

Glossary

A

Accuracy An accurate measurement is close to the true value.

Acid rain Rain that is acidic due to dissolved gases, such as sulphur dioxide, produced by the burning of fossil fuels.

Activity Number of atoms of a radioactive substance that decay each second.

Adaptations Special features which make an organism particularly well suited to the environment where it lives.

Alcohol The commonly used name for drinks containing ethanol.

Alcoholics People who are addicted to alcohol.

Alkane A hydrocarbon with the general formula C_nH_{2n+2} .

Alkene A hydrocarbon with the general formula C_nH_{2n} .

Alleles A version of a particular gene.

Alloy A substance made by combining two or more metals.

Alpha radiation Alpha particles, each composed of two protons and two neutrons, emitted by unstable nucleus.

Analogue signal A signal that varies continuously in amplitude or frequency between a maximum and minimum value.

Anomalous A measurement that is well away from the pattern shown by other results.

Anorexia nervosa a mental disorder linked to an unrealistic body image and a need for control.

Antibiotics Drugs which destroy bacteria inside the body without damaging human cells.

Antigens The unique proteins on the surface of a cell. They are recognised by the immune system as 'self' or 'non-self'.

Arthritis A painful and debilitating disease affecting the joints.

Atomic nucleus Positively charged object composed of protons and

neutrons at the centre of every atom with one or more electrons moving round it.

Atom The smallest part of an element.

B

Background microwave radiation

Electromagnetic radiation emitted shortly after the Big Bang. Its discovery confirmed the Big Bang theory.

Background radioactivity

Radioactivity from substances around us.

Bar charts Used when the independent variable is categorical and the dependent variable is continuous.

Beta radiation Beta particles which are high-energy electrons created in and emitted from unstable nuclei.

Bias The influence placed on scientific evidence because of: wanting to prove your own ideas; supporting the person who is paying you; political influence; the status of the experimenter.

Big Bang theory The theory that the Universe was created in a massive explosion (the Big Bang) and that the Universe has been expanding ever since.

Binge drinking Short bouts of very heavy drinking.

Biodiesel Diesel fuel made from plant materials.

Blast furnace A reaction vessel in which iron oxide is heated with coke and limestone to produce iron.

C

Carcinogen A chemical which is known to cause cancer.

Carrier wave Waves used to carry a signal.

Cast iron Iron containing between 2% and 5% carbon.

Categoric variable These tell us the name of the variable e.g. copper, iron, magnesium.

Causal links One change in a variable has caused a change in another variable. You can only be reasonably certain of this when you have valid and reliable evidence. E.g. increasing the length of the wire causes an increase in resistance.

Cement A building material made from limestone and clay mixed with water.

Central nervous system (CNS)

The central nervous system made up of the brain and spinal cord where information is processed.

Cholesterol A substance made in the liver and carried around the body in the blood. High blood cholesterol levels seem to be linked to a high risk of heart disease.

Chromosomes Thread-like structures carrying the genetic information found in the nucleus of a cell.

Cirrhosis of the liver A disease which is often the result of heavy drinking over a long period of time.

Clones Offspring produced by asexual reproduction which are identical to their parent organism.

Compound A substance made of two or more types of atom chemically joined together.

Conclusion A conclusion considers the results and states how those results match the hypothesis. The conclusion must not go beyond the data available.

Concrete A building material made from sand, cement and crushed rock mixed with water.

Conduction Heat transfer in a substance due to motion of particles in the substance.

Conservation of energy Energy cannot be created or destroyed.

Continuous variable A continuous variable can be any numerical value, e.g. your own weight.

Control groups Often used when there are a large number of control variables that cannot be kept constant. E.g. when testing a drug on thousands of different people, half will be given the drug and half will be given a similar treatment that does not contain the drug (placebo).

Control variable These are the variables that might affect your result and therefore must be kept the same for a valid investigation. E.g. volume of acid used.

Convection Heat transfer in a liquid or gas due to circulation currents.

Convection currents The flow of a fluid due to differences in temperature. E.g. circulation of the upper part of the Earth's mantle.

Core The central part of the Earth below the mantle.

Cracking Breaking a molecule apart using heat.

Crust The outermost layer of the Earth.

D

Data Measurements or observations of a variable. Plural of datum.

Density Mass per unit volume of a substance.

Dependent variable The variable that you are measuring as a result of changing the independent variable. E.g. the volume of CO₂ produced.

Diabetes A condition in which it becomes difficult or impossible for your body to control the levels of sugar in your blood.

Diffusion Spreading out of particles away from each other.

Digital signal A signal that consists of a sequence of pulses which are at two levels only, either high (1) or low (0).

Directly proportional A graph will show this if the line of best fit is a straight line through the origin.

Discrete variable These are numerical, but can only be whole numbers e.g. numbers of layers of insulation.

DNA Deoxyribose nucleic acid, the material of inheritance.

Doppler effect The change of wavelength (and frequency) of the waves from a moving source due to the motion of the source.

E

E number A number given to a food additive in order to identify it.

Economic How science affects the cost of goods and services. E.g. developing wind power might increase the cost of electricity.

Ecosystem All the animals and plants living in an area, along with things which affect them such as the soil and the weather: also the interaction between many different types of living organisms and the non-living features of their home.

Effector organs Muscles and glands which respond to impulses from the nervous system.

Efficiency

$$\frac{\text{Useful energy transferred by a device}}{\text{Total energy supplied to the device}}$$

Electromagnetic waves Electric and magnetic disturbances that transfer energy from one place to another. The spectrum of electromagnetic waves, in order of increasing wavelength, is as follows: gamma and X-rays, ultraviolet radiation, visible light, infra-red radiation, microwaves, radio waves.

Element A substance made up of only one type of element.

Emulsifier A substance which stops the two liquids in an emulsion separating.

Emulsion A mixture of tiny droplets of one liquid in another liquid.

Energy forms Ways in which energy is stored or transferred, including **chemical energy**: energy stored in fuel; **elastic (or strain energy)**: energy stored in a squashed or stretched object; **electrical energy**: energy transferred by an electric current; **gravitational potential energy**: energy of an object due to its position, **kinetic energy**: energy of a moving object, **thermal energy**: energy of an object due to its temperature.

Energy transfer Energy transferred from one place to another.

Energy transformation Energy change from one form to another.

Environmental How science affects our natural surroundings. E.g. killing badgers to stop disease in cows.

Enzyme Protein molecules which act as biological catalysts. They change the rate of chemical reactions without being affected themselves at the end of the reaction.

Ethical Whether it is 'right' or 'wrong' to do something. E.g. experimentation on animals to develop new drugs.

Evidence Scientific evidence should be reliable and valid. It can take many forms. It could be an observation, a measurement or data that somebody else has obtained.

Evolution The process of slow change in living organisms over long periods of time as those best fitted to survive breed successfully.

Expansion of the Universe The motion of galaxies away from each other, discovered from the observations that the red shift (and therefore the speed) of the distant galaxies increases with their distance.

Extinction The process by which animals become extinct – the permanent loss of all the members of a species from the face of the Earth.

F

Fair test Only the independent variable is affecting your dependent variable, all other variables are kept the same.

Fluid A liquid or a gas.

Food additive A substance added to food to improve its flavour, texture or shelf-life.

Fossil fuel Coal, oil or gas or any other fuel formed long ago from the fossilised remains of dead plants or creatures.

Fractional distillation A way of separating a mixture of substances according to their different boiling points.

Free electrons Electrons that move about freely inside a metal and are not held inside an atom.

Frequency The number of complete waves passing a point each second. The unit of frequency is the hertz (Hz).

G

Gametes Sex cells.

Gamma radiation Electromagnetic radiation from radioactive substances.

Gasohol A mixture of petrol (gasoline) and ethanol.

Genes A short section of DNA carrying genetic information.

Genetic engineering/genetic modification A technique for changing the genetic information of a cell.

Glass Transparent material made by heating a mixture of sand, sodium carbonate and limestone.

Global dimming A gradual reduction in the amount of light reaching the Earth's surface.

Global warming A gradual increase in the average temperature of the Earth's atmosphere.

Global warming Warming of the Earth due to greenhouse gases in the atmosphere trapping infra-red radiation from the surface.

Greenhouse gases Gases such as carbon dioxide in the atmosphere that absorb infra-red radiation from the Earth's surface.

H

Haematite An ore containing iron combined with oxygen.

Half-life of a radioactive isotope Time taken for the number of nuclei of the isotope (or mass of the isotope) in a sample to halve.

Hardening Adding hydrogen to an oil, replacing the carbon-carbon double bonds in the molecules of an oil with carbon-carbon single bonds.

Heat transfer Energy transfer due to a temperature difference: see thermal radiation, conduction and convection.

High-density lipoproteins (HDLs) Chemicals which carries cholesterol in the blood and lower the risk of heart disease.

Homeostasis Maintaining a constant internal environment.

Hormones Chemical messages secreted by special glands and carried around the body in the blood.

Hydrocarbon A compound containing only carbon and hydrogen.

Hypothesis Using theory to suggest explanations for observations. E.g. 'I think that the plants are smaller because they do not have enough water.'

I

Immune system The body system which recognises and destroys foreign tissue such as invading pathogens.

Immunisation Giving a vaccine which allows immunity to develop without exposure to the disease itself.

Independent variable The variable that you have decided to change in an investigation. E.g. temperature of the acid.

Infra-red radiation Electromagnetic waves between visible light and microwaves in the electromagnetic spectrum.

Interference Unwanted variations on waves carrying a signal.

Intermolecular forces Forces of attraction between molecules.

Interval measurements The values of your independent variable that you choose within the range e.g. 10 cm³; 20 cm³; 30 cm³; 40 cm³; 50 cm³.

Ionisation Any process in which atoms become charged.

Ionising radiation Radiation that ionises substances it passes through. Alpha, beta, gamma and X-radiation are all ionising.

Ionosphere Layer of ionised gases in the atmosphere which reflect radio waves of frequency less than 30 MHz.

Ion A charged atom.

Isotopes Atoms of an element that contain different numbers of neutrons in their nuclei.

K

Kilowatt hour (kW h) Electrical energy supplied to a 1 kW electrical device in 1 hour.

L

Lime water Solution of calcium hydroxide, used to test for carbon dioxide.

Line graphs Used when the independent and the dependent variables are both continuous.

Line of best fit Used to show the underlying relationship between the independent and the dependent variables. It should fit the pattern in the results and have roughly the same number of plots on each side of the line. It could be a straight line or a curve. Remember to ignore any anomalies!

Linear These are straight line graphs that can be positive (as the concentration increases so too does the oxygen produced) or negative (as the concentration increases the oxygen produced decreases).

Link due to association When two variables change together, but they are both linked by a third variable. E.g. lack of carbon dioxide in soil and poor growth of plants, both could be linked to too much water in the soil.

Link due to chance When there is no scientific link between the two variables. E.g. increased sea temperatures and increased diabetes.

Low-density lipoproteins (LDLs) Chemicals which carry cholesterol in the blood and raises the risk of heart disease.

M

Malleable Capable of being hammered into shapes without smashing – a property of metals.

Mantle The layer of the Earth between the crust and the core.

Mean Add up all of the measurements and divide by how many measurements there are. Don't forget to ignore any anomalous results.

Menstrual cycle The reproductive cycle in women controlled by hormones.

Metabolic rate The rate at which the reactions of your body take place, particularly cellular respiration.

Microorganism Bacteria, viruses and other organisms which can only be seen using a microscope.

Model Description of a theory or theories that suggests further ideas that could test those theories. E.g. 'plum pudding' model of the atom that was tested and found not to be correct. A better model was then suggested.

Modulation The process of varying the amplitude or frequency of a carrier wave so it can carry a signal.

Monomer A molecule that can combine with other, similar, molecules to form a polymer.

Mortar Mixture of sand, cement and water used to hold building materials together.

Mutation A change in the genetic material of an organism.

N

National Grid Network of cables and transformers that supply electricity from power stations to consumers.

Natural selection The process by which evolution takes place. Organisms produce more offspring than the environment can support so only those which are most suited to their environment – the 'fittest' – will survive to breed and pass on their useful characteristics.

Neurones Basic cells of the nervous system which carry minute electrical impulses around the body.

Nicotine Colourless, poisonous substance which is the addictive drug in tobacco smoke.

Noble gas One of the six gases found in group 0 of the periodic table.

Nuclear energy Energy released from an unstable atom as a result of a change in its nucleus.

O

Opinion Opinions are personal judgements. Opinions can be formed from scientific evidence or non-scientific ideas.

Ordered variable Variables that can be put into an order e.g. small, large, huge lumps of rock. These tell us more than categoric variables.

Ores Rocks that contain enough metal to make it economical to extract the metal.

Ovaries Female sex organs which contain the eggs and produce hormones during the menstrual cycle.

Ovulation The release of a mature egg from the ovary in the middle of the menstrual cycle.

Ozone layer Layer of ozone gas in the Earth's atmosphere that absorbs ultraviolet radiation.

P

Pathogens Microorganisms which cause disease.

Pay-back period (or time) Length of time for the savings from an improvement to match the actual cost of the improvement.

Penicillin The first broad-spectrum antibiotic discovered.

Pituitary gland Small gland in the brain which produces a range of hormones controlling body functions.

Pollution The contamination of air, water or soil by substances which are harmful to living organisms.

Polymer A substance consisting of very large molecules made of smaller identical molecules called monomers.

Population A group of individuals of the same species living in the same habitat.

Power Rate of transfer of energy. The unit of power is the watt (W).

Precision Where your repeat results are very close to each other. This is related to the smallest scale division on the measuring instrument used.

Predator An animal which preys on other animals for food.

Prediction A hypothesis that can be used to design an investigation e.g. I predict that if I increase the amount of water given to plants there will be an increase in the mass of the plants.

Puberty The stage of development when the sexual organs and the body become adult.

Pumped storage station A power station that uses electricity to store energy by pumping water uphill to an upper reservoir. Electricity is generated when water in the upper reservoir is allowed to flow downhill.

Q

Quicklime Calcium oxide.

R

Radiation Energy carried by waves.

Radioactive substances Substances with unstable nuclei that emit alpha, beta or gamma radiation when they become more stable.

Radiograph An X-ray picture.

Random changes Changes that cannot be predicted.

Random error Measurements when repeated are rarely exactly the same. If they differ randomly then it is probably due to human error when carrying out the investigation.

Range The maximum and minimum values.

Red shift Increase in the wavelength of electromagnetic waves emitted by a star or galaxy due to its motion away from us. The faster the speed of the star or galaxy, the greater the red shift is.

Reduction reaction A reaction in which an atom or ion gains electrons.

Reflexes Rapid automatic responses of the nervous system which do not involve conscious thought.

Reliability The trustworthiness of data collected.

Renewable energy Energy from sources that never run out, including wind energy, wave energy, tidal energy, hydroelectricity, solar energy and geothermal energy.

S

Sankey diagram Diagram to show the energy transfer through a device.

Saturated A hydrocarbon which contains as many hydrogen atoms as possible in each molecule.

Scattergrams Used when you want to see how variables relate to each other. E.g. people's age and size.

Selective breeding Choosing parents with a desired characteristic for breeding.

Sense organ Collection of special cells known as receptors which respond to changes in the surroundings (e.g. eye, ear).

Sensitivity The smallest change that an instrument can measure, e.g. 0.1 mm.

Slag The waste produced when iron is made in a blast furnace.

Slaked lime Calcium hydroxide.

Smart alloy An alloy which returns to its original shape when it is heated.

Social How science influences and is influenced by its effects on our friends and neighbours. E.g. building a wind farm next to a village.

Solar cell Electrical cell that produces a voltage when in sunlight; solar cells are usually connected together in solar cell panels.

Solar heating panel Sealed panel designed to use sunlight to heat water running through it.

Speed of a wave Distance travelled per second by a wave.

Stabiliser A substance with molecules that produce large 'cages' full of air when they are mixed with water.

Statins Drugs which lower the blood cholesterol levels and improve the balance of HDLs to LDL.

Steels Alloys of iron containing controlled amounts of carbon and/or other metals.

Stimulus A change which causes a response in the body.

Stomata Small holes (pores) in the leaves of a plant that can be opened or closed.

Sustainable development Using natural resources in a way which also conserves them for future use.

Synapses The gaps between neurones where the transmission of information is chemical rather than electrical.

Systematic error If the data is inaccurate in a constant way e.g. all

results are 10mm more than they should be. This is often due to the method being routinely wrong.

T

Tar Thick, black chemical found in tobacco smoke which can cause cancer.

Tectonic plates Huge sections of the Earth's crust and upper mantle.

Technology Scientific knowledge can be used to develop equipment and processes that can in turn be used for scientific work.

Telescope, optical Instrument consisting of lenses (and/or a mirror) used to make distant objects appear larger or brighter.

Telescope, radio Large concave metal dish and aerial used to detect radio waves from space.

Territory An area where an animal lives and feeds which it may mark out or defend against other animals.

Theory A theory is not a guess or a fact. It is the best way to explain why something is happening. E.g. Sea levels are rising, and the global warming theory is the best way to describe why they are. Theories can be changed when better evidence is available.

Thermal decomposition Splitting a substance using heat.

Thermal radiation Energy transfer by electromagnetic waves emitted by objects due to their temperature.

Thermosetting A polymer that hardens or sets permanently when it is formed by heating the monomers of which it is made.

Thermosoftening A polymer that softens when it is heated.

Transformer Electrical device used to change an (alternating) voltage. A **step-up transformer** is used to step the voltage up from a power station to the grid voltage.
A **step-down transformer** is used to step the voltage down from the

grid voltage to the mains voltage used in homes and offices.

Transition metals The large block of metallic elements in the middle of the periodic table.

Transpiration stream The constant movement of water through a plant from the roots to the leaves where it is lost by evaporation from the leaf surface.

Trial run Carried out before you start your full investigation to find out the range and the interval measurements for your independent variable.

Tsunami A large wave caused by an underwater earthquake or volcanic eruption.

U

Unsaturated oils Oils in which the molecules contain carbon atoms joined together by carbon-carbon double bonds.

Unsaturated A hydrocarbon which contains a carbon-carbon double bond.

Useful energy Energy transferred to where it is wanted in the form it is wanted.

V

Valid data Evidence that can be reproduced by others and answers the original question.

W

Wasted energy Energy that is not usefully transferred or transformed.

Wavelength The distance from one wave peak to the next wave peak along the waves.

Z

Zero error A systematic error, often due to the measuring instrument having an incorrect zero. E.g. forgetting that the end of the ruler is not at zero.