Be Brave, Be Curious, Be Kind

Lesson Breakdown - Science

LANDAU FORTE ACADEMY MOORHEAD

Spring – Cycle A – LKS2

Prior Learning – EYFS
• explore, name and sort materials according to their properties • introduced to vocabulary such as hard, soft, smooth, rough, light and heavy • introduced to the phenomena of floating and sinking • describe, predict and investigate objects that float or sink
Prior Learning – KS1
• investigate the properties of materials • begin to recognise that a material's properties defines its use

Project: <u>Forces and Magnets</u>	Learning Objective	Skills	Knowledge	Resources
Introductory Knowledge: What is a force? Lesson 1	Notice that some forces need contact between two objects, but magnetic forces can act at a distance.	Explain that an object will not move unless a push or pull force is applied, describing forces in action and whether the force requires direct contact or whether the force can act at a distance (magnetic force).	An object will not move unless a pushing or pulling force is applied. Some forces require direct contact, whereas other forces can act at a distance, such as magnetic force. Forces act in pairs that oppose each other. Forces cause objects to move, change speed or change shape.	
Engage: Points of contact Lesson 2	Notice that some forces need contact between two objects, but magnetic forces can act at a distance.	Explain that an object will not move unless a push or pull force is applied, describing forces in action and whether the force requires direct contact or whether the force can act at a distance (magnetic force).	An object will not move unless a pushing or pulling force is applied. Some forces require direct contact, whereas other forces can act at a distance, such as magnetic force.	
Engage: Frictional forces	Notice that some forces need contact between two	Explain that an object will not move unless a push or pull force is applied, describing forces in action	An object will not move unless a pushing or pulling force is applied. Some forces require direct contact, whereas other forces can act at a distance, such as magnetic force.	• Range of objects that move when pushed

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Lesson 2	objects, but magnetic forces can act at a distance.	and whether the force requires direct contact or whether the force can act at a distance (magnetic force).		○ Balls ○ Marbles ○ Toy cars ○ Dice ○ Hoops
Engage: Exploring force meters Lesson 3	Make systematic and careful observations and take accurate measurements.	Take measurements in standard units, using a range of simple equipment.	Equipment is used to take measurements in standard units. Examples include data loggers plus sensors, timers (seconds, minutes and hours), thermometers (°C) and metre sticks (millimetres, centimetres and metres). Taking repeat readings can increase the accuracy of the measurement. A force meter is a piece of equipment that measures a force or mass. Forces are measured in newtons (N). Mass is measured in kilograms (kg).	• Range of push/pull force meters
Engage: Measuring and recording frictional forces (Lesson 1)	Compare how things move on different surfaces.	Compare how objects move over surfaces made from different materials.	Friction is a force between two surfaces as they move over each other. Friction slows down a moving object. Smooth surfaces usually generate less friction than rough surfaces. Friction is greater the rougher the surfaces.	• Range of different shoes • Push/pull force meters • Bulldog clips
Engage: Measuring and recording frictional forces (Lesson 2)	Report on findings from enquiries and use results to draw simple conclusions	Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements. View progression Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy.	Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected. Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams. Data can be used to provide evidence to answer questions. A bar chart displays information (data) as rectangular bars. A bar chart's vertical axis has a numerical scale, and its horizontal axis has values of something that has been investigated.	
Develop: Magnetic forces Lesson 3	Identify differences, similarities or changes related to simple scientific ideas and processes.	Investigate and compare a range of magnets (bar, horseshoe and floating) and explain that magnets have two poles (north and south)	Magnets have two poles (north and south). Opposite poles (north and south) attract each other, while like poles (north and north, or south and south) repel each other.	• Bar magnets

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		and that opposite poles attract each other, while like poles repel each other. Make increasingly careful observations, identifying similarities, differences and changes and making simple connections.	An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features. Magnetism is a non-contact force.	
Develop: Exploring magnets Lesson 4	Predict whether two magnets will attract or repel each other, depending on which poles are facing.	Investigate and compare a range of magnets (bar, horseshoe and floating) and explain that magnets have two poles (north and south) and that opposite poles attract each other, while like poles repel each other.	Magnets have two poles (north and south). Opposite poles (north and south) attract each other, while like poles (north and north, or south and south) repel each other. There are different types of magnets, such as horseshoe magnets, magnetic marbles, wand magnets and floating magnets. Magnets have different strengths.	• Range of different magnets
Develop: Magnetic fields Lesson 4	Make systematic and careful observations and take accurate measurements	Make increasingly careful observations, identifying similarities, differences and changes and making simple connections.	An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features. Magnets have invisible magnetic fields that can be seen using iron filings. Magnetic field lines emerge from a magnet's north pole then travel in an arc to a magnet's south pole. Magnetic force is stronger at the poles of a magnet	• Bar magnets • Masking tape • Iron filings • White card • Camera or tablet
Develop: Grouping and sorting magnetic materials Lesson 5	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.	Compare and group materials based on their magnetic properties.	Some materials have magnetic properties. Magnetic materials are attracted to magnets. All magnetic materials are metals but not all metals are magnetic. Iron is a magnetic metal. Iron, cobalt, nickel and steel are magnetic metals.	• Magnets • Range of magnetic and non-magnetic materials
Develop: Magnetic Earth	Use straightforward scientific evidence to	Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with	Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected.	• Shallow bowls • Sewing needles or paperclips

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Lesson 5	answer questions or to support their findings.	help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements.	The Earth acts like a huge bar magnet. It is surrounded by an invisible magnetic field called the magnetosphere, protecting it from the Sun's solar wind.	• Drinking straws • Bar magnets and floating magnets • Marker pens • Compass

Develop: Uses of magnets and friction	Ask relevant questions and using different types of scientific enquiries to answer them.	Ask questions about the world around them and explain that they can be answered in different ways.	Questions can help us find out about the world and can be answered in different ways. • Why do people change their car tyres in winter? • Why are bowling alleys slippery? • How do you make the soles of shoes less slippery? • What would life be like without friction? • Which magnets are the strongest? • Why are magnets used in some electrical devices? • Why are magnets used in recycling plants? • Do all planets have a magnetosphere? • If you cut a magnet in half, what happens to its poles?	• Tablets • printer
Innovate Observing, measuring and recording Step 1 (30mins)	Set up simple practical enquiries, comparative and fair tests.	Set up and carry out some simple, comparative and fair tests, making predictions for what might happen.	Tests can be set up and carried out by following or planning a set of instructions. A prediction is a best guess for what might happen in an investigation based on some prior knowledge.	• Sets of five different magnets labelled 1–5 (one set per group) • Push/pull force meters • Index cards • Paperclips • Squared paper • Rulers and pencils
Innovate Observing, measuring and recording	Set up simple practical enquiries, comparative and fair tests.	Set up and carry out some simple, comparative and fair tests, making predictions for what might happen.	Tests can be set up and carried out by following or planning a set of instructions. A prediction is a best guess for what might happen in an investigation based on some prior knowledge.	• Sets of five different magnets labelled 1–5

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Step 2 (20mins)				(one set per group) • Push/pull force meters • Index cards • Paperclips • Squared paper • Rulers and pencils
Innovate Observing, measuring and recording Step 3 (30mins)	Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	Gather and record findings in a variety of ways (diagrams, tables, charts and graphs) with increasing accuracy.	Data can be recorded and displayed in different ways, including tables, charts, graphs and labelled diagrams. Data can be used to provide evidence to answer questions.	
Innovate Observing, measuring and recording Step 4 (45mins)	Report on findings from enquiries and use results to draw simple conclusions.	Use suitable vocabulary to talk or write about what they have done, what the purpose was and, with help, draw a simple conclusion based on evidence collected, beginning to identify next steps or improvements. View progression Make increasingly careful observations, identifying similarities, differences and changes and making simple connections.	Results are information that has been discovered as part of an investigation. A conclusion is the answer to a question that uses the evidence collected. An observation involves looking closely at objects, materials and living things, which can be compared and grouped according to their features.	

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Links within other projects:	Learning Objective	Skills	Knowledge
Geography: Rocks, Relics and Rumbles Lesson 1: How are rocks used?	Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.	Compare and group rocks based on their appearance, properties or uses.	There are three different rock types: sedimentary, igneous and metamorphic. Sedimentary rocks form from mud, sand and particles that have been squashed together over a long time to form rock. Examples include sandstone and limestone. Igneous rocks are made from cooled magma or lava. They usually contain visible crystals. Examples include pumice and granite. Metamorphic rocks are formed when existing rocks are heated by the magma under the Earth's crust or squashed by the movement of the Earth's tectonic plates. They are usually very hard. Examples include slate and marble.
Geography: Rocks, Relics and Rumbles Lesson 2: Fossils	Describe in simple terms how fossils are formed when things that have lived are trapped within rock.	Describe simply how fossils are formed, using words, pictures or a model.	Fossils form over millions of years and are the remains of a once-living organism, preserved as rock. Scientists can use fossils to find out what life on Earth was like in prehistoric times. Fossils form when a living thing dies in a watery environment. The body gets covered by mud and sand and the soft tissues rot away. Over time, the ground hardens to form sedimentary rock and the skeletal or shell remains turn to rock.
Geography: Rocks, Relics and Rumbles Lesson 4: Soil Testing	Recognise that soils are made from rocks and organic matter.	Investigate soils from the local environment, making comparisons and identifying features.	Soils are made from tiny pieces of eroded rock, air and organic matter. There are a variety of naturally occurring soils, including clay, sand and silt. Different areas have different soil types.

Gaps:

- **Where you find fossils**
- **What materials are magnetic**

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Key Vocabulary:							
alloy	compass	Ferro fluid	iron	magnetite	non-contact force	push	solar wind
atmosphere	conclusion	ferrous	lubricant	magnetosphere	north pole	question	south pole
attract	contact force	findings	magnet	material	observe	record	steel
attraction	data	force	magnetic	measurement	outer core	repel	surface
aurora	describe	force meter	magnetic field	metal	prediction	repulsion	table
bar chart	diagram	friction	magnetic force	method	property	research	test
cobalt	equipment	frictional force	magnetise	Newtons	pull	results	tread pattern
compare	explanation	investigation	magnetism	nickel			