.St Bernadette's Catholic Primary Voluntary Academy

Science Medium Term Planning - LKS2 Lent Term Cycle A - Incredible Inventions

Prior Learning	
EYFS: • ELG - Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences. • Explore & talk about different forces they can feel e.g. stretch, snap, rigid, magnetic repulsion, water pushing up when pushing a boat under it • Observe & interact with natural processes, such as a magnet attracting an object & a boat floating on water • Explore how things work e.g. pulleys.	KS1 • Identify and classify things they observe. • Gather and record data to help in answering questions. • Compare and group together a variety of everyday materials on the basis of their simple physical properties- exploring which materials let light pass through.

Lesson 1 Electricity Topic	L.O.44: To be able to identify common appliances that run on electricity (NC4). <u>Year 3</u> L.O. 3 *To be able to make careful observations*, and, where appropriate, take measurements using standard units, using a range of equipment. <u>*Year 4*</u> L.O. 3 *To be able to make systematic and careful observations,* and where appropriate to take accurate measurements.	**Focus- Electric and Non electric appliances** Introduce that our new science topic is electricity. Explore what electricity is and talk about where electricity comes from. Look at a variety of different items, toaster, laptop, torch, football, kettle, toy etc. Which use electricity? How do you know? Do they all use electricity in the same way? Explain about the differences between mains and battery electricity. Activity 1 - Sort the appliances that the children might find at home or school into a table of electric and non-electric items. Activity 2- Identify if the item uses mains electricity, battery electricity or both.	• Know appliances run on electricity. • Know mains electricity is when items are plugged into electrical wall socket • Know battery electricity is when an object has a battery in it.	Group appliances into electric and non electric Group appliances into if they use mains electricity, battery electricity or if they use both.	Appliance Electric Non-Electric Mains Battery

Lesson 2	L.O.45: To be able to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, ~~switches~~ and buzzers (NC4).	**Focus - Building a simple series circuit** Retrieval - Recap Lesson 1 - What electricity is and examples of electrical appliances. Explain what an electrical circuit is and that an electrical circuit must include at least 1 bulb, battery and 2 wires which are connected correctly to work. Discuss how the positive and negative ends of a battery must be connected to the circuit for the bulb to light up. Explore what a buzzer is. Activity 1 Children experiment with 1 bulb, 1 battery and 2 wires to see if they can make a complete circuit. Y4/HA - Challenge the children to include more than one bulb in their circuits. Activity 2 - Explore how buzzers work in a simple series circuit and include these in their circuit.	• Know a electrical circuit provides a path that electricity can flow. • Know an electrical circuit must include at least 1 bulb, battery and 2 wires to work.	Construct a live circuit using basic parts - bulb, battery, wire Use observation skills to document what they see happen	Battery Bulb Wires Positive Negative Practical

Lesson 3	L.O. 46 To be able to identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.	**Focus - Complete and Incomplete Circuits** Retrieval - Recap learning from lesson 1 and 2. Explain that an electrical circuit can be complete and incomplete and what these words mean. Look at diagrams of complete and incomplete circuits and practice identifying complete and incomplete circuits. Activity Look at different circuit diagrams and make a prediction about whether they think the circuit will work or not. Then, build the circuit to test their predictions. Record the results (did it light up or not) and conclusions (why it did or did not light up) in a table.	• Know a complete circuit needs: -a battery -no gaps -wires connecting to positive and negative ends of the battery • Know an incomplete circuit is when there is a gap in the circuit, so the electrical current cannot flow around it.	Predict whether the bulb will light by looking at circuit diagrams	Complete circuit Incomplete circuit Battery Bulb Wires
Lesson 4	L.O. 47 To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.	**Focus - Switches** Retrieval - Recap learning from Lesson 1, 2 and 3. Explore what a switch is and how it works. When a switch is open (off), there is a gap in the circuit and electricity cannot travel around the circuit. When a switch is closed (on), it makes the circuit complete and electricity can travel around the circuit. Discuss when and where they might see switches in everyday life. Activity Children create circuits that include switches and draw diagrams of their circuit in their book. Look at using different kinds of switches in their	• Know that when a switch is open (off), there is a gap in the circuit and electricity cannot travel around the circuit. • Know that when a switch is closed (on), it makes the circuit complete and electricity can travel around the circuit.		Open circuit Closed circuit Switch On Off Observation

		circuits. E.g. on/off switch and push to make switch. Write sentences in books to explain how the switch works using scientific vocabulary.			
Lesson 5	L.O. 48 To recognise some common conductors and insulators, and associate metals with being good conductors.	**Focus - Conductors and Insulators** <u>Retrieval</u> - Recap learning from Lesson 1, 2, 4 and 4 Show a variety of materials to the children. What are they? What can they be used for? Now explain what a conductor and insulator are. Will any of the materials work? Activity -Predict if each material will be a conductor (let electricity pass through it) or an insulator (does not let electricity pass through it) and then test each material.. Investigate together. Discuss findings as a class. Discuss how many metals, such as copper, iron and steel as good conductors of electricity but plastic, wood, glass and rubber are good electrical insulators.	• Know a conductor lets electricity pass through them. • Know an insulator does not let electricity pass through them.		Conductor Insulator
	End of topic assessment - Electricity				
Lesson 6 New Topic Forces and Magnets	L.O. 39 To be able to recognise that some forces need contact between two objects. NC: L.O. 39 To be able to recognise that some forces need contact between two objects, but magnetic forces can act at a distance (NC3)	**Focus - What is a force? (Push and Pull Forces)** Explain what a force is and that there are two forces: push and pull. We push and pull objects to do many different things. When we pus or pull objects, we can move the	• Know there are two forces: push and pull.		Force Push Pull Contact

		object, change the object's shape, or make the object change direction. <u>Activity</u> -Look at different pictures/scenarios and decide if the force being applied is a push force or a pull force. Discuss reasons why.			
Lesson 7 Double Lesson with lesson 8	L.O. 38 To be able to compare how things move on different surfaces. <u>Working scientifically LOs:</u> <u>Year 3</u> L.O.2: To be able to set up simple practical enquiries, comparative and fair tests, with support. <u>Year 4</u> L.O.2: To be able to set up simple practical enquiries, comparative and fair tests.	**Focus - Investigation Comparing objects moving on different surfaces (pattern seeking)** <u>Retrieval</u> - Recap learning from the previous lesson (push and pull forces). Explain that different surfaces create a force called friction. - Friction is a force between two surfaces that are sliding, or trying to slide, across each other. <u>Activity - Plan investigation</u> Investigation Question - Which surfaces have the most friction when pushing a toy car across it? Complete the investigation planning sheet, making predictions of which material has the most or least friction. Writing the method we will use and the equipment needed.	• Know friction is a force between two surfaces that are sliding, or trying to slide, across each other. • Know if an object has less friction it will move across a surface faster. • Know if an object has more friction it will move across a surface slower.	• <u>Making predictions</u> Using prior knowledge to suggest what will happen in an enquiry.	Friction Surface Sliding Faster Slower
Lesson 8 Double Lesson with Lesson 7	<u>Year 3</u> - L.O.6: To be able to record findings using simple scientific language, drawings, labelled diagrams and tables.	<u>Activity - Carry out and record results & conclusions for the investigation</u>		<u>Recording data</u> • Using tables, drawings and other means to note measurements. • Give verbal and written explanations	Labelled diagram Bar chart Results Conclusions

	Year 4 - L.O.6: To be able to record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Retrieval - Recap previous lessons' learning. Complete the investigation by testing how far a toy car will travel on 3 different surfaces - carpet, wood flooring (hall), blanket. All - Draw labelled diagrams to show how we conducted our investigation. Record results in a results table. Year 4 - As above and draw a bar chart to show the results on the 3 different surfaces. After recording the results, ask the children to discuss what pattern they notice between how far the car travelled on the different surfaces and the amount of friction (more or less). Make conclusions.		● Make simple conclusions .	
Lesson 9	L.O. 39 To be able to recognise that some forces need contact between two objects, but magnetic forces can act at a distance (NC3)	**Focus - Magnetic Forces** Retrieval - Recap previous lessons' learning. Children will learn about how most objects will require contact in order to move. However, they will learn that a magnet can act as a force from a distance. Watch the video on Explorify which shows how the toy car with a magnet attached to it can	● Magnetic forces do not need contact to move.	● Observe and measure the relationship between the closeness of the magnet and the distance the toy car travels	Magnetic Force Measure Results Conclusions

		be moved with another magnet showing magnetic force. <u>Activity - Magnetic forces at a distance</u> Put a toy car next to the ruler, with the start of the toy at 0cm and the rest of the ruler facing away from the toy. One at a time, slowly bring each magnet close to the toy. Measure in cm how far away the magnet is from the toy when the toy moves towards the magnets. Results to be recorded in their books and mae conclusions. E.g. the further away the magnet the shorter distance the toy car travelled. ("Applying magnetic force" twinkl).			
Lesson 10	L.O.40: To be able to observe how magnets attract or repel each other and attract some materials and not others (NC3).	**Focus - Testing materials to see if they are magnetic or not** <u>Retrieval</u> - Recap previous lessons' learning. Explain that if an object is magnetic then it will attract to the magnet but if it is not magnetic then it will not attract to a magnet. <u>Activity</u> - Predict which materials will be magnetic/non-magnetic. Use magnets to investigate which materials from the classroom are magnetic/non-magnetic. E.g. scissors, pencils, rulers, Children record their findings in a table.	• A magnet attracts objects that are magnetic. • Not all metals are magnetic.	• Predicting materials that will be magnetic • Recording results in a table	Magnet Attract Repel

		Not all metals are magnetic- only iron and nickel are.			
Lesson 11	L.O.41: To be able to 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 (NC3).	**Focus -Compare and group magnetic and non magnetic materials** Retrieval - Recap previous lessons' learning. Children to learn more about the properties that make something magnetic. For an object to be magnetic it must contain iron, nickel or cobalt. Explore that not all metals are magnetic. Activity - Sort the materials that we tested last lesson into a table with the categories 'magnetic' and 'no-magnetic'. Write sentences to explain the diagram and their results from last lesson.	• Know magnetic metals are: Iron Nickel Cobalt Steel	• Compare and group everyday materials	Compare Group together Iron Nickel Cobalt Steel
Lesson 12	L.O. 42 To be able to describe magnets as having two poles.	**Focus - North Pole and South Pole on Magnets** Retrieval - Recap previous lessons' learning. Introduce the children to magnets and their poles. Look at all different types of magnets and explain how they have poles. N and S. Look at what different types of magnets are used for in everyday life.	• Magnets have two poles: North South		North Pole South Pole

		Activity - Draw diagrams of different types of magnets and label them with magnet name and label the poles: ● Bar magnet ● Horseshoe magnet ● Disk or ring magnet Explain where they might have seen magnets in everyday life.			
Lesson 13	L.O. 43 To be able to predict whether two magnets will attract or repel each other, depending on which poles are facing. (Recognise that magnetic force doesn't need contact.)	**Focus - Predicting which poles of a magnet will attract or repel each other** Retrieval - Recap previous lessons' learning. Recap with the children the fact that all magnets have two poles from last lesson; a north and a south (probably shown in two colours on bar magnets). Activity - Predict whether they think the magnets will attract or repel each other. What will happen when you bring different poles together. What will happen when you bring similar poles together? Then, test the magnets and record results. Explore why N and S attract but N and N, S and S do not attract.	● Know North and south poles attract. ● Know the same poles will repel.	● Predict which poles of magnets will attract or repel each other ● Observe which magnets will attract or repel each other	North Pole South Pole Attract Repel
	End of topic test - Forces and Magnets				