CE13+ Science Revision Checklist

Biology

- Cells and organisation
    - Structures of plant and animal cells
    - Roles of each organelle
    - 7 characteristics of life (MRSGREN)
    - Using microscopes and making slides
- Gas exchange systems
    - Structure and adaptations of the lungs
    - How we breathe (inhale and exhale)
    - Structure of the circulatory system
    - How smoking affects the gas exchange system
    - Effect of exercise on heart rate and breathing rate
- Cellular respiration
    - Equations for aerobic and anaerobic respiration in animals
    - Equation for anaerobic respiration in plants and yeast
- Reproduction in animals
    - Structures of the male and female reproductive systems
    - Structures and adaptations of sperm and eggs cells
    - Fertilisation and the development of the fetus (including the function of the placenta and umbilical cord)
    - Birth
    - Puberty in boys and girls
        - Stages of the menstrual cycle
- Nutrition and digestion
    - Names and functions of the substances required for a balanced diet (including examples of foods containing each substance)
    - The tests for starch and glucose
    - Experiment to determine the amount of energy in different foods
    - Structure of the digestive system (including adaptations of the small intestine and the role of enzymes)
- Health
    - Effects of smoking on health
    - Examples of diseases caused by viruses and bacteria
    - Reproduction of bacteria and factors affecting this (competition)
    - Human defences against pathogens (including the immune system)
- Relationships in an ecosystem
    - Food chains and food webs
    - The accumulation of toxic materials
    - Pyramids of numbers and biomass
    - Experiment to estimate the population of a species within an area (using quadrats)
    - Population curves
    - Competition and its effects on population
    - Conservation
- Variation, classification and inheritance
    - Kingdoms and the characteristics of their cells

- Characteristics of:
  - Reptiles
  - Amphibians
  - Mammals
  - Birds
  - Fish
  - Insects
  - Spiders
- Adaptations of various organisms
- Types of variation

Chemistry

- Atoms, elements and compounds
    - Diagrams for solids, liquids and gases
    - Properties of solids, liquids and gases (including movement, arrangement, intermolecular forces and energy)
    - Diffusion and Brownian motion
    - Changes of state (including heating curves)
    - Definitions for element, compound, molecule, mixture and atom
    - Chemical symbols for various elements, molecules and compounds (see Memory Workout for details)
    - Properties of metals/non-metals
    - The composition of air
- Pure and impure substances
    - Filtration
    - Chromatography
    - Distillation
    - Crystallisation
    - How to identify a pure/impure substance using melting/boiling points
    - Solubility
- Acids and alkalis
    - pH scale
    - Indicators (including Universal Indicator, litmus paper and indicators made from plants)
- Chemical reactions
    - The difference between physical and chemical changes
    - These general equations:
        - Hydrocarbon + oxygen → carbon dioxide + water (complete combustion)
        - Hydrocarbon + (little) oxygen) → carbon monoxide + soot + water (incomplete combustion)
        - Metal + oxygen → metal oxide (oxidation)
        - (reactive) metal + water → metal hydroxide + hydrogen
        - Metal + acid → salt + hydrogen
        - Metal oxide + acid → salt + water (neutralisation)
        - Metal hydroxide + acid → salt + water (neutralisation)
        - Metal carbonate + acid → salt + water + carbon dioxide (neutralisation)
        - Metal carbonate → metal oxide + carbon dioxide (thermal decomposition)
    - The type of salt formed by different acids:
        - Hydrochloric acid = _____chloride
        - Sulfuric acid = _____ sulfate
        - Nitric acid = _____ nitrate
    - Why incomplete combustion is a problem
    - Displacement reactions (including recalling the reactivity series of metals)
    - Rusting (including how to prevent rusting)
    - Suck-back
- Gas tests
    - Hydrogen
    - Carbon dioxide

    - Water
    - Oxygen
- Environmental chemistry
    - Causes of pollution (including acid rain, carbon dioxide and carbon monoxide)
    - The water cycle
    - The greenhouse effect

Physics

- Equations
  - $Pressure = \frac{force}{area}$
  - $Speed = \frac{distance}{time}$
  - $Moment = force \times distance\ from\ pivot$
  - $Density = \frac{mass}{volume}$
  - $Weight = mass \times gravitational\ field\ strength$
  - Units for all of the quantities above
- Energy
  - Energy resources (including identifying renewable vs. non-renewable and giving advantages/disadvantages of each)
  - Energy stores and transfers
  - The law of conservation of energy (including the idea of dissipation to the surroundings)
- Motion and forces
  - Types of forces
  - Balanced forces (including identifying how we know that forces are balance – constant velocity)
  - Friction and air/water resistance (including how to reduce these forces)
  - Distance-time graphs (including calculating speed)
    - Calculations
  - How a spring stretches (including reaching the elastic limit)
    - Springs in series and parallel
  - Stopping distances
- Forces, rotation and pressure
  - Moments (including applications of moments)
    - Calculations
  - Pressure (including how it is used in everyday life)
    - Calculations
- Density
  - Calculations
  - Measuring density of regularly and irregularly shaped objects
  - Calculating volume
  - Floating and sinking
- Electric circuits
  - Symbols for electrical components (see Memory Workout)
  - Current in series and parallel circuits
  - The effect of resistance on current
  - Truth tables (including AND and OR circuits)
  - Relay circuits
  - Effect of light intensity on the resistance of an LDR
  - The use of fuses
  - The placement of LEDs (or diodes) in a circuit
- Magnetism/electromagnetism
  - Diagrams showing the shape of the magnetic field (for a bar magnet and an electromagnet)

    - Experiment to determine the shape of the magnetic field
    - How to make an electromagnet
    - How to change the strength of an electromagnet
- Space physics
    - Time taken for:
        - Earth to spin on its axis
        - Moon to orbit Earth
        - Earth to orbit the Sun
    - The order of the planets
    - Seasons
    - Eclipses
    - Satellites (including their uses)
    - The relative size of: a moon, a planet, a star, a solar system, a galaxy, the universe