

Forces

Definition: Force - strength or energy as an attribute of physical action or movement.

Physics definition: Physics is the study of nature and how matter and energy behave.

POS:

- compare how things move on different surfaces
- notice that some forces need contact between 2 objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- 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
- describe magnets as having 2 poles
- predict whether 2 magnets will attract or repel each other, depending on which poles are facing

Prior learning:

Explore how things work. (Nursery - Forces)
 Explore and talk about different forces they can feel. (Nursery - Forces)
 Talk about the differences between materials and changes they notice. (Nursery - Forces)
 Explore the natural world around them. (Reception - Forces)
 Describe what they see, hear and feel whilst outside. (Reception - Forces)
 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)

Links to other science topics:

- States of matter
- Properties and changes of materials

Disciplinary concepts:

Cause and effect: How do forces affect an objects movement?

Common misconceptions:

The bigger the magnet the stronger it is
 All metals are magnetic
 People think that to keep an object moving you need to keep giving the object a force (push)
 A stationary object has no forces acting on it. The reason the object is stationary is because the forces acting on it are balanced.

Core Knowledge:

A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes.
 A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract.
 For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts.

Wider Knowledge:

Sir Isaac Newton was an English mathematician and physicist who lived from 1642-1727. The legend is that Newton discovered Gravity when he saw a falling apple while thinking about the forces of nature - <https://sciencing.com/first-person-discover-gravity-23003.html>

Working scientifically:

Explore what materials are attracted to a magnet.
 Classify materials according to whether they are magnetic.
 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.
 Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table.
 Devise an investigation to test the strength of magnets.

End Goals:

- To explore how objects move on different surfaces
- To explore making objects move using contact forces and those that act at a distance (magnetic forces).
- To explain the role of a magnet
- To know that some materials are magnetic and that others are not.

CPD: Reach out CPD

Science Association / STEM website