

## ADVENT TERM 1

### SCIENCE – Year 3 - Medium Term Planning – PHYSICS: FORCES AND MAGNETS

<u>LESSON 1</u>	<u>LESSON 2</u>	<u>LESSON 3</u>
<p><b>LEARNING INTENTION:</b> To know that physics is a branch of science.</p> <p>To know that a force is an action that changes or maintains the motion of an object.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> </ul> <p><b>Aim:</b> Develop scientific knowledge and conceptual understanding through the specific disciplines of physics.</p>	<p><b>Interpreting results</b></p> <p><b>LEARNING INTENTION:</b> To know friction is a stopping / slowing force.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> <li>Use results to draw simple conclusions and raise further questions.</li> </ul> <p><b>Aim:</b> Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.</p>	<p><b>Setting up tests</b> <b>Observing and Measuring</b></p> <p><b>LEARNING INTENTION:</b> To know that a forcemeter measures a force or mass.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Set up simple practical enquiries, comparative and fair tests, with support</li> <li>Make careful observations and, where appropriate, take measurements using standard units, using a range of equipment.</li> </ul> <p><b>Aim:</b> Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.</p>
<p><b>Key Vocabulary:</b> physics, force, contact, non-contact, pairs, opposite</p>	<p><b>Key Vocabulary:</b> force, friction, opposite, movement, slows, smooth, rough, increase, decrease, reduce</p>	<p><b>Key Vocabulary:</b> forcemeter, force, mass, Newtons, kilograms, measure</p>
<p><b>Recap &amp; retrieval:</b></p>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>Forces act in pairs that oppose each other.</li> </ul>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>Forces act in pairs that oppose each other.</li> <li>Friction always slows down a moving object.</li> </ul>

**Key Knowledge:****Child:**

- An object will not move unless a pushing or pulling force is applied.
- Forces act in pairs that oppose each other.
- Forces cause objects to move, change speed or change shape.

**Teacher:**

- Physics is a branch of science that studies matter and its motion as well as how it interacts with energy and forces.
- Scientists who are experts in physics are called physicists.
- Some forces require direct contact, whereas other forces can act at a distance, such as magnetic force.

**Key Knowledge:****Child:**

- Friction is a force between two surfaces as they move across each other.
- Friction acts in the opposite direction to the movement.
- Friction always slows down a moving object.

**Teacher:**

- Friction is in all places where two surfaces meet.
- When the underside of an object is smooth, frictional force is reduced.
- Objects move differently on different surfaces.
- The amount of friction depends on the materials the surfaces are made from.
- The rougher the materials, the larger the frictional force.
- The smoother the materials, the smaller the frictional force.
- Friction also produces heat, which can be a problem as it can cause damage to moving parts of machines.

**Key Knowledge:****Child:**

- A force meter is a piece of equipment that measures a force or mass.
- Forces are measured in newtons (N).

**Teacher:**

- Mass is measured in kilograms (kg).

## ADVENT TERM 1

### SCIENCE – Year 3 - Medium Term Planning – PHYSICS: FORCES AND MAGNETS

LESSON 4	LESSON 5	LESSON 6
<p><b>LEARNING INTENTION:</b> To know that magnetism is a non-contact force. To know that a magnet has a North and South pole.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>Observe how magnets attract or repel each other and attract some materials and not others.</li> <li>Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.</li> </ul> <p><b>Aim:</b> Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.</p>	<p><b>Communicating results</b></p> <p><b>LEARNING INTENTION:</b> To know that some materials are attracted to magnets and some are not.</p> <p><b>Disciplinary Knowledge:</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Report on findings from enquiries, including oral and written explanations.</li> </ul> <p><b>Aim:</b> Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.</p>	<p><b>LEARNING INTENTION:</b> To know that William Gilbert discovered that the Earth was magnetic.</p> <p><b>Disciplinary Knowledge:</b></p> <p><b>Aim:</b> Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.</p>
<p><b>Key Vocabulary:</b> force, magnet, magnetism, non-contact, poles, magnetic field, attract, repel, attraction, repulsion, opposite, like</p>	<p><b>Key Vocabulary:</b> magnetic, materials, metal, iron, cobalt nickel, aluminium, gold, copper, silver, alloy, non-magnetic</p>	<p><b>Key Vocabulary:</b> magnetism, magnetic, lodestone, iron ore, spherical, sphere, compass</p>
<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>Forces act in pairs that oppose each other.</li> <li>Friction always slows down a moving object.</li> <li>Forces are measured in newtons (N).</li> </ul>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>Forces act in pairs that oppose each other.</li> <li>Friction always slows down a moving object.</li> <li>Forces are measured in newtons (N).</li> <li>Opposite poles attract and like poles repel.</li> </ul>	<p><b>Recall &amp; retrieval:</b></p> <ul style="list-style-type: none"> <li>Forces act in pairs that oppose each other.</li> <li>Friction always slows down a moving object.</li> <li>Forces are measured in newtons (N).</li> <li>Opposite poles attract and like poles repel.</li> </ul>

		<ul style="list-style-type: none"> <li>All magnetic materials are metals, but not all metals are magnetic.</li> </ul>
<p><b>Key Knowledge:</b></p> <p><b>Child:</b></p> <ul style="list-style-type: none"> <li>Some forces exert a push or a pull but have no direct contact with the objects they affect. These are called non-contact forces.</li> <li>A magnetic force is a type of non-contact force.</li> <li>Opposite poles attract and like poles repel.</li> </ul> <p><b>Teacher:</b></p> <ul style="list-style-type: none"> <li>A magnetic force or magnetism is created by magnets.</li> <li>When two magnets are close together they create a pushing or pulling force on each other.</li> <li>The invisible forces we can feel when magnets are close together are caused by their magnetic fields.</li> <li>Magnetic fields are invisible but can be shown as lines on a diagram.</li> <li>All magnets have two ends called poles. These poles are called the north pole and the south pole.</li> </ul>	<p><b>Key Knowledge:</b></p> <p><b>Child:</b></p> <ul style="list-style-type: none"> <li>Magnets use their magnetism to pull some materials towards them.</li> <li>All magnetic materials are metals, but not all metals are magnetic.</li> <li>Some objects are magnetic because they have parts made from magnetic metals</li> </ul> <p><b>Teacher:</b></p> <ul style="list-style-type: none"> <li>Iron, cobalt and nickel are three natural metals that are magnetic.</li> <li>Aluminium, gold, copper and silver are not magnetic.</li> <li>Other materials, such as plastic, glass, paper and wood, are not magnetic.</li> </ul>	<p><b>Key Knowledge:</b></p> <p><b>Child:</b></p> <ul style="list-style-type: none"> <li>William Gilbert discovered that lodestone (magnetic iron ore) was magnetic.</li> <li>He created the science of magnetism, not least through his discovery that the Earth is a magnet.</li> <li>He believed that a perfectly spherical lodestone, if aligned with the earth's North and South poles, would cause it to spin on its axis as Earth does every 24 hours.</li> <li>He was the first to use a thoroughly experimental method to support his new conclusions.</li> </ul> <p><b>Teacher:</b></p> <ul style="list-style-type: none"> <li>A unit of magnetomotive force, also known as magnetic potential, was named the <i>Gilbert</i> in his honour.</li> <li>He also did pioneering work in electricity.</li> <li>For this he is celebrated by the physics community.</li> <li>Gilbert's findings suggested that magnetism was the soul of the Earth.</li> <li>Gilbert was in fact debunking the traditional cosmologists' belief that the Earth was fixed at the centre of the universe.</li> </ul>

		<ul style="list-style-type: none"><li>• He made Galileo think, who eventually came up with the proposition that the Earth revolves around the Sun.</li><li>• Gilbert was born 24<sup>th</sup> May 1544 and died on 30 November 1602, probably of the plague.</li></ul>
<b>Assessment</b> Cumulative quiz. Retrieval practice.		