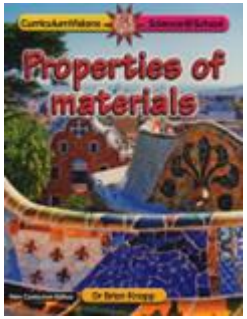
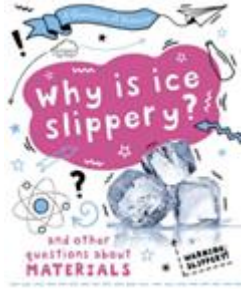
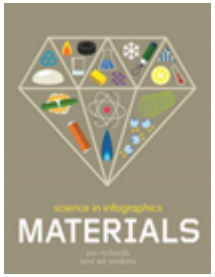
BILSTON CHURCH OF ENGLAND PRIMARY

MEDIUM TERM PLANNING

Subject	Topic/Key Question	Year Group	Term	Time Allocation
Science	Materials Everyday materials Get sorted	5	Autumn 1	20 hours
 Library service	 Library service	 Library service	 Library service	 Library service
End of upper Key stage 2 Outcomes	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Using test results to make predictions to set up further comparative and fair tests. Reporting and presenting findings from enquiries, including conclusions, causal			

	relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Identifying scientific evidence that has been used to support or refute ideas or arguments.
End of Unit Outcomes	I can identify the variety of different types of materials used around school. I can link the properties of the material to its use. I can give examples of where certain materials are showing signs of decay or wear and suggest why this might be. I can describe how buildings can be insulated and propose how insulation of school buildings might be improved. I can plan a fair test, controlling variables as necessary, to investigate the best plastic carrier bag for a particular purpose. I can use evidence that I have collected to say why a particular plastic carrier bag is best for a specific task. I can identify properties of materials used to make plates that make them suitable for different purposes. I can plan and carry out a comparative test to collect evidence to help me decide which material is most suitable for a plate for a specific purpose I can use the line on a line graph to answer questions about temperature change. I can calculate a change in temperature over time. I can explain how insulation in a cool bag can help to keep hot things hot and cool things cool. I can decide what observations I need to make and what measurements to take as I add water to the mystery material. I can select the best equipment for the task and use it accurately to measure the quantities involved.

	I can use scientific vocabulary to describe what happens to the mystery material as water is added. I can explain the processes involved when water is added to the mystery material. can identify a question that I can investigate to test the effectiveness of nappies. I can plan how to collect evidence to answer my question about nappies. I can draw conclusions about the properties of the materials used and the effectiveness of the nappies tested. I can present a persuasive argument about why one brand of nappies might be better than another.
Vocabulary	properties hardness solubility transparency electrical conductor thermal conductor response to magnets dissolve solution separate separating solids liquids gases evaporating reversible changes dissolving mixing evaporation filtering sieving melting irreversible new material burning rusting magnetism electricity chemists Spencer Silver Ruth Benerito quantitative measurements conductivity insulation chemical.

Lesson Sequence	Time Allocation	Key Question/WALT	Teaching Activities	Resources
Lesson 1 How can we compare	2 hour	WALT: investigate materials. **Success Criteria**	Working Scientifically Link. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, and bar and line graphs.	Sticky notes, large sheets of paper, familiar classroom

and group materials?		• I can make comparisons between different materials, using technical vocabulary to accurately describe their properties. • I can identify specific criteria to help me compare and group materials. • I can create a key to help me classify different materials	Organise children into groups and give each a selection of familiar classroom objects to discuss, for example, a marker pen, pencil, paper clip, plant pot, sweatshirt, sports shoe, stapler, ruler, water bottle, lunch box, eraser. Make sure that there is a good mix of objects made of different materials and with different properties. Check that children know what all the objects are. Ask: What materials are the objects made from? What properties could describe the materials? Make sure that the distinction is established here between the materials the objects are made from, for example, metal, plastic, and the properties of those materials, for example, hard, shiny. Ask the children, in groups, to write the property words that they have come up with on separate sticky notes. Take feedback from the children about the properties they have identified. Prompt them to use technical vocabulary to describe properties, for example, flexible, rigid, transparent, translucent, opaque, conductor, insulator, (electrical and thermal), magnetic. Explain to the children that they are going to play 'materials dominoes' in their groups. Model the game yourself first. Place an object where the children can see it. Identify two material or property words for that object. For example, for a ruler, the material and property words could be plastic, flexible. The children then have to match either the property (two points) or material (one point). Take several suggestions, identifying two words and making a match each time. The children should then try	objects, for example, marker pen, pencil, paper clip, plant pot, sweatshirt, sports shoe, stapler, ruler, watercomp bottle, lunch box, eraser; real objects and substances, for example, milk, shaving foam, ketchup, butter, yoghurt, jelly, hair gel, steam, sand, flour, sugar. Snap science resource sheets. Challenge slides.

			with the objects on their tables, aiming to use all of them and score the maximum number of points.	
Lesson 2 Is a solid always hard?	2 hour	WALT: investigate materials. **Success Criteria** • I can compare the properties of solid materials. • I can plan a test to group and classify solids according to their hardness. • I can sequence a range of solid materials according to the property of hardness. • I can describe how the hardness of solids differs. • I can explain what is different about the structure of a soft and a hard solid.	E-learning Link – Data Handling. I can choose an appropriate tool (microscope) to help me collect data Working Scientifically Link. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results in oral and written forms such as displays and other presentations. Show children Slideshow 1, which shows comments from children talking about a collection of materials and sharing their points of view. Ask: Which of these statements do you agree with? Which do you disagree with? Which are you not sure about it? Can you give reasons why? Organise children into groups and explain that they are going to investigate solids to find out how soft and hard it is possible for a solid to be. The three challenges describe a sequence of learning that might be attempted by all of the children, with an appropriate level of support. The challenges are presented on the Challenge slides to be displayed on the board, or printed out and placed in the centre of the table.	Microscope, marshmallows and jelly sweets, chocolate buttons, cheese strings, cooked pasta, foil, elastic, net (or old tights), sponge, polystyrene, sand, soil, butter, brick, wooden ruler, plastic toy, metal object, piece of fabric, glass bottle, sponge, corn flour, water, tray or large bowl. Snap science resource sheets.

				Challenge slides. Snap science slideshow 1.
Lesson 3 Is a liquid always runny?	2 hour	WALT: investigate materials. **Success Criteria** • I can test the properties of liquids and compare them. • I can plan a test to compare the viscosity of different liquids. • I can sequence a variety of liquids according to how viscous they are.	Working Scientifically Link. Planning different types of enquiries to answer questions, including recognising and controlling variables where necessary. What is a liquid? Print out the Concept words (Resource sheet 1) on card, cut them out and give each table of children a set of the cards, together with a large sheet of paper and pens. Explain that they are going to create a concept map using these words, linking the words with arrows and labelling the links. If necessary, model this process quickly using two or three of the concept words, adding links and defining the link, for example, washing up liquid and oil both linked to container; link phrase 'can be held in'. Check that they all have a clear understanding of the difference between solids that behave like liquids and liquids themselves.	Large sheets of paper, honey, cooking oil, syrup, milk, washing up liquid, bubble bath, lemonade, yoghurt, different brands of tomato ketchup, wipe-clean ramps, whiteboards, teaspoons, tablespoons, stop watches or watches with second hands. Snap science resource sheet 1.

				Challenge slides.
Lesson 4 Are all metals the same?	2 hour	WALT: investigate materials. **Success Criteria** • I can identify the properties of a variety of different metals. • I can link the properties of metals to how they are used. • I can explain that particular metals are used for specific purposes because of their properties.	Working Scientifically Link. Identifying scientific evidence that has been used to support or refute ideas. What do we know about metals already? Print out the Sorting cards (Resource sheet 1), cut them out and give a set to children in pairs. Ask the children to sort the statements on the cards identifying whether they Agree, Disagree, or are Not sure. When they have made an initial sort, ask them to describe how they have sorted the cards, to share their reasons and to explain why they placed any cards in the Not sure group. Use this activity as an opportunity to clarify children's understanding of metals and their properties, and to identify any misconceptions that they may have and opportunities for further teaching later in this and other lessons.	Magnets, examples of objects made of metals, for example, cooking pan, spoon, bell, paper clips, stepladder, power cable, access to books or the internet for research. Snap science resource sheets. Challenge slides. Snap Science interactive 1.
Lesson 5	2 hour	WALT: investigate materials. **Success Criteria**	Working Scientifically Link.	Large bowl or jug, variety of large serving spoons made

Are all plastics the same?		• I can identify different plastics and their properties. • I can link these properties to how they are used. • I can carry out an enquiry to answer a question about plastics. • I can describe how the number of plastics used might be reduced and the importance of recycling and reusing plastics.	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. Show children a selection of large spoons made of wood, plastic or metal. Ask: What materials are these spoons made of? When might we use them? Explain that you are going to put one spoon made of each material into some very hot water. Ask children what will happen to the spoons, and to say which spoon handle they think will get hotter more quickly. Invite some children to carefully feel the handles of the spoons and feedback their observations to the rest of the class. Were their predictions correct? Which spoon handle got hottest, and the most quickly? Introduce children to, or remind them of, the terms 'thermal insulator' and 'thermal conductor'. Ask: Are plastics good or poor insulators? (good). What about metals? (poor). Are woods good or poor conductors? (poor). What about metals? (good). Encourage children to think about the properties of these different materials and how they might be affected by how they are used. Ask: When might a wooden spoon be better to use than a metal spoon? When might a plastic spoon be better than a wooden spoon?	out of plastic, wood or metal, collection of objects made of plastics, for example, plastic bottles and packaging, plastic jugs and bowls (polythene), clothing made of polyester, strong ropes, washing line (nylon), beakers, plates, disposable cutlery, yoghurt pots (hardened polystyrene), insulation and packaging materials (expanded polystyrene), perspex sheets, lenses

			Explain that we also use the terms conductor and insulator when talking about electricity. Ask: Are woods, plastics and metals good or poor conductors of electricity?	in torches (acrylic), pencils of different hardness, polystyrene cup, lemonade bottle, shampoo bottle, carrier bags, cling fi lm, dustbin, washing up bowl or classroom tray, access to the internet or books for further research. Snap science resource sheets. Challenge slides.
Lesson 6 Which materials are used in	2 hour	WALT: investigate materials. **Success Criteria**	Working Scientifically Link. Reporting and presenting findings from enquiries, including conclusions, causal relationships and	Snap science resource sheets.

our school buildings, what for and why?		• I can identify the variety of different types of materials used around school. • I can link the properties of the material to its use. • I can give examples of where certain materials are showing signs of decay or wear and suggest why this might be. • I can describe how buildings can be insulated and propose how insulation of school buildings might be improved.	explanations of and degree of trust in results, in oral and written forms such as displays and other presentations Find out how much exposure children have had to building projects, either through personal experience or through the media. Ask: Have you any experience of a building project, perhaps a house extension, building in your locality, or from watching DIY TV programmes? What is done first? What types of materials are used for buildings? How are buildings constructed? Explain to children that it usually takes months to construct a building like a house or a school. Plans have to be drawn up, permission given for buildings to be built, a construction team put in place, and materials ordered and brought onto site before construction can start. Show children the video of the different materials used in building construction (Video 1). Ask children to look out for the different construction materials that are being used. How are the materials put together? What are their different purposes? Show the video a second time, so that they can make notes.	Challenge slides. Snap Science videos 1&2.
Lesson 7 Weighty problem: which is the best carrier bag?	2 hour	WALT: work scientifically. **Success Criteria** • I can plan a fair test, controlling variables as necessary, to	Working Scientifically Link. Planning different types of science enquiries to answer questions, including recognising and controlling variables where necessary. Ask: Which is the best carrier bag to use to carry shopping?	Lengths of thick dowel, broom handles, etc., modelling clay, large masses, for example, bricks, heavy

		investigate the best plastic carrier bag for a particular purpose. • I can use evidence that I have collected to say why a particular plastic carrier bag is best for a specific task.	Explore with children what might be meant by 'best'. The strongest? Handles that don't mark your fingers? Both? Collect children's ideas on sticky notes and place on a poster with the heading: Variables to measure. Provide children with a selection of plastic carrier bags to look at in detail. Ask them to look at the type of plastic, shape, size and construction, and identify any different features, for example, extra strengthening around the handle area or use of thicker plastic in 'bags for life'. Collect these ideas on sticky notes and place on a poster with the heading: Variables that can be changed. Encourage children to think about how carrier bags are used. Ask: Is shopping only being transferred to the car boot or is the shopping being carried a long way by hand? How thick are carrier bags generally? Are free carrier bags always thin and charged for carriers always thicker? Does it depend on what the shopping is that goes inside?	books or cans of food to test bags, stop watches, different types of carrier bags, thick and thin plastic. Snap science resource sheets. Challenge slides.
Lesson 8 Cool box conundrum: can the same container keep cold things cold and hot things hot?	2 hour	WALT: investigate materials. **Success Criteria** • I can use the line on a line graph to answer questions about temperature change. • I can calculate a change in	E-learning Link – Data Handling. I can choose appropriate tools (thermometers and data loggers) to help me collect data. I can present data in an appropriate way. Working Scientifically Link. Taking measurements, using a wide range of scientific equipment, with increasing accuracy and precision, and taking repeat readings when appropriate.	Thermometers, data loggers with temperature probes, hot water or soup in plastic containers with lids that have holes to allow access of

		temperature over time. • I can explain how insulation in a cool bag can help to keep hot things hot and cool things cool.	Explain to the class that some children are going on a picnic and the menu that they have decided on includes both ice cream and hot jacket potatoes! For this lesson you can substitute the items and use ice and hand warmers. These children want to know whether the same type of cool bag could be used to keep the hot things hot as well as cold things cold. Ask: What do you think? Display Cool box conundrum (Slideshow 1). Ask children which of the statements they agree with and how they can test what they think. Explain to children that during this lesson they are going to find out how a cool bag affects both hot and cold food. It is likely that many children will think that cool bags only keep things cold or even cool them down further. In Challenges 1 and 2 children collect data that will confront these ideas. Children who already show a clear understanding of insulation at this stage should take on Challenge 3. The groups for these challenges can be up to six in number. The challenges are presented on the Challenge slides to be displayed on the board, or printed out and placed in the centre of the table.	thermometer or probe, ice cubes or ice cream in similar sized boxes or containers, cooked hot jacket potatoes, cool bags to use for testing, plus a couple of cool bags for disassembling. Snap science resource sheets. Challenge slides. Snap Science slideshow 1.
Lesson 9 Mystery material: what will happen if	2 hour	WALT: investigate materials. **Success Criteria** • I can decide what observations I need	Working Scientifically Link. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, and taking repeat readings when appropriate.	Tub of 'Insta-Snow®' (available from TTS and other suppliers),

we add water to the material?		to make and what measurements to take as I add water to the mystery material. • I can select the best equipment for the task and use it accurately to measure the quantities involved. • I can use scientific vocabulary to describe what happens to the mystery material as water is added. I can explain the processes involved when water is added to the mystery material.	Give each child less than a teaspoon of the mystery material in the palm of their hands and ask them to observe the material closely. Ask: What does the white material look like? Can you describe the particles? Does it remind you of anything similar? Ask children to add a small amount of water, a drop at a time, to the material. It is useful to fi lm the changes and replay it later. Ask: What do you notice? What happens to the material? Can you feel anything? What if you move the material around? Does it absorb more water? How much water do you think a small amount of snow could absorb?	water jugs, measuring cylinders, pipettes or water droppers, syringes, paper clips, jelly strings, hand lenses. Snap science resource sheet 1. Challenge slides.
Lesson 10 Nappy ending: what's the best brand of nappies?	2 hour	WALT: work scientifically. **Success Criteria** • I can identify a question that I can investigate to test	Working Scientifically Link. Identifying evidence that has been used to support or refute ideas or arguments. Instead of inviting a parent into school, the children can conduct research at home by asking their parents. They can also conduct some research prior to the lesson.	Mini whiteboards, water jugs, measuring cylinders, pipettes or water droppers,

		the effectiveness of nappies. • I can plan how to collect evidence to answer my question about nappies. • I can draw conclusions about the properties of the materials used and the effectiveness of the nappies tested. • I can present a persuasive argument about why one brand of nappies might be better than another.	Invite a parent with a small baby to visit the class. Children prepare questions in advance of the parent's visit, using any information that they have gathered from home to help them identify what to ask. For example, what makes a good nappy? Why do you choose the brand that you buy? Are they all made in the same way or are they different for boys and girls? Do nappies come in different sizes? How much do they cost? How many do you use each day? How many each week? Can nappies be washed and used again? How do you dispose of them? Which brands are the best value? Ask children to make notes on a mini whiteboard so that they can use the information later. Alternatively, you could show the video about nappies (Video 1), which answers the questions above. Show children the marketing information and claims on the packaging of different brands of nappies. If there are not enough sets of packaging for all to see easily, project an image of each in turn using a visualiser. Ask children to identify any information that might be useful, for example, does the packaging mention how much the nappy might absorb without leaking?	syringes, a collection of nappies with a variety of brands. Snap science resource sheets. Challenge slides. Snap Science video 1. iPads.