Mendell Primary School

Aspire Challenge Achieve

Medium Term Plan Science

Year Group: 2	Term: Autumn 2 – continued from Aut 1	Teacher: Sarah Bride	Subject lead: Sarah Bride

Common Misconceptions:

Some children may think:
- only fabrics are materials
- only building materials are materials
- only writing materials are materials
- the word rock describes an object rather than a material
- solid is another word for hard.

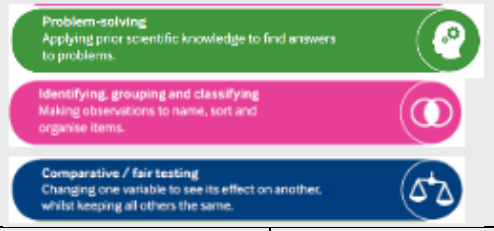
Unit key Vocabulary:

Names of materials – wood, metal, plastic, glass, brick, rock, paper, cardboard

Properties of materials – opaque, transparent and translucent, reflective, non-reflective, flexible, rigid shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

Overview: Everyday Materials:

. • 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.



Key End Points: By the end of this unit children will be able to:

Talk about and describe different objects/materials.
Talk about the properties of everyday objects that we use. Talk about how they've made objects and things that went well or could be improved. Which object is the most suitable for a task.

Links to other learning:
Design technology, Art.

Prior Learning:

Distinguish between an object and the material from which it is made. (**Y1** - Everyday materials)
• Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (**Y1** - Everyday materials)
• Describe the simple physical properties of a variety of everyday materials. (**Y1** - Everyday materials)
• Compare and group together a variety of everyday materials on the basis of their simple physical properties. (**Y1** - Everyday materials)

Future Learning:

Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. (**Y3** - Rocks)
• Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (**Y3** - Forces and magnets)
• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. (**Y5** - Properties and changes of materials)
• Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. (**Y5** - Properties and changes of materials)

High Quality Text:

The Three Little Pigs and The Three Little Wolves and the Big Bad Pig, Michael Rosen's poem – Woolly Saucepan

Scientist to study:
John Dunlop

Risk Assessment:

Teacher CPD:

ASE plan exemplification – Glory.

Reach out CPD https://www.reachoutcpd.com/ sign up for free.

	Learning Intention	Lesson Outline (Key Questions in colour)	Resources	Vocabulary	Lowest 20% Adaptations
1.	L.I. I can set up a fair test to find out which	**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making predictions and setting up tests.** Recap learning from Autumn 1 using a kahoot quiz – can the children name a range of materials and identify their properties? **Word of the week: squash**	A selection of hard and soft materials that can all be squashed to some degree.	**Elastic** **Squash** **Fair test** **Distance** **Bounce**	

	ball is the bounciest . 	Explorify – mystery bag – changing shape – Can it be squashed?. https://explorify.uk/en/activities/mystery-bag/changing-shape (1. Several parcels of mystery items have been delivered! How can they tell what's inside without looking? Some methods they could use: feeling, observing, listening, smelling. 2. All the objects have something in common. They are solid objects and are squishable. Has this changed what they think is in the bag and if so, why? Reveal the items in each bag one at a time.) **Big Question: which ball is the bounciest?** Ask the children: **Would you choose a ball of plasticine to play tennis or table tennis? Why not? Do you think the squashy ball will bounce well? What sort of balls do you think will bounce best?** Discuss these questions and write down their ideas and theories. Then ask the children: Why do you think balls bounce? Explain that balls bounce because they are elastic. When a ball hits a hard surface its shape changes – the part touching the ground flattens slightly. It gets back into its original shape quickly and bounces back up. Play them this video of a ball bouncing in slow motion to show how the ball flattens and goes back into shape. Then show the children the variety of balls. Place them in different places in the classroom, ask the children to go and stand by the ball they think will be the bounciest and to try and explain why. Share the work of John Dunlop using the 'Standing on the shoulders of giants' resources. Explain: We are going to learn about John Dunlop and how he made a tyre filled with air (a pneumatic tyre). We will be using balls that behave like the material in tyres, to compare their bounciness. Provide the children with a range of different small balls, a ramp and a surface to allow the balls to bounce off of. Ask the children to explore the balls and how they can change their shape – does this tell them anything to inform a prediction? Discuss why are you going to roll the balls from the same place each time? Children record their findings in a table – groups then present their data in a graph. **Exit pass:** would the surface of the area effect how the ball bounces?	A variety of balls, preferably of fairly similar size, e.g. tennis, sponge, rubber, ping pong Chair, ramp	**Change shape** **Flatten**	
2	L.I. I can set up a test to find out which is the stretchies t fabric.  	**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making predictions and setting up tests.** **Big Question: Which fabric is the stretchiest?** **Word of the week: stretchy** Ask the children to look at the fabrics on their tables and to sort them based on criteria they choose. They may focus on properties such as 'flexibility' or 'absorbency' and sort accordingly. Then ask the children what they know about 'stretchiness' and stretchy fabrics. Ask: **What makes elasticity (stretchiness) a useful property for fabric? When would you use stretchy materials?** *(For gymnastics, in swimsuits, etc.)* Ask: **What happens when you pull a swimsuit etc and then let go?** *(it goes back to its original shape; it sometimes goes a bit baggy).* Explain that there is a point where stretchy fabric can be overstretched and won't return to its original shape and size. Ask the children: **How can we test the fabrics for elasticity/stretchiness? What ideas can we come up with to help us design an investigation?** *(Add a problem solving element by saying that you would like them to find the stretchiest so that you can make the most comfortable headband to wear when playing sport. You need it to stretch well so that it is easy to put on).* Split the children into groups and give them a selection of fabrics and the Testing stretchy materials resource to help with their investigation. The sheet asks them to think of a hypothesis, so support them to do this. It could be *"The smoothest piece of fabric is the stretchiest"* or *"Dark fabrics always stretch more than lighter ones".* Ask the children to start by predicting which of the fabrics will be the stretchiest and to put them in order on the table. They could photograph this to refer to later. Remind the children that the test is essentially about observing and exploring the material but it still needs to be fair. Say to them: *Each piece of fabric has to be treated the same, otherwise it isn't fair if you pull one piece more than the other, or if one piece is bigger than the rest. So make sure all your fabric pieces are the same size and pull them all in the same way. It will be very hard to keep these pulling forces the same each time so this will not be a true fair test.* Then ask them to stretch the pieces of material in both directions (i.e. along, and at right angles to, the 'grain'), and also diagonally (i.e. on the bias), and make observations.	Testing stretchy materials resource. Range of stretchy fabrics. Measuring tape. Exit pass.	**Change** **Fabric** **Material** **Stretchy** **hypothesis**	

		Whilst the less able will explore and observe the fabrics, ask the more able to consider accuracy, by thinking about these questions: **What length is the fabric at the start? To what length does it need to stretch? What length does it return to? Can they sort the fabrics into very stretchy, quite stretchy and not very stretchy? What advice will they give you about which would make the best sports' headband?** **Exit pass;** most and least stretchy sorting activity looking at different materials.			
3.	L.I. I can set up a test to find out which is the bendiest material.	**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making predictions and setting up tests** **Explorify Big Question: Which is the bendiest?** **Word of the week: bendy** Plan an investigation around the Big Question. **What do the pupils already know about the properties of materials and why some things are bendy?** • **Can you name some objects that are bendy, and some that aren't?** • **How do you bend objects?** • **What happens when objects bend?** Discuss the odd one out pictures; pencil, straw, pipe. **How will the group explore the question?** Prompt pupils to explain their ideas, qualify them and refine them based on views expressed by other people. What is their plan for the investigation? Let them explore their own ideas but if they get stuck, suggest that they tape down the strips onto a table edge so they lie horizontally, then to use the string and tape to secure a weight on the end of each strip. Remind them that the weights will need to be the same and so, if they don't have multiple 100g weights, they will need to measure the bendiness of one strip of material, then remove the weight and attach it to the next strip. Ask them *How will you record the bendiness?* They may want to attach the strips to the part of a table closest to a wall so they can attach paper to the wall (directly behind the horizontal strips) and draw the bend produced. **Exit pass;** Display bendy object resource. In their pairs, children select one object and imagine what life would be like if that object was not bendy,	Odd one out pictures Bendy objects resource.	**squash/squashing, bend/bending, stretch/stretching, material, properties, strong, weak, rigid, flexible**	
4.	L.I. I can set up a test to find out the strength of twisted thread.	**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making predictions and setting up tests** **Big Question: what happens when materials are twisted?** **Explorify: fuzzy friend – zoom in zoom out -** https://explorify.uk/en/activities/zoom-in-zoom-out/fuzzy-friend Show the class a range of twisted materials. Ask the children to identify how the shape of each material has been changed. Provide hand lens. Discuss the children's observations and discuss why some materials are twisted? Why might this be a positive thing? Take feedback from the children after discussion time. e.g. to make the material stronger (as with thread, rope or string) or for fastening something and holding it in pace e.g. sweet wrapper.	Wool; string; rope; springs; twisted sweet wrappers; spiral bound books; pipe cleaners; digital microscope/hand lenses; paper straws; tightly woven (e.g. cotton t-shirts and shirts, school trousers, waterproof coat, etc.) and loosely woven (e.g. knitted jumpers, dishcloths, socks, tights, etc.) fabrics. Sewing thread; embroidery thread;	**Material, Strength, twisted Tread, woven**	

		Children loosely clutch a bundle of paper straws in one hand. With the other hand, they should easily be able to remove a single straw from the bundle. Repeat the same activity with a bundle of pipe cleaners. They should find it more difficult to remove a single pipe cleaner from the bundle. Explain that twisting, weaving and knotting are often used to make fabric; if fabric was not twisted, our clothes would more easily pull apart like the first bundle of straws. Using a digital microscope or set of hand lenses, children explore how the fabric in their clothes has been twisted and woven together. Provide children with a range of materials that are both tightly and loosely woven. Allow observation time so that they can identify the differences and similarities between the materials. Provide children with a selection of threads, e.g. sewing thread, embroidery thread, wool, gardening string and parcel string. Ask the children to look closely at the individual pieces of thread and how they have bee collected and twisted. Explain that we will be setting up a test to prove that twisted tread is stringer than untwisted thread. Take suggestion son the best way to do this. Share the idea of adding weight to the thread using a bag and marbles. Allow the children to complete their investigation and recording their observations in a table.	wool; gardening string; parcel string; sticky-tack; pencil; small plastic bags with handles marbles; weights; extra strong paperclips.		
5	L.I. I can make links between materials and how they are used.	**This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is identifying materials and asking questions.** Odd one out – Explorify – it's in the bag - https://explorify.uk/en/activities/odd-one-out/it-s-in-the-bag Show the three images above and ask everyone to come up with as many similarities and differences as they can. If they get stuck, prompt them to think about: • appearance • what they do • where they might be found **Word of the week: elastic** Ask the children to collect three different objects from around the classroom; First they identify the materials the object is made from. Next test if they can change the shape of the material by twisting, bending, squashing or stretching. – take photo evidence for books. Remind the children about their work last half term about how materials are suited to certain objects e.g. chairs made from wood, plastic, metal because they are rigid materials. Encourage the children to apply their new understand of twisting, stretching, bending and squashing to think about the best materials for an object. Remind the children about The Three Little Pigs story we used last half term- Discuss the object – a house. **What is the best material to make a house structure? What properties does the material need?** – stiff, rigid, waterproof. Discuss in terms of the new vocabulary the children have tested in previous lessons. As shown in the example below, ask the children to think carefully about a set of objects and discuss which material would be best based on the materials properties.	Explorify activity. Pre pared table for SEN children.	**– wood, metal, plastic, glass, brick, rock, paper, cardboard** **- flexible, rigid** **shape,** **push/pushing,** **pull/pulling,** **twist/twisting,** **squash/squashing,** **bend/bending,** **stretch/stretching**	

Year	2	Topic	Uses of everyday materials

Focus of assessment (National Curriculum statements)

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

Description of activity

The children were asked to complete a worksheet prompting them to think about suitable properties for a range of objects and then use this to identify a material to match the required property for each use.

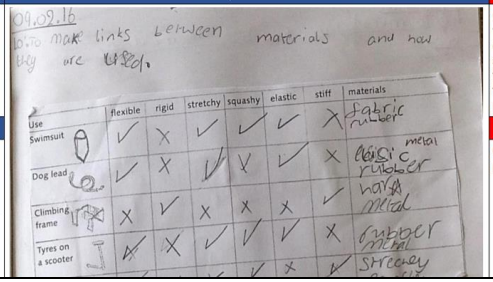
EVIDENCE OF LEARNING

Oral evidence

Teacher observations

Glory mostly correctly identifies the properties required for particular uses. Discussion with him about the dog lead showed confusion between stretchy/elastic and extendable as, at home, he has a dog lead which reels in and out.

Examples of work



ASSESSMENT

Knowledge

Glory shows understanding of the vocabulary for properties related to changing shape by selecting the suitable properties for each use. He then identifies appropriate materials for each specific use based on the properties required for that use.

Working scientifically

Glory records his ideas in a prepared table.