Curriculum Map

Subject: Science **Year: 7**

|  | **Autumn** | **Spring** | **Summer** | **Summer 2** |
| --- | --- | --- | --- | --- |
| **Content** | **Introduction to science**:  Safety in the laboratory  Laboratory equipment  Measuring liquids  Transferring solids  The Bunsen burner  Heating Equipment  Variables - Independent, dependent and control  Graphs  **Particles**  Solids, liquids and gases  Melting and Freezing  Boiling  Diffusion  Gas pressure  Crystallisation  Elements & Atoms  **Cells**  Microscopes  Animal/Plant cells  Specialised cells  Diffusion in cells  Osmosis  Unicellular organisms | **Forces**  Introduction to forces  Stretch/squash force  Friction  Mass / Weight  Balanced/Unbalanced forces  Streamlining  Air resistance  Flight  **Human body**  Cells, Tissues,Organs  Skeleton  Joints  Muscles  Human parasites  Mosquito nets  **Reactions**  Chemical / Physical change  Making compounds  Word equations  Chemical formula  Conservation of mass  Burning  Thermal decomposition  Exothermic and Endothermic reactions | **Light**  Sources of light  Reflection  Refraction  The eye and the camera  Colour  Lenses  Pinhole cameras and periscopes  **Reproduction**  Puberty  Reproductive system  Fertilisation  Pregnancy  Menstrual cycle  Reproduction in plants  Germination  Seed dispersal  **Acids and Alkalis**  Testing acids and alkalis  pH and universal indicator  Comparing indicators  Neutralisation  Making Salts  Basic Titration  Testing Indigestion tablets | **Sports Science**  Respiratory system  Breathing  Inhaled exhaled air  Peak flow and height  Blood oxygen level and exercise  Exercise and breathing  Exercise and carbon dioxide production  Muscle systems  **Sound**  Waves  Speed of sound  Using an oscilloscope  The ear  Changing pitch  Echoes  Ultrasound |
| **Skills** | **Laboratory Safety & Practice:** Adhering to safety rules, correctly using and identifying laboratory equipment, accurately measuring liquids, and safely handling and heating solids.  **Experimental Design & Data Handling:** Identifying and controlling variables in experiments, and accurately drawing and interpreting graphs.  **Understanding of Matter:** Describing the particle model for solids, liquids, and gases, explaining phase changes (melting, freezing, boiling), and understanding diffusion and gas pressure.  **Microscopy & Observation:** Correctly using a microscope to observe and identify different types of cells (animal, plant, specialised, unicellular).  **Cellular Processes:** Explaining diffusion and osmosis in the context of cells.  **Basic Chemistry Foundations:** Understanding the fundamental concepts of elements and atoms. | **Defining & Explaining Concepts:** Describing types of forces (e.g., friction, air resistance), distinguishing between mass and weight, and explaining balanced/unbalanced forces. Understanding biological organisation (cells to organs) and the functions of body systems (skeleton, muscles). Defining chemical vs. physical changes, and explaining exothermic/endothermic reactions.  **Observing & Identifying:** Recognizing the effects of forces like stretch/squash. Identifying different components of the human body and types of reactions.  **Representing Chemical Information:** Writing word equations and basic chemical formulas.  **Applying Principles:** Understanding and applying the concept of conservation of mass in reactions. Applying concepts like streamlining to explain real-world phenomena (e.g., flight).  **Analysing & Predicting:** Considering factors like streamlining and air resistance. Predicting outcomes of chemical reactions. | **Understanding & Explaining Phenomena:** Describing how light behaves (reflection, refraction), explaining vision, colour, and how optical instruments like lenses work. Explaining human and plant reproductive processes, including cycles and development. Describing properties of acids and alkalis, and the process of neutralisation.  **Practical & Experimental Skills:** Safely testing substances for acidity/alkalinity using indicators, performing neutralisation reactions, and making salts.  **Interpreting Data:** Using pH and indicator results to determine acidity/alkalinity.  **Applying Scientific Principles:** Relating light properties to the design of cameras and periscopes. Connecting biological processes to human health (e.g. reproduction).  **Problem Solving:** Applying knowledge to scenarios like making salts or testing indigestion tablets. | **Understanding Biological Systems:** Describing the structure and function of the respiratory and muscular systems, and how they interact.  **Data Measurement & Interpretation:** Measuring and analysing physiological responses to exercise (e.g., peak flow, blood oxygen, breathing rate), and interpreting quantitative data related to physical activity.  **Explaining Physiological Responses:** Detailing how the body adapts to exercise, including changes in breathing, oxygen transport, and carbon dioxide production.  **Understanding Wave Properties:** Defining and explaining wave concepts, including the speed of sound, and how pitch is related to frequency.  **Using Scientific Equipment:** Operating and interpreting data from an oscilloscope.  **Explaining Sound Phenomena:** Describing how sound travels, creates echoes, and understanding the principles and uses of ultrasound. |
| **Assessment** | 1. Knowledge Check: End of unit Google form comprising multiple-choice questions.  2. End of term test completed in class under exam conditions. | 1. Knowledge Check: End of unit Google form comprising multiple-choice questions.  2. End of term test completed in class under exam conditions. | 1. Knowledge Check: End of unit Google form comprising multiple-choice questions.  2. End of term test completed in class under exam conditions. | 1. Knowledge Check: End of unit Google form comprising multiple-choice questions. |

Curriculum Map

Subject: Science **Year: 8**

|  | **Autumn** | **Spring** | **Summer** | **Summer 2** |
| --- | --- | --- | --- | --- |
| **Content** | **Ecosystem processes**:  Photosynthesis,  Aerobic & anaerobic respiration  Adaptations of the leaf  Minerals required for plant growth  Chemosynthesis  Food chains and webs  Human disruption of food web  Ecosystems  **The Earth**:  Layers of the Earth and its atmosphere  Igneous, metamorphic and sedimentary rocks  The Rock cycle  Erosion and weathering  The Carbon Cycle  Climate change & Recycling  **Energy**:  Energy in food  Conduction, convection and radiation  Energy and temperature  Energy transfers and the conservation of energy  Methods of producing  electricity  Work done  Energy and power | **Electricity and Magnetism**  Static electricity  Current  Potential difference  Series and Parallel circuits  Resistance  Magnets and magnetic fields  Electromagnets and their uses  **Health & Lifestyle**  Nutrients  Food tests  Unhealthy diets  The digestive system  Bacteria and enzymes in digestion  Drugs, smoking and vaping  Alcohol  **Motion and Pressure**  Speed  Motion Graphs  Pressure in solids, liquids and gases  Moments and Turning forces | **Separation**  Mixtures  Solutions  Factors affecting solubility  Filtration  Evaporation and Distillation  Chromatography  **Space**  The night’s sky (planets, moons and the Earth’s location in the Universe)  Planets of the solar system  Seasons and the day/night cycle  Phases of the moon  Solar and lunar eclipses  **Adaptation**  Competition  Adapting to change  Variation  Continuous and discontinuous variation  Inheritance  Natural selection  Extinction | **Metals & Other Materials**  Reactions of metals and acid  Reactions of metals and oxygen  Reactions of metals and water  Displacement reactions of metals  Extracting metals  Ceramics  Polymers  Composites  **The Periodic Table**  Metals and Non-metals  Groups and Periods  History of the Periodic Table  The Alkali metals  The Halogens  The Noble Gases |
| **Skills** | **Understanding and Explaining Processes:** Defining, describing, and explaining natural and scientific processes (e.g., photosynthesis, rock cycle, energy transfers).  **Identifying Relationships:** Recognising cause and effect, understanding interdependence (e.g., in food webs, energy transformations).  **Interpreting Data and Models:** Analysing information from food chains/webs, cycles (carbon, rock), and diagrams.  **Classifying and Categorizing:** Grouping and identifying types of rocks, energy transfers, or organisms in an ecosystem.  **Analyzing Systems:** Breaking down complex systems (e.g., ecosystems, Earth's layers, energy production) into their components and understanding how they interact.  **Evaluating Environmental Impact:**  Considering human actions' effects on natural cycles and ecosystems (e.g., climate change, pollution).  **Applying Scientific Principles:** Using concepts like conservation of energy or specific material properties to explain phenomena. | **Defining & Explaining Concepts:** Describing core ideas in electricity (e.g., current, resistance), magnetism (e.g., fields, electromagnets), human biology (e.g., nutrients, digestion), and mechanics (e.g., speed, pressure, moments).  **Interpreting Diagrams & Graphs:** Reading and interpreting circuit diagrams, magnetic field lines, and motion graphs.  **Applying Formulas & Calculations:** Using equations to calculate speed, current, resistance, or moments.  **Conducting & Interpreting Tests:** Performing practical food tests and understanding their results.  **Analyzing Cause & Effect:** Explaining how changes in variables affect circuits, the body, or motion (e.g., unhealthy diets on health, forces on pressure).  **Understanding Systems:** Describing the function and interaction of parts within systems (e.g., series/parallel circuits, the digestive system).  **Evaluating Information:** Assessing impacts of lifestyle choices (e.g., drugs, alcohol) on health. | **Observation & Classification:** Distinguishing between different types of mixtures and solutions; identifying celestial bodies and phenomena.  **Practical Skills:** Applying various separation techniques (e.g., filtration, distillation, chromatography) in a laboratory context.  **Explaining Processes:** Describing how separation methods work; detailing astronomical events like seasons, moon phases, and eclipses; explaining biological processes such as adaptation, inheritance, and natural selection.  **Interpreting & Analyzing:** Reading and understanding diagrams of the solar system or evolutionary concepts; interpreting results from separation experiments.  **Understanding Relationships:** Connecting factors to solubility; linking environmental changes to adaptation and extinction; understanding competition and variation within species. | **Observing & Describing Reactions:** Noting and describing changes when metals react with acids, oxygen, or water, and in displacement reactions.  **Predicting Chemical Behaviour:** Using the Periodic Table and reactivity series to predict how metals will react or how elements within groups behave.  **Classifying Materials:** Distinguishing between metals, non-metals, and different types of engineered materials (ceramics, polymers, composites).  **Explaining Concepts:** Describing processes like metal extraction, and understanding key features of the Periodic Table (groups, periods).  **Identifying Trends:** Recognising patterns in reactivity as you move down or across the Periodic Table (e.g., in alkali metals, halogens).  **Relating Properties to Uses:** Explaining why specific materials are chosen for particular applications based on their characteristics. |
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Curriculum Map

Subject: Science **Year: 9**

|  | **Autumn** | **Spring** | **Summer** | **Summer 2** |
| --- | --- | --- | --- | --- |
| **Content** | **Forensic Science**:  Microscopy of fibres  Fingerprinting  Casting  Time of Death  Blood spatter analysis  Testing unknown powders and liquids  Drug testing  **Engineering**:  Designing and making rockets  Detecting position (GPS)  Engineering for earthquakes  Bridge engineering  Rocket cars  Building towers  Wind Turbines  **Brain & Mind**:  The nervous system  Snapses  Effects of drugs on synapses  Learning new skills  Conditioned Reflexes  Feral children  The Stroop effect  Memory | **Microbes**  Types of disease  Condition for microbes  The immune system  Vaccines  Biotechnology  Temperature and enzymes  Enzymes and washing powder  **Genetics**  Genes and inheritance  Inherited disorders  Selective breeding  Cloning  Modelling DNA  Charles Darwin  Preventing Extinction  **Plastics & Materials**  Types of Material  Types of polymer  Testing materials  Fractional distillation of oil  Polymer lifecycles  Changing polymers  Eco-friendly polymer alternatives | **Skills for Science**  Standard Form  Rearranging equations  Core practical skills  Gradients and Tangents  Percentage change  Specific practical skills (biology, chemistry and physics)  **Environmental Chemistry**  Soil type and composition  Effect of soil pH on plant growth  Air quality and pollution  Acid Rain  Alternative fuels  Testing and determining water quality  Biological indicator species  **Medicine**  History of Medicine  Medicines from plants  Emergency at A&E (first aid)  The skeleton  Circulation and blood pressure  Antibodies and immunity  Blood types | **New Technology**  What is a nanoparticle?  Uses of nanoparticles  Investigating sunscreen  Nanoscience in medicine  Pollutants produced by cars  Synthetic fuels  Hydraulic systems  Lab-grown meat  **Ecology**  Factors affecting distribution of species  Sampling techniques (random and systematic)  Choice chambers (animal behaviour)  Classification of vertebrates and invertebrates.  Classification of plants |
| **Skills** | **Observation & Analysis:** Closely examining details (fibres, blood spatters), recognizing patterns (fingerprints), and interpreting visual information.  **Practical Investigation:** Performing hands-on tests (unknown powders/liquids, casting), designing and building models (rockets, towers).  **Application of Scientific Principles:** Using knowledge of physics (forces, motion, structures in engineering) and biology/chemistry (time of death, drug testing, nervous system function) to solve problems.  **Problem-Solving & Design Thinking:** Identifying challenges and developing solutions, particularly in engineering contexts (designing for earthquakes, bridges).  **Interpreting Biological & Psychological Phenomena:** Understanding the functions of the nervous system, how drugs affect the brain, and concepts related to learning and memory.  **Evaluation & Prediction:** Assessing evidence in forensic scenarios; predicting outcomes based on scientific understanding (e.g., effects of drugs on synapses). | **Understanding Biological Processes:** Explaining how microbes cause disease, the body's immune response, and the action of enzymes.  **Applying Biological Concepts:** Describing principles of inheritance, genetic disorders, and the processes of selective breeding and cloning.  **Analysing & Evaluating Data:** Interpreting information related to enzyme activity (e.g., temperature effects) or material testing results.  **Classifying & Categorising:** Distinguishing between different types of microbes, diseases, genetic concepts, and various polymers/materials.  **Connecting Structure to Function:** Relating the structure of enzymes to their action, or polymer properties to their uses.  **Considering Societal & Ethical Implications:** Discussing the impact of biotechnology, vaccines, cloning, and environmental issues related to plastics.  **Understanding Cycles & Lifecycles:** Describing the journey of polymers from oil to disposal or recycling. | **Quantitative & Mathematical Reasoning:** Using standard form, rearranging equations, calculating percentage change, and interpreting gradients/tangents from graphs.  **Practical & Experimental Skills:** Planning and conducting core laboratory investigations and safely performing specific practical techniques (biology, chemistry, physics).  **Data Analysis & Interpretation:** Analysing experimental results, reading graphs and assessing environmental data (e.g., air/water quality, soil pH, indicator species).  **Problem-Solving & Application:** Applying scientific principles to real-world scenarios, such as understanding alternative fuels, first aid, or medical interventions.  **Understanding & Explaining Systems:** Describing the composition and interactions within environmental systems (soil, air, water quality) and biological systems (skeleton, circulation, immune response).  **Historical & Evaluative Thinking:** Tracing the development of scientific ideas (history of medicine) and evaluating different approaches to environmental challenges. | **Understanding Scale & Properties:** Grasping the concept of nanoparticles and how their unique properties lead to specific uses and potential safety concerns.  **Analysing Environmental Impacts:** Investigating how human activities (e.g., car emissions, new fuels) affect air quality and exploring solutions.  **Investigating & Applying Techniques:** Describing and understanding various sampling methods in ecology, using choice chambers, and applying classification principles.  **Data Collection & Interpretation:** Planning and carrying out simple ecological sampling, and interpreting observations from experiments on animal behavior.  **Evaluating Technology:** Assessing the benefits and drawbacks of new technologies like nanoparticles and lab-grown meat.  **Categorisation & Systematics:** Classifying living organisms (vertebrates, invertebrates, plants) based on observable characteristics. |
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