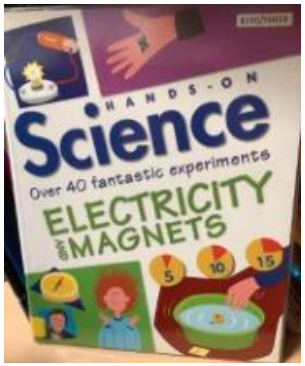
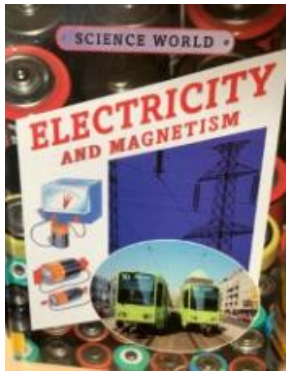
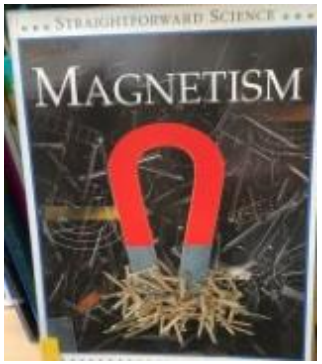
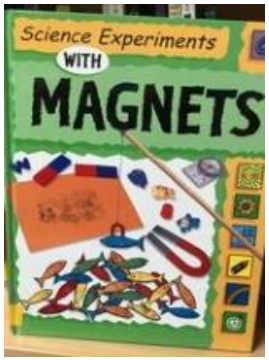
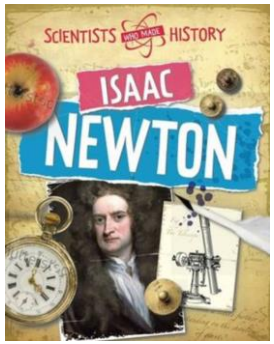
BILSTON CHURCH OF ENGLAND PRIMARY

MEDIUM TERM PLANNING

Subject	Topic/Key Question	Year Group	Term	Time Allocation
Science	The Power of Forces	3	Spring 1	12 hours
 Library	 Library	 Library	 Library	 Library service
End of lower Key stage 2 Outcomes	Asking relevant questions and using different types of scientific enquiries to answer them. Setting up simple practical enquiries, comparative and fair tests. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. Reporting on findings from enquiries, including oral and written explanations, displays			

	or presentations of results and conclusions. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Identifying differences, similarities or changes related to simple scientific ideas and processes. Using straightforward scientific evidence to answer questions or to support their findings.
End of Unit Outcome	I can compare how things move on different surfaces. I notice that some forces need contact between 2 objects, but magnetic forces can act at a distance. I can observe how magnets attract or repel each other and attract some materials and not others. I can compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. I can describe magnets as having 2 poles. I can predict whether 2 magnets will attract or repel each other, depending on which poles are facing.
Vocabulary	Force, push, pull, open, surface, magnet, magnetic, attract, repel, magnetic poles, North, South.

Lesson Sequence	Time Allocation	Key Question/WALT	Teaching Activities	Resources

Lesson 1 How can you make it move?	2 hours	WALT: explore how a force is required to make something start to move. WILF: I can use pushes, pulls and twists to make objects move in different ways. I can draw and label a diagram to show the force that makes an object start to move. I can explain how to make an object start, change direction and stop.	**Working Scientifically:** Identifying differences, similarities or changes related to simple scientific ideas and processes. Key Vocabulary: push, pull, twist, force Watch video – What makes it Move? Groups to note down as many things that started to move as they can and to think about what started each one moving. Challenge the children to make objects move in different ways using only certain resources. Children will need to think of different ways to use the resources to make an object move. Carousel activity. Challenge 1 **Children explore how they can make each object start to move.** When they have visited all of the activities ask them to draw a diagram to show how they started the two objects moving. Children to compare diagrams talk about whether they pushed, pulled or twisted to start the object moving. Challenge 2 **Children explore how to make objects start to move and then how to stop them, and show the forces used in a diagram.** Challenge 3 **Children explore how to make objects start moving, change direction and stop**	**Resources:** Table tennis balls, drinking straws, cotton wool balls, rubber bands, A4 sheets of strong card (such as from cereal packets), spinning tops, clockwork toys. Snap Science Lesson 1

			Children explore ways to start, stop and change direction for each object. Draw a series of diagrams for one or two of the objects to show how they achieved this using arrows to show the force. Demonstrate to the children pushing a toy car along the floor and letting go, then repeat but this time keep your hand on to push it. Ask Why did the car stop the first time? Why does the car keep moving? In both examples, what is providing the force? Can you think of any examples where something starts to move and there is not a contact force?	
Lesson 2 What's making it move?	2 hours	WALT: explore how air can make things move. WILF: I can explain how the air pushes the windmill. I can plan and carry out a comparative test. I can compare how the windmills move.	**Working Scientifically:** Setting up simple practical enquiries, comparative and fair tests. Key Vocabulary: push, force ,air, turns, fast, slow Watch video 1 – what is making each object move? Children describe to their partner what they can see when the windmill moves using the key words on the slide show. Highlight the word blades and show what it means. Record the children's ideas. Challenge 1 Children to observe how windmills work outside. Children work in pairs to observe how the wind turns their windmills. Do both windmills behave in the same way?	**Resources:** Four different windmills, varying in size and material, (per group)paper, pins, wooden sticks, stop watches Snap Science Lesson 2

		I can say what I found out from my test.	Ask – Is the windmill stronger in some places? Is the wind constant? Does it matter which way you hold your windmill? Challenge 2 Children plan and carry out a test to find out which is the best windmill. Children to explore one windmill. Will it make a good windmill? Why? Children to think about and record why they think it is a good windmill. What criteria will they use to investigate the best windmills? Give them three more windmills and a stopwatch. Ask the children to consider what they are testing, how they are carrying it out, how they will record results, what do their results tell them and which is the best windmill? Challenge 3 Children make a windmill and the plan and carry out a test to investigate the effect of different blade sizes on the length of time a windmill turns. Children to consider how they carry out the test, how they record their results, what they tell them and what did they find out. Children to share what they learnt with the class. Show Video 2 – Wind turbines and discuss with the children.	
Lesson 3	2 hours	WALT: explore how objects move on different materials.	**Working Scientifically:** Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	**Resources:** Heavy objects such

How well can an object slide on different materials?		WILF: I can decide how to carry out a comparative test. I can compare how an object moves on different surfaces. I can talk about how the surface affected the movement of the object across it.	Key Vocabulary : push, force, material, surface Show first part of video 1 – children to look out for how the child slows down at the end. Why did the child slow down so quickly at the bottom of the slide? Challenge 1 Explore how objects move over different surfaces. Children to predict how easy it would be to move a heavy object without picking it up over 2 or 3 different surfaces. Record the predictions for each surface. Test out their predictions (choose a child to do this) Children to consider how easy or hard it is to move on different surfaces, which was easiest/ hardest? Why? Challenge 2 Children to investigate the effect of different materials on the way an object slides down a ramp. Using a ramp and different materials children will investigate how easily an object slides down the ramp. Children to put materials in order of how easily they think they will slide down. Children to consider what their results tell them, does their evidence support their prediction? Challenge 3 Children investigate the effect of different surfaces on the way an object slides down a ramp. Children to explore how different materials or surfaces affect how easily an object slides. Children to share their predictions and findings – does their evidence match their findings?	as photocopier paper, boards for ramps (such as mini whiteboards), rulers, object to slide on ramp, such as 100g weight, materials to cover ramps, such as felt, foam, fabric, sandpaper, tin foil, plastic, carpet, rubber matting, large open space, such as a hall, helter skelter. Snap Science Lesson 3

Lesson 4 Which materials are magnetic?	2 hours	WALT: explore which materials are magnetic. WILF: I know how to test a material to find out if it is magnetic. I can group materials according to what I find out. I can use my findings to draw simple conclusions about magnetic and non-magnetic materials.	**Working Scientifically:** Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions. Key vocabulary: magnet, attracts, magnetic material, non-magnetic material, metal, non-metal Treasure hunt – find objects buried in sand some magnetic some not. When all have been retrieved place them in two hoops. Introduce the terms magnetic – nonmagnetic. Challenge 1 Children us a magnet to sort magnetic and nonmagnetic objects. Children to repeat the introductory activity – but this time use a fishing rod with a magnet attached to retrieve items from a bucket of water. Use a net to get the nonmagnetic items. Sort them into two hoops or the venn diagram(resource 1) Children to consider what an object is, is it magnetic or not, how do they know? Which hoop does it go in? Is it similar to any of the other objects? Challenge 2 Children use a magnet to sort metal and non-metal objects according to whether they are magnetic or not. Children sort the objects first metal or not metal? Photo evidence of sorting. Then they predict which will be magnetic or not – then they use a magnet to sort again	**Resources:** Sand or sawdust in a large container (a sand or water tray or stacking tray), small magnetic objects (paperclips, coins, cans, keys, cutlery), small non-magnetic objects (marbles, cubes, beads), sorting circles, large magnet, magnetic fishing rods (made using a garden cane, string and a magnet), fishing nets, digital camera. Snap Science Lesson 4 **Key information:** Chil… word… attra… **Key information:** Children may use the word stick rather than

			(photo evidence of the new sorting) Children to try and identify whether there is a link between what the object is made of and whether it is magnetic. Use venn diagram to help. Children sort the objects first metal or not metal? Photo evidence of sorting. Then they predict which will be magnetic or not – then they use a magnet to sort again (photo evidence of the new sorting) Children to try and identify whether there is a link between what the object is made of and whether it is magnetic. Use venn diagram to help. Children to consider which objects are made of metal and whether they are magnetic or not. How do they know? Are all metal object magnetic? Challenge 3 Children sort materials in order to support or refute statements about the magnetic properties of certain materials. Ask the children to discuss the cartoon characters' statements (Resource sheet 3) and decide which child they agree with, trying to give reasons to support their decisions. Provide the children with a range of magnetic and non-magnetic objects and a magnet and ask them to sort and present their evidence to support or refute the statements. Children to consider which two criteria that will need to use to sort their materials and they can present it clearly.	

			Video clip – large magnet being used to separate metals at a recycling plant. Show the cartoon to the whole class. Children to share their evidence from their investigations to refute or support the statements.	
Lesson 5 What can magnets do?	2 hours	WALT: measure the strength of a magnet in different ways. WILF: I can carry out an investigation to answer the question 'How strong is my magnet?' I can use a ruler to take careful measurements. I can record my observations in a table.	**Working Scientifically:** Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. Key vocabulary: magnet, attracts, magnetic material, non-magnetic material, metal, non-metal Children to think of an item that they have at home that has a magnet. Tell them there also lots of hidden magnets. Show video from Lesson 4 of items being moved by a magnet Explain that they will have one magnet to test its strength in different ways. Challenge 1 Children test magnets and record results in a table. Children to watch video 1 that shows them how to carry out the activity. Record on resource sheet 1. Challenge 2 Children test magnets and draw a table to record results. .The children look at the diagrams and explanation of each activity (Resource sheet 2). They collect the resources that they need and test their magnet. They draw a table to record the measurements. Challenge 3	**Resources:** Bar magnets per pair, paper clips, rulers, a range of magnetic objects of different weights (such as keys, cutlery, scissors, cans, tins), paper, measuring scales. Snap Science Lesson 5 **Key information:** There are two approaches being used to test the strength of the magnets in these

			Children decide on activities and draw a table to record results. Children decide how they will carry out each activity to answer the questions. They collect the resources that they need and draw a table to record their measurements. Show one set of results – ask the other children if their results are the same – ask them to look at each result carefully.	Challenge activities. One is with the magnet touching the objects, such as 'How much can a magnet hold/lift up?' The other is exploring the distance from which the magnet affects an object, for example, the paperclip, when they are not touching.
Lesson 6 How do magnets affect each other?	2 hours	WALT: identify the two poles on a magnet and investigate how magnets attract or repel each other. WILF: I know that a magnet has two	**Working Scientifically:** Making systematic and careful observations. Key vocabulary: north pole, south pole, attract, repel, magnet Watch video 1. Children to describe the motion, can they think of reasons for the erratic movement? Challenge 1 Children investigate the effect of bringing two magnets together. Children use two magnets with poles clearly identified to explore them.	**Resources:** Bar magnets with poles labelled, a good range of different types of magnets, such as bar, disc with the poles unmarked or covered, iron filings, petri dishes. Snap Science Lesson 7. **Health and safety:**

		poles: north and south. I can describe the effect of bringing two poles together. I can correctly use the terms attract and repel.	Show slideshow 1 to demonstrate the relationship between poles. Challenge 2 Children explore different types of magnets, identifying the north and south poles. Using the marked magnets can they identify the poles on other magnets? Draw each magnet and mark the poles clearly on it. Challenge 3 Children investigate patterns using iron filings. Show children ow to put a magnet underneath a petri dish (with a lid on) to make patterns. Use resource sheet 2 to help them explore patterns. Show Video 1 again. Ask the children to identify how this is behaving, for example, the pendulum is swinging in a random motion, not swinging to and fro. Why is the motion so random? Provide the children with the key words on Slideshow 2 and ask them to work in pairs with their talk partner to create one or two sentences to explain what is happening. Encourage them to draw a diagram to help with the explanation.	Iron filings are a health hazard if inhaled or if they get into eyes, and can be a skin irritant. They must be kept in tightly sealed plastic containers.