Y7 Science Controlled Assessment Topics & Keywords

Biology

Cells.

- Cells as the fundamental unit of living organisms, including how to observe cell structure using a light microscope.
- The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts.
- The similarities and differences between plant and animal cells.
- The role of diffusion in the movement of materials in and between cells.
- The adaptations of some single cell organisms.
- The organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.

Keywords

Cell: The unit of a living organism, contains parts to carry out life processes.
Uni-cellular: Living things made up of one cell.
Multi-cellular: Living things made up of many types of cell.
Tissue: Group of cells of one type.
Organ: Group of different tissues working together to carry out a job.
Diffusion: One way for substances to move into and out of cells.
Structural adaptations: Special features to help a cell carry out its functions.
Cell membrane: Surrounds the cell and controls movement of substances in and out.
Nucleus: Contains genetic material (DNA) which controls the cell's activities.
Vacuole: Area in a cell that contains liquid and can be used by plants to keep the cell rigid and store substances.
Mitochondria: Part of the cell where energy is released from food molecules.
Cell wall: Strengthens the cell. In plant cells it is made of cellulose.
Chloroplast: Absorbs light energy so the plant can make food.

Digestion.

- The content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed.
- Calculations of energy requirements in a healthy daily diet.
- The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases.
- The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food.
- The importance of bacteria in the human digestive system.
- Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.

Keywords

Enzymes: Substances that speed up the chemical reactions of digestion.
Dietary fibre: Parts of plants that cannot be digested, which helps the body eliminate waste.
Carbohydrates: The body's main source of energy. There are two types: simple (**sugars**) and complex (**starch**).
Lipids (fats and oils): A source of energy. Found in butter, milk, eggs, nuts.
Protein: Nutrient your body uses to build new tissue for growth and repair. Sources are meat, fish, eggs, dairy products, beans, nuts and seeds.
Stomach: A sac where food is mixed with acidic juices to start the digestion of protein and kill microorganisms.
Small intestine: Upper part of the intestine where digestion is completed and nutrients are absorbed by the blood.
Large intestine: Lower part of the intestine from which water is absorbed and where faeces are formed.
Gut bacteria: Microorganisms that naturally live in the intestine and help food break down.

Variation.

- The variation between individuals within a species being continuous or discontinuous
- The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection
- Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction

Keywords

Species: A group of living things that have more in common with each other than with other groups.
Variation: The differences within and between species.
Continuous variation: Where differences between living things can have any numerical value.
Discontinuous variation: Where differences between living things can only be grouped into categories.

Y7 Science Controlled Assessment Topics & Keywords

Chemistry

Elements.

- To understand the Dalton atomic model.
- To explain the differences between atoms, elements and compounds.
- To be proficient in using chemical symbols and formulae to represent elements and compounds.
- To understand the concept of a pure substance.
- To understand the physical and chemical properties of different elements and compounds; including metals, non-metals.

Keywords

Elements: What all substances are made up of, and which contain only one type of atom.
Atom: The smallest particle of an element that can exist.
Molecules: Two to thousands of atoms joined together. Most non-metals exist either as small or giant molecules.
Compound: Pure substances made up of two or more elements strongly joined together.
Chemical formula: Shows the elements present in a compound and their relative proportions.
Polymer: A molecule made of thousands of smaller molecules in a repeating pattern. Plastics are man- made polymers, starch is a natural polymer.

Metals & Non-metals.

- The properties of metals and non-metals
- The chemical properties of metal and non-metal oxides with respect to acidity.
- The order of metals and carbon in the reactivity series

Keywords

Metals: Shiny, good conductors of electricity and heat, malleable and ductile, and usually solid at room temperature.
Non-metals: Dull, poor conductors of electricity and heat, brittle and usually solid or gaseous at room temperature.
Displacement: Reaction where a more reactive metal takes the place of a less reactive metal in a compound.
Oxidation: Reaction in which a substance combines with oxygen.
Reactivity: The tendency of a substance to undergo a chemical reaction.

Periodic Table.

- The physical and chemical properties of different elements.
- The principles underpinning the Mendeleev Periodic Table.
- The layout of Periodic Table: periods and groups; metals and non-metals.
- How patterns in reactions can be predicted with reference to the Periodic Table

Keywords

Periodic table: Shows all the elements arranged in rows and columns.
Physical properties: Features of a substance that can be observed without changing the substance itself.
Chemical properties: Features of the way a substance reacts with other substances.
Groups: Columns of the periodic table.
Periods: Rows of the periodic table.

Acids & Bases.

- Define acids and alkalis in terms of neutralisation reactions
- Use the pH scale for measuring acidity/alkalinity
- Use indicators to show pH
- Know that reactions of acids with metals to produce a salt plus hydrogen
- Know that reactions of acids with alkalis to produce a salt plus water

Keywords

pH: Scale of acidity and alkalinity from 0 to 14.
Indicators: Substances used to identify whether unknown solutions are acidic or alkaline.
Base: A substance that neutralises an acid - those that dissolve in water are called alkalis.
Concentration: A measure of the number of particles in a given volume.

Y7 Science Controlled Assessment Topics & Keywords

Physics

Sound.

- That frequencies of sound waves are measured in hertz (Hz).
- That sound echoes are reflections and materials will absorb of sound energy
- That sound needs a medium to travel.
- Compare the speed of sound in air, in water and in solids.
- That sound is produced by vibrations of objects, e.g. in loud speakers, detected by their effects on microphone diaphragm and the ear drum.
- That sound waves are longitudinal.
- Compare auditory range of humans and animals.

Keywords

Vibration: A back and forth motion that repeats.
Longitudinal wave: When the direction of the vibration is the same as that of the wave.
Volume: How loud or quiet a sound is, in decibels (dB).
Pitch: How low or high a sound is. A low (high) pitched sound has a low (high) frequency.
Amplitude: The maximum amount of vibration, measured from the middle position of the wave, in metres.
Wavelength: The distance between two corresponding points on a wave, in metres.
Frequency: The number of waves produced in one second, in Hertz (Hz).
Vacuum: A space with no particles of matter in it.
Oscilloscope: Device for viewing patterns of sound waves that have been turned into electrical current.
Absorption: When energy is transferred from sound to a material.
Auditory range: The lowest and highest frequencies that a type of animal can hear.
Echo: Reflection of sound waves from a surface back to the listener.

Light.

- Know the similarities and differences between light waves and waves in matter
- That light waves can through a vacuum at the speed of light
- That light can transmit through materials
- That light can be absorbed by a surface, or scattered or reflected from a surface
- To use ray models to explain imaging in mirrors, the pinhole camera, the refraction of light and action of convex lens in focusing in the human eye
- That light transfers energy from source to absorber leading to chemical and electrical effects; e.g. photo-sensitive material in the retina and in cameras
- That colours are different frequencies of light
- That white light can be split into a colour spectrum using prisms
- That objects can appear to be different colours, due to the effects of absorption and reflection.

Keywords

Incident ray: The incoming ray.
Reflected ray: The outgoing ray.
Normal line: From which angles are measured. At right angles to the surface.
Angle of reflection: Between the normal and the reflected ray.
Angle of incidence: Between the normal and the incident ray.
Refraction: Change in direction of light going from one material into another.
Absorption: When energy is transferred from light to a material.
Scattering: When light bounces off an object in all directions.
Transparent: A material that allows all light to pass through it.
Translucent: A material that allows some light to pass through it.
Opaque: A material that allows no light to pass through it.
Convex lens: A lens that is thicker in the middle which bends light rays towards each other.
Concave lens: A lens that is thinner in the middle which spreads out light rays.
Retina: Layer at the back of the eye with light detecting cells and where image is formed.

Energy Transfers.

- That energy as a quantity that can be quantified and calculated.
- That the total energy has the same value before and after a change.
- Compare the starting with the final conditions of a system and describing increases and decreases in the amounts of energy.

Keywords

Thermal energy store: Filled when an object is warmed up.
Chemical energy store: Emptied during chemical reactions when energy is transferred to surroundings.
Kinetic energy store: Filled when an object speeds up.
Gravitational potential energy store: Filled when an object is raised.
Elastic energy store: Filled when a material is stretched or compressed.
Dissipated: Become spread out wastefully

Energy Costs.

- Compare power ratings of appliances in watts (W, kW)
- Compare amounts of energy transferred (J, kJ, kW hour)
- Compare fuels and energy resources (renewable and nonrenewable)
- Evaluate the global demand of energy resources

Keywords

Power: How quickly energy is transferred by a device (watts).
Energy resource: Something with stored energy that can be released in a useful way.
Non-renewable: An energy resource that cannot be replaced and will be used up.
Renewable: An energy resource that can be replaced and will not run out. Examples are solar, wind, waves, geothermal and biomass.
Fossil fuels: Non-renewable energy resources formed from the remains of ancient plants or animals. Examples are coal, crude oil and natural gas.

Gravity.

- Know how to calculate the size of the gravity force using
  weight = mass x gravitational field strength (g)
- Know that on Earth g=10 N/kg.
- Know that gravitational field strength is different for other planets and stars
- Know that there are gravity forces between Earth and Moon, and between Earth and Sun which cause them to move in circular paths called orbits

Keywords

Mass: The amount of stuff in an object (kg)
Weight: The force of gravity on an object (N)
Non-contact force: One that acts without direct contact
Gravitational field strength: The force from gravity on 1kg (N/kg)
Field: The area where other objects feel a gravitational force

Contact Forces.

- Know forces are pushes or pulls, arising from the interaction between two objects.
- Use force arrows on diagrams.
- Add forces in one dimension, to decide if forces are balanced or unbalanced.
- Know forces include
    - deform objects; stretching and squashing – e.g. springs
    - rubbing and friction between surfaces,
    - pushing things out of the way
    - resistance to motion of air and water
- Know forces are measured in Newtons.
- Know a Newtonmeter works by how much an objects stretches or compresses as the force is changed.
- Know force is linked to extension by linear relation called Hooke's Law.

Keywords

Equilibrium: State of an object when opposing forces are balanced.
Deformation: Changing shape due to a force.
Linear relationship: When two variables are graphed and show a straight line which goes through the origin, and they can be called proportional.
Newton: Unit for measuring forces (N).
Resultant force: Single force which can replace all the forces acting on an object and have the same effect.
Friction: Force opposing motion which is caused by the interaction of surfaces moving over one another. It is called 'drag' if one is a fluid.
Tension: Force extending or pulling apart.
Compression: Force squashing or pushing together.
Contact force: One that acts by direct contact.