

# Y8 Science Controlled Assessment

## Topics & Keywords

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### Biology

#### Respiration.

- Know that respiration in living organisms can be aerobic or anaerobic
- The word equation for aerobic respiration
- The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration
- The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.

#### Keywords

**Aerobic respiration:** Breaking down glucose with oxygen to release energy and producing carbon dioxide and water.

**Anaerobic respiration (fermentation):** Releasing energy from the breakdown of glucose without oxygen, producing lactic acid (in animals) and ethanol and carbon dioxide (in plants and microorganisms).

#### Interdependence.

- The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops
- The importance of plant reproduction through insect pollination in human food security
- How organisms affect, and are affected by, their environment, including the accumulation of toxic materials

#### Keywords

**Food web:** Shows how food chains in an ecosystem are linked.

**Food chain:** Part of a food web, starting with a producer, ending with a top predator.

**Ecosystem:** The living things in a given area and their non-living environment.

**Environment:** The surrounding air, water and soil where an organism lives.

**Population:** Group of the same species living in an area.

**Producer:** Green plant or algae that makes its own food using sunlight.

**Consumer:** Animal that eats other animals or plants.

**Decomposer:** Organism that breaks down dead plant and animal material so nutrients can be recycled back to the soil or water.

## Evolution.

- Understand the evidence for theories about how a particular species went extinct.
- Know that natural selection is a theory that explains how species evolve and why extinction occurs.
- Understand biodiversity is vital to maintaining populations.
- Know that within a species variation helps against environment changes, avoiding extinction and that within an ecosystem, having many different species ensures resources are available for other populations, like humans.
- Explain why a species has become extinct or adapted to changing conditions.
- Evaluate whether evidence for a species changing over time supports natural selection.
- Explain how a lack of biodiversity can affect an ecosystem. Describe how preserving biodiversity can provide useful products and services for humans.
- Be able to predict and explain the changes in a population over time due to natural selection.
- Evaluate ways of preserving plant or animal material for future generations.

## Keywords

**Population:** Group of organisms of the same kind living in the same place.

**Natural selection:** Process by which species change over time in response to environmental changes and competition for resources.

**Extinct:** When no more individuals of a species remain.

**Biodiversity:** The variety of living things. It is measured as the differences between individuals of the same species, or the number of different species in an ecosystem.

**Competition:** When two or more living things struggle against each other to get the same resource.

**Evolution:** Theory that the animal and plant species living today descended from species that existed in the past.

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### Chemistry

#### Separating Mixtures.

- To know that a pure substance consists of only one type of element or compound
- To know that a substance has a fixed melting and boiling point.
- That mixtures may be separated due to differences in their physical properties
- Suggest the methods to separate a mixture based on which properties of the individual substances are different.

#### Keywords

**Solvent:** A substance, normally a liquid, that dissolves another substance.

**Solute:** A substance that can dissolve in a liquid.

**Dissolve:** When a solute mixes completely with a solvent.

**Solution:** Mixture formed when a solvent dissolves a solute.

**Soluble (insoluble):** Property of a substance that will (will not) dissolve in a liquid.

**Solubility:** Maximum mass of solute that dissolves in a certain volume of solvent.

**Pure substance:** Single type of material with nothing mixed in.

**Mixture:** Two or more pure substances mixed together, whose properties are different to the individual substances.

**Filtration:** Separating substances using a filter to produce a filtrate (solution) and residue.

**Distillation:** Separating substances by boiling and condensing liquids.

**Evaporation:** A way to separate a solid dissolved in a liquid by the liquid turning into a gas.

**Chromatography:** Used to separate different coloured substances.

## Types of Reaction.

- Know that a combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light.
- Explain Thermal Decomposition as a reaction where a single reactant is broken down into simpler products by heating.
- Know what happens in a precipitation reaction and in a neutralisation reaction.
- Describe chemical changes by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved.

### Keywords

**Fuel:** Stores energy in a chemical store which it can release as heat.

**Chemical reaction:** A change in which a new substance is formed.

**Physical change:** One that changes the physical properties of a substance, but no new substance is formed.

**Reactants:** Substances that react together, shown before the arrow in an equation.

**Products:** Substances formed in a chemical reaction, shown after the reaction arrow in an equation.

**Conserved:** When the quantity of something does not change after a process takes place.

## Chemical Energy.

- Know some reactions transfer energy to their surroundings, these are known as exothermic reactions.
- Know other reactions take in energy from their surroundings, these are known as endothermic reactions.
- Know that photosynthesis is the most common endothermic reaction.
- Know that catalysts are substances that can speed up or slow down a reaction. Enzymes are examples of biological catalysts.

### Keywords

**Catalysts:** Substances that speed up chemical reactions but are unchanged at the end.

**Exothermic reaction:** One in which energy is given out, usually as heat or light.

**Endothermic reaction:** One in which energy is taken in, usually as heat.

**Chemical bond:** Force that holds atoms together in molecules.

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### Physics

#### Pressure.

- Know that pressure measured by ratio of force over area – acting normal ( $90^\circ$ ) to any surface.
- Know that atmospheric pressure decreases with height
- Know that pressure in liquids increases with depth
- Understand that pressure causes upthrust effects, floating and sinking

#### Keywords

**Fluid:** A substance with no fixed shape, a gas or a liquid.

**Pressure:** The ratio of force to surface area, in  $\text{N/m}^2$ , and how it causes stresses in solids.

**Upthrust:** The upward force that a liquid or gas exerts on a body floating in it.

**Atmospheric pressure:** The pressure caused by the weight of the air above a surface.

#### Magnetism & Electromagnetism.

- Know that magnets have magnetic poles
- Know that magnets cause forces of attraction and repulsion
- Understand that magnetic fields can be seen by plotting with compass, and are represented by field lines
- Know the Earth's magnetism can be used by a compass for navigation
- Know the magnetic effect of a current, which can be used in electromagnets and D.C. motors

#### Keywords

**Magnetic force:** Non-contact force from a magnet on a magnetic material.

**Permanent magnet:** An object that is magnetic all of the time.

**Magnetic poles:** The ends of a magnetic field, called north-seeking (N) and south-seeking poles (S).

**Electromagnet:** A non-permanent magnet turned on and off by controlling the current through it.

**Solenoid:** Wire wound into a tight coil, part of an electromagnet.

**Core:** Soft iron metal which the solenoid is wrapped around.

## Work.

- To know the energy transfers when work is done
- To know work done = Force x Distance Moved
- To know how wheels work to reduce friction
- To know simple machines give bigger force but at the expense of smaller movement (and vice versa): e.g. Pulleys & levers

### Keywords

**Work:** The transfer of energy when a force moves an object, in joules.

**Lever:** A type of machine which is a rigid bar that pivots about a point.

**Input force:** The force you apply to a machine.

**Output force:** The force that is applied to the object moved by the machine.

**Displacement:** The distance an object moves from its original position.

**Deformation:** When an elastic object is stretched or squashed, which requires work.

## Wave Effects.

- Know that when a wave travels through a substance, particles move to and fro.
- Know that energy is transferred in the direction of movement of the wave and that waves of higher amplitude or higher frequency transfer more energy.
- Explain differences in the damage done to living cells by light and other waves, in terms of their frequency.
- Explain how audio equipment converts sound into a changing pattern of electric current.

### Keywords

**Ultrasound:** Sound waves with frequencies higher than the human auditory range.

**Ultraviolet (UV):** Waves with frequencies higher than light, which human eyes cannot detect.

**Microphone:** Turns pressure waves of sound hitting it into an electrical signal.

**Loudspeaker:** Turns an electrical signal into a pressure wave of sound.

**Pressure wave:** An example is sound, which has repeating patterns of high-pressure and low-pressure regions.

## Wave Properties.

- Know that a wave moves from place to place, while the material it travels through does not.
- Describe the properties of different longitudinal and transverse waves.
- Use the wave model to explain observations of the reflection, absorption and transmission of a wave.

### Keywords

**Waves:** Vibrations that transport energy from place to place without transporting matter.

**Transverse wave:** Where the direction of vibration is perpendicular to that of the wave.

**Transmission:** Where waves travel through a medium rather than be absorbed or reflected.