that we can squash and that goes back to its starting shape, otherwise it would not bounce! Rubber is an excellent material for tennis balls because it has these material properties. How did the predictions vary to the correct answer?		