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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.
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| **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.
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| **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.
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| **Assessment**  Cumulative quiz. Retrieval practice. |