Ashtree Primary School and Nursery Medium Term Plan for Science

Year 3 Spring Term – Forces Unit – Magnets and Forces

Prior Knowledge – EYFS & Y2

- **Revise and refine the fundamental movement skills they have already acquired: - rolling, crawling, walking, jumping, running, hopping, skipping, climbing**
- **Further develop and refine a range of ball skills including: throwing, catching, kicking, passing, batting and aiming.**
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)

Prior Skills – EYFS

Comparative testing
Classification

Key Vocabulary Force, push, pull, speed up, slow down, change shape, change direction, movement, direction, friction, magnets, magnetic, surface, magnetism, north pole, south pole, repel, attract,

Key Knowledge

Step 1 - that pushes and pulls are forces
- recognise that a force acts in a particular direction

Step 2 - observe the movements, shape and direction of objects when forces act on them
- describe how to make a familiar object start moving by pushing or pulling

Step 3 - describe how to use pushes and pulls to make familiar objects speed up, slow down, change direction or shape
Step 4 - produce annotated drawings showing the direction of force needed to make an object move
Step 5 - identify friction as a force
- observe and explore how friction affects the movement of objects

Step 6 - describe some ways in which friction between solid surfaces can be increased or decreased
Step 7 - classify materials as magnetic or non-magnetic
Step 8 - describe the difference between a magnet and a magnetic material
Step 9 - describe what happens when some materials are put near a magnet
Step 10 - recall that magnets have a north and a south pole
Step 11 - describe the direction of forces between magnets

Key Skills

Step 1 - beginning to make systematic and careful observation
Step 2 - sets up simple practical enquiries, comparative and fair tests with support, asks relevant questions and uses, with support, different types of scientific enquiries to answer them
Step 3 - beginning to make systematic and careful observation
Step 4 - with support, records and presents findings using drawings, labelled diagrams, keys, tally charts**,** Carroll diagrams, Venn diagrams**, bar charts and tables**
Step 5 - reports on findings from enquiries, in simple scientific language, using oral and written explanations.
Step 6 - Using model frames for support, gathers and records data in a variety of ways to help in answering questions
Step 7 - uses observable criteria to group, sort and classify in different ways
Step 8 – reports on findings from enquiries, in simple scientific language, using oral and written explanations.
Step 9 – beginning to make systematic and careful observation
Step 10 – reports on findings from enquiries, in simple scientific language, using oral and written explanations.
Step 11 - reports on findings from enquiries, in simple scientific language, using oral and written explanations.

Curriculum Enhancements

Explore how magnets are used in everyday life

Have some 'Magnetix' or similar construction toys available to use in class

Possible Misconceptions

Some children may think:

the bigger the magnet the stronger it is

all metals are magnetic.

Suggested Activities

Step 1 – Discuss how we play games e.g. football and how we make the ball move, stop, change direction etc. Relate to forces. Play a game of football!

Step 2 – Identify how to use different playground items (slide, swing, climbing frame etc) and which forces you need. Differentiate between pushes and pulls.

Step 3 – Using the scenarios from the previous steps, children to annotate diagrams of games and activities, to show where the force is applied and whether it is a push or a pull (or twist).

Step 4 – Prior knowledge – why is it tricky to walk on ice? Watch examples of winter sports (bob sleigh, curling etc) Explain how friction is a force and it is reduced in these activities.

Step 5 - Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc.

Step 6 – Design the perfect shoe for walking on ice.

Explore what materials are attracted to a magnet.

Step 7 - Classify materials according to whether they are magnetic.

Step 8 – True or False statement – A magnetic material is also a magnet.

Step 9 – describe what happens when some materials are put near a magnet

Step 10 - Explore the way that magnets behave in relation to each other. Use a marked magnet to find the unmarked poles on other types of magnets.

Step 11 - describe the direction of forces between magnets

This will lead to . . . Y5 – Forces

Step 1 - identify weight as a force and identify that force is measured in Newtons and name simple forces such as gravity, friction and air resistance

Step 2 - recognise that more than one force can act on an object and observe and explore the effect of several forces on objects

Step 3 - describe and explain the motion of some familiar objects in terms of several forces acting on them

Step 4 - identify forces on an object as either balanced or unbalanced and use the terms 'balanced' and unbalanced' when describing several forces on an object

Step 5 - explain that balanced forces on an object cause it to remain stationary or travel at the same speed and explain that unbalanced forces on an object cause it to speed up, change shape or slow down

Step 6 - understand that air resistance is the frictional force of air on objects moving through it and recognise that air resistance slows things down (gravitational attraction)

Step 7 - describe some of the factors that increase friction between solid surfaces and increase air and water resistance (upthrust, surface area)

Step 8 - describe situations in which frictional forces are helpful as well as those in which frictional forces are unhelpful

Step 9 - **recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.**