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| **ADVENT TERM 1**  **SCIENCE – Year 3 - Medium Term Planning – PHYSICS: FORCES AND MAGNETS** | | |
| **LESSON  1** | **LESSON  2** | **LESSON  3** |
| **LEARNING INTENTION:**  To know that physics is a branch of science.  To know that a force is an action that changes or maintains the motion of an object.  Skills:  Explain and describe forces in action.  Aim:  Develop scientific knowledge and conceptual understanding through the specific disciplines of physics. | **LEARNING INTENTION:**  To know friction is a stopping / slowing force.  Skills:  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.  Aim:  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. | **LEARNING INTENTION:**  To know that a force meter measures a force or mass.  Skills:  Take measurements in standard units, using a range of simple equipment.  Aim:   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. |
| **Key Vocabulary:**  Physics, force, contact, non-contact, pairs, opposite | **Key Vocabulary:**  Force, friction, opposite, movement, slows, smooth, rough, increase, decrease, reduce | **Key Vocabulary:**  Forcemeter, force, mass, Newtons, mass, kilograms, measure |
| **Recap & retrieval:** | **Recall & retrieval:**   * Forces act in pairs that oppose each other. | **Recall & retrieval:**   * Forces act in pairs that oppose each other. * Friction always slows down a moving object. |
| **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). |

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| **ADVENT TERM 1**  **SCIENCE – Year 3 - Medium Term Planning – PHYSICS: FORCES AND MAGNETS** | | |
| **LESSON  4** | **LESSON  5** | **LESSON  6** |
| **LEARNING INTENTION:**  To know that magnetism is a non-contact force.  To know that a magnet has a North and South pole.  Skills:  Make increasingly careful observations, identifying similarities, differences and changes and making simple connections.  Aim:  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. | **LEARNING INTENTION:**  To know that some materials are attracted to magnets and some are not.  Skills:  Compare and group materials based on their magnetic properties.  Aim:  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. | **LEARNING INTENTION:**  To know that William Gilbert discovered that the Earth was magnetic.  Skills:  Research and understand the legacy of William Gilbert’s discovery.  Aim:  Are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. |
| **Key Vocabulary:**  Force, magnet, magnetism, non-contact, poles, magnetic field, attract, repel, attraction, repulsion, opposite, like | **Key Vocabulary:**  Magnetic, materials, iron, cobalt nickel, aluminium, gold, copper, silver, alloy, non-magnetic | **Key Vocabulary:**  Magnetic, lodestone, iron ore, spherical, sphere, compass |
| **Recall & retrieval:**   * Forces act in pairs that oppose each other. * Friction always slows down a moving object. * Forces are measured in newtons (N). | **Recall & retrieval:**   * Forces act in pairs that oppose each other. * Friction always slows down a moving object. * Forces are measured in newtons (N). * Opposite poles attract and like poles repel. | **Recall & retrieval:**   * Forces act in pairs that oppose each other. * Friction always slows down a moving object. * Forces are measured in newtons (N). * Opposite poles attract and like poles repel. * All magnetic materials are metals, but not all metals are magnetic. |
| **Key Knowledge:**  **Child:**   * Some forces exert a push or a pull but have no direct contact with the objects they affect. These are called non-contact forces. * A magnetic force is a type of non-contact force. * Opposite poles attract and like poles repel.   **Teacher:**   * A magnetic force or magnetism is created by magnets. * When two magnets are close together they create a pushing or pulling force on each other. * The invisible forces we can feel when magnets are close together are caused by their magnetic fields. * Magnetic fields are invisible but can be shown as lines on a diagram. * All magnets have two ends called poles. These poles are called the north pole and the south pole. | **Key Knowledge:**  **Child:**   * Magnets use their magnetism to pull some materials towards them. * All magnetic materials are metals, but not all metals are magnetic. * Some objects are magnetic because they have parts made from magnetic metals   **Teacher:**   * Iron, cobalt and nickel are three natural metals that are magnetic. * Aluminium, gold, copper and silver are not magnetic. * Other materials, such as plastic, glass, paper and wood, are not magnetic. | **Key Knowledge:**  **Child:**   * William Gilbert discovered that lodestone (magnetic iron ore) was magnetic. * He created the science of magnetism, not least through his discovery that the Earth is a magnet. * 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. * He was the first to use a thoroughly experimental method to support his new conclusions.   **Teacher:**   * A unit of magnetomotive force, also known as magnetic potential, was named the *Gilbert* in his honour. * He also did pioneering work in electricity. * For this he is celebrated by the physics community. * Gilbert's findings suggested that magnetism was the soul of the Earth. * Gilbert was in fact debunking the traditional cosmologists' belief that the Earth was fixed at the centre of the universe. * He made Galileo think, who eventually came up with the proposition that the Earth revolves around the Sun. * Gilbert was born 24th May 1544 and died on 30 November 1602, probably of the plague. |
| **Assessment**   Cumulative quiz. Retrieval practice. | | |