


Forces

Threshold Concept

Every action has an equal and opposing action.

Contact and non contact forces

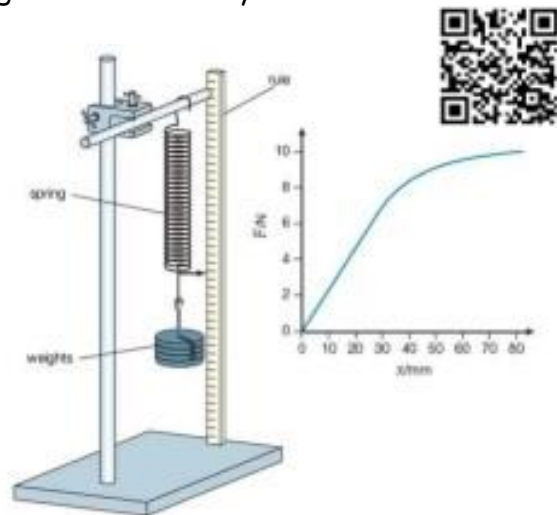
Contact Force	Non-Contact Force
<p>A contact force involves a force between two objects in contact.</p> 	<p>A non-contact force involves a force between objects not touching. You can't 'see' anything physically touching, but there is still an attraction or repulsion.</p>
<p>For example, friction between your feet and the ground can be present.</p>	<p>For example, magnetic forces between two magnets can happen when the magnets are near but not touching.</p>

Keywords

- **Contact:** Contact forces are forces that act between two objects that are physically touching each other.
- **Non contact:** Non-contact forces are forces that act between two objects that are not physically touching each other.
- **Balanced:** When the total force in opposite directions are equal in magnitude.
- **Unbalanced:** When the total force in opposite directions aren't equal in magnitude.
- **Force:** A push or a pull. The unit of force is the newton (N).

Required practical

When you apply a force to a material it can extend. The extension is the amount the length has increased by.



Scalar and vector quantities

A scalar quantity has only **magnitude**.
A vector quantity has both **magnitude** and **direction**.

Scalar Quantities

length, area, volume
speed
mass, density
pressure
temperature
energy, entropy
work, power



Vector Quantities

displacement
velocity
acceleration
momentum
force
lift, drag, thrust
weight



Free body diagrams

A free body diagram models the forces acting on an object

The object or 'body' is usually shown as a box or a dot. The forces are shown as thin arrows pointing away from the centre of the box or dot

Pressure:

Pressure is the amount of force applied to a specific area. It is caused when objects exert a force on another object. It can be on a visible level (pushing a door, rolling out cake icing) or at a molecular level (gas particles in a can)



Equations for this topic

weight = mass × gravitational field strength	$W = m g$
work done = force × distance (moved along the line of action of the force)	$W = F s$
force = spring constant × extension	$F = k e$
moment of a force = force × distance (perpendicular to the direction of the force)	$M = F d$
pressure = $\frac{\text{force normal to a surface}}{\text{area of that surface}}$	$p = \frac{F}{A}$
distance travelled = speed × time	$s = v t$
resultant force = mass × acceleration	$F = m a$

Ecology

Threshold Concept

Understand that living things interact with the world around them

Different Habitat An area where an organism is at home



Adaptations



Keywords

Living- Undertaking the seven processes of living things
 Changes - structural, physiological and behavioural changes that allow species to compete
 Animal - Living creature of one of seven domains
 Plant - Living tissue that is a producer
 Energy - The flow through all organisms and food chains

Food Chains/Webs - show the flow of energy



Abiotic and Biotic Factors

Biotic factors	Abiotic factors
Living factors that affect another organism or shapes the environment.	Non-living factors that affect organisms.
<ul style="list-style-type: none"> ✓ Predation ✓ Food availability ✓ Competition ✓ Disease 	<ul style="list-style-type: none"> ✓ Temperature ✓ Light intensity ✓ Water ✓ Soil PH & mineral content ✓ Gases

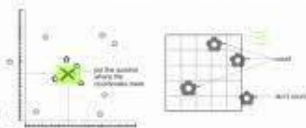


Required practical



Quadrats

1. Measure area and form a grid
2. Take 2 random numbers and use these as coordinates on your grid
3. Lay your quadrat down
4. Count the number of a species and record results



- Must be random assignment of grids
- The bigger the sample the better (validity)

Producers and Consumers



Equations for this topic

Metals

Threshold Concept

Identify most metals have similar properties

Metals and non metals

Most elements on the periodic table are metals. They are grouped together in the middle to the left-hand side of the periodic table.

Non metals are on the right-hand side.



Keywords

Metal DEFINITION

Non metal DEFINITION

Property a characteristic of a particular substance

Reaction a process that leads to the change of one set of chemical substances into another

Alloy a mixture of two or more metals or a metal and a non-metal

Displacement A more reactive metal will displace a less reactive metal from its compound.

Physical properties of metals

Properties	Metals	Non-metals
Appearance	Shiny	Dull
Hardness	Very hard or hard	Brittle
Malleability	Malleable	Non-malleable
Ductility	Ductile	Non-ductile
Heat conduction	Good conductor	Bad conductor
Conduction of electricity	Good conductor	Bad conductor
State	Solid	Solids, liquid, gases
Density	Higher	Lower

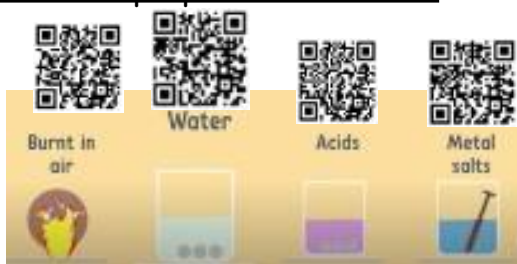


Metals and alloys

Making alloys changes the metals properties by changing its structure. Alloying is done for many reasons, typically to increase strength, increase corrosion resistance, or reduce costs



Chemical properties of metals



Practical - Displacement reactions

1. Metal

2. Sulfate

3. What did you see?

	Magnesium	Zinc	Copper
Magnesium sulfate	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Zinc sulfate	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Copper sulfate	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



The reactivity series

The Reactivity Series lists metals in order how easily they react with other substances

potassium	most reactive	K
sodium		Na
calcium		Ca
magnesium		Mg
aluminium		Al
carbon		C
zinc		Zn
iron		Fe
tin		Sn
lead		Pb
hydrogen		H
copper		Cu
silver		Ag
gold		Au
platinum	least reactive	Pt

Equations for this topic

Metal + acid → salt + hydrogen

Metal + oxygen → Metal oxide

Metal + water → Metal hydroxide + hydrogen