

Science – Year 3

Forces and Magnets

Are all metals attracted to magnets?

Does the size and shape of a magnet affect how strong it is?

NC objectives - areas of study	End point of area of study	Vocabulary		
		Basic	Adventurous	Technical
<p>compare how things move on different surfaces</p> <p>notice that some forces need contact between two objects, but magnetic forces can act at a distance</p> <p>observe how magnets attract or repel each other and attract some materials and not others</p> <p>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</p> <p>describe magnets as having two poles</p> <p>predict whether two magnets will attract or repel each other, depending on which poles are facing.</p>	<p>Pupils observe magnetic forces working without direct contact and explore the behaviour and uses of different magnets and explain their observations. They compare magnetic forces with other forces that need direct contact for example pushing or pulling a door.</p> <p>Pupils identify magnetic materials and investigate those which are attracted and repelled. Pupils know a magnet has two poles and predict the behaviour of two magnets depending on which poles are facing. They can explain their findings of working with different magnets and the strength of each type.</p>	<p>push, pull, twist, non-magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron,</p>	<p>force,</p>	<p>contact force, non-contact force steel, poles, north pole, south pole</p>

Knowledge

Substantive Knowledge

This is the children's first opportunity to work as physicists.

Lesson 1

LO To know that magnets attract and repel.

force, magnet, metal, poles, north pole, south pole

Disciplinary Knowledge

Working as physicists to study the use of energy in the world around them in the form of forces.

- Know that metal is a material from which objects can be made
- Know that magnets have two poles called north and south
- Know that like poles (south-south and north-north) of two magnets repel each other and that opposite poles of two magnets (north-south) attract each other
- Know that a force can be thought of as a push or a pull

Lesson 2

LO To know that there is a magnetic field around a magnet.

magnetic force, magnet, strength,

- Know that there is a magnetic field around a magnet which is strongest at each pole
- Pupils explore the magnetic field of a magnet using iron filings in containers.
- If you can't see something is it real?

● Lesson 3

● LO To know that some materials are magnetic.

● attract, repel, magnetic material, metal, iron, steel,

- Know that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic
- Sort and classify materials according to their magnetic properties.
- To appreciate the different properties of materials- that maybe challenge previous knowledge (not all metals are magnetic).

Lesson 4

LO To know there are different forces.

force, push, pull, twist, contact force, non-contact force, magnetic force,

- Know that there are different types of contact force: impact forces (when two surfaces collide), frictional forces (when two surfaces are already in contact) and strain forces (when an elastic material is stretched or squashed)
- Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force

Lesson 5

Similarities and differences

Children work as physicists to explore how different things move and begin to group and classify them. Exploring how magnets make things move, they look for similarities and differences in how things move across different surfaces, gathering and recording data to find answers to questions.

Classifying different materials as magnetic and those which are not, they sort items according to the material they are made from.

Patterns

Children explore the behaviour of different magnets and explain patterns in their findings.

They should work with bar, ring, button and horseshoe magnets, exploring the strength of each. Is there any pattern in the findings? Children find fair ways to compare magnets.

Children ask and answer their own questions through exploration, recording their findings through notes, drawings, tables, bar charts and photographs. They may video explanations of them using the correct scientific vocabulary too. Children explore magnets and find patterns in the way they behave in relation to each other, for example depending on how their poles are facing.

Evidence

Through observations pupils know that magnetic forces can act without direct contact unlike most forces where direct contact is necessary. Through exploration and play with magnets and magnetic games, they can discuss the evidence they have for the behaviour of magnetic forces.

Using evidence children draw conclusions about the strengths of different magnets and explain their knowledge base for this.

LO To know objects move differently on different surfaces.

force, contact force, non-contact force, magnetic force, magnet, attract, repel, magnetic material,

- Know that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves
- Know that as objects move across a surface there is friction when they rub against each other and that sometimes this friction is larger or smaller
- Know that applying forces to objects can change their shape
- Know that the roughness of a material is an example of a property

Concepts

Biology

Chemistry

Physics

SKILLS

1. Compare

2. Explore

3. Identify

4. describe

5. classify

6. Question

7. observe

8. test

9. record

10. research

ASSESSMENT

KNOW MORE, REMEMBER MORE, DO MORE...

In this unit of learning, progress has been made when a learner knows more. This 'distance travelled' from the starting point is evidenced through them remembering more and doing more: in books, low stakes quizzes, retrieval, use of mind maps, answering the big question and being able to feel more confident about this unit.