**Unit 1 Integrated Science**

**POS Yr 7 2016 -2017**

**Unit title: What the world is made of ?**

**Key concept: Relationships Related concepts: Patterns Global concept: Scientific and Technical Innovation**

**Statement of inquiry: We observe, look for patterns and relationships in order to help us understand the natural world.**

**Inquiry Question: What are the building blocks of our world?**

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| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
| 1 - 5 | Cellular organization & microscopy | **Animal and plant cells**  1. Appreciate that all living organisms are made up of cells  2. Identify the basic parts of an animal and plant cell and explain their function  3. Describe the organelles and explain their function in animal and plant cells  4. Understand the significance of the differences in structure between animal and plant cells    **Specialised cells**  1. State some specialised cells  2. Describe the structure and function of specialised cells    **Microscopy**  1. Describe who Robert Hooke was  2. Label a light microscope  3. Know the rules when drawing cells  4. State what resolution and magnification are  **Movement of Molecules – Osmosis and Diffusion**   1. Define osmosis and diffusion 2. Carry out an investigation to observe osmosis and diffusion     **Organ Systems**  1. Know that cells are arranged into groups to form tissues  2. Describe the different levels of organization within the human body  3. Recognize tissues, organs and systems | Label animal and plant cells    Make a model of a cell (animal cell or plant cell)    Set up microscope and make slides    Observe prepared slides of tissues    Speed dating specialised cells | **Formative:** Making a model cell    **Criterion B:** Using a microscope    **Criterion C:** Using a microscope    **Criterion A:** Body Systems video    **Criterion A:** Written test on microscopy, cells and systems    **Optional:** Criterion D: OWE on history of the microscope. How has it changed how we view the world? |
| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
| 6 - 9 | Structure of matter  &  Classifying chemical elements | **Structure of the Atom**  1. Label the structure of the atom  2. Identify atomic and mass number  3. Draw electron configurations    **States of Matter**  1. Name the three states of matter, and the state changes  2. Describe and draw the arrangement of particles in each state  3. Explain the amount of energy and movement in each state    **Boiling Water**  1. Create a risk assessment  2. State the equipment and method  3. Draw a graph of the results  4. Describe a conclusion and evaluation    **Periodic table**  1. Label where metals and nonmetals are in the periodic table  2. Describe where periods and groups are in the periodic table  3. Recall that elements are arranged in groups with similar chemical properties  4. Explain what each part of the periodic table means  5. Write the symbols and electronic configuration of common elements, including the first 20 elements    **Atoms, elements and compounds**  1. State what an atom, element, compound and mixture are  2. Describe the difference between them  3. Explain the methods of separation (filtration, chromatography, distillation, crystallisation)    **Chemical and physical changes**  1. Identify reactants and products in a reaction  2. Describe the changes that take place in a chemical and physical reaction  3. Explain the difference between a chemical and physical reaction    **Metals and nonmetals**  1. State what property means  2. Give examples of metals and nonmetals  3. Describe the properties of metals and nonmetals | Chocolate doodles experiment    Periodic table card game    Tom Lehrer Element song (You Tube)    We are the elements song    Make a model of an atom    Making mixtures, solutions, suspensions    Separation practical: filtration, chromatography, distillation, crystallisation | **Formative:** Lab report for boiling water experiment    **Criterion D:** Water Purification Essay    **Criterion A:** Written test on structure of matter and classifying chemical elements    **Optional:** Criterion D: Design a periodic table |
| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
| 10 - 13 | Biological classification | **Living Organisms**  1. State the 7 processes of life  2. Describe whether something is living or nonliving  3. Compare and contrast living and nonliving organisms    **Classification**  1. Define the word classification  2. Describe why animals are classed into groups  3. Recognise the binomial system of naming organisms  4. Read branching keys and dichotomous keys  5. Create your own branching keys    **Kingdoms**  1. State the names of the kingdoms  2. Know the 7 levels of classification  3. Give examples of organisms in the kingdoms  4. Give examples of the characteristics of the organisms in the kingdoms  5. Know the main features of the five main animal classes of vertebrates (fish, amphibians, reptiles, birds, mammals)    **Mimicry**  1. Define the word mimic  2. State some animals that use mimicry  3. Explain why organisms use mimicry | Making a key to sort out different household of classroom objects    Using keys to classify different animals    Use a dichotomous key to identify cats | **Formative:** Poster on MRS NERG    **Formative:** Presentations on a kingdom – peer assessed    **Criterion A:** Written test on biological classification (SAW) |

**Unit 2 Integrated Science**

**POS Yr 7 2016 -2017**

**Unit title: Exploration of our world and beyond**

**Key concept: Relationships Related concepts: function Global concepts: Scientific and technical innovation**

**Statement of inquiry: Understanding the nature of light and sound allows us to explore our own environment, and to discover other worlds beyond ours.**

**Inquiry question: How do we investigate our surroundings?**

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| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
| 1 - 5 | Light | **Light**  1. State the colours that make up white light  2. Describe how light travels  3. Explain how light travels through different objects    **Reflection and Refraction**  1. State what is meant by reflection and refraction  2. Investigate what happens when light is shone into different objects  3. Measure the angles involved in reflection and refraction    **Dispersion**  1. Recall that white light is made up of a spectrum of colours  2. Describe how filters work  3. Explain how a prism splits light into a spectrum    **Convex and Concave Lenses**  1. Define refraction  2. Label how light changes direction in each type of lens  3. Explain how a lens forms an image    **The Human Eye**  1. State the five senses and their functions  2. Label the key parts of the eye and their function  3. Describe which parts of an eye and camera are similar    **Eye Damage**  1. State the ways we can protect our eyes  2. Describe how our eye sees an image  3. Describe ways we can lose our sight (Inc. long/short sightedness) | In a darkened room show a variety of objects - some will be seen and some will not.    Simple investigation of shadows- what happens to shadow when source/object are moved      Reflection and refraction experiment    Construct a pinhole camera    Dissect the eye of a cow | **Criterion B:** Periscope construction & leaflet    **Criterion C:** Periscope construction & leaflet |
| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
| 6 - 7 | Astronomy & Waves | **Waves**  1. Define a wave  2. State the two types of wave and how they differ  3. Define and label the key terms onto wave diagrams    **Our Solar System**  1. State the order of the planets  2. Describe which planets are rocky or gaseous  3. Describe some key facts about the planets    **Satellites**  1. State what gravity is  2. Describe the effects of gravity on objects  3. Explain the main uses for artificial satellites    **Seasons**  1. Describe how the earth orbits the sun  2. Explain why we have day and night  3. Explain why we have seasons | Slinky to show waves | **Formative:** Create your own solar system    **Formative:** Design a resort on a planet    **Criterion D:** Hubble Telescope Essay |
| 7 to 9 | Sound | **The Human Ear**  1. Label the key parts of the ear  2. Describe the function of each part of the ear  3. Explain what stereophonic hearing is    **Sound**  1. State how sound travels  2. State what an oscilloscope is  3. Describe how pitch and volume are measured  4. Interpret wave graphs from an oscilloscope  5. Describe what causes and echo  6. Describe how a sound insulator works    **Bell Jar**  1. State what a vacuum is  2. Describe why no sound can be heard in a vacuum | Stereophonic hearing experiment    Bell Jar experiment    Oscilloscope demonstration    Ghost oscilloscope readings    Tuning forks | **Formative:** Design a house to suit a family with different specific needs in terms of hearing    **Criterion A:** Written test – light, sound, waves, astronomy |

**Unit 3 Integrated Science**

**POS Yr 7 2016 -2017**

**Unit title: Sharing our planet**

**Key concept: Change Related concepts: balance, interaction Global concept: Globalization and sustainability**

**Statement of inquiry: Human activity has significantly changed the natural world for better and for worse.**

**Inquiry question: How do we take care of our planet?**

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| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessment** |
| 1 – 2 | Ecology  (organisms & the environment) | **Food Webs**  1. State what an ecosystem is  2. Describe where ecosystems get their energy  3. Draw and label your own food web  4. Explain how small influences have an affect on food webs  5. State what the arrows show in a food chain    **Photosynthesis**  1. State the word equation for photosynthesis  2. Describe the limiting factors of photosynthesis  3. Explain how the plants use the products of photosynthesis  4. Know how to test for starch in a plant leaf    **Pyramids**  1. Define the word biomass  2. Construct a pyramid of numbers  3. Explain how energy is lost at each trophic level    **Factors affecting population distribution**  1. State some factors that affect distribution  2. Explain how these factors affect distribution  3. Create environments with hostile and optimum conditions    **Acid Rain**  1. State what acid rain is  2. Describe what causes acid rain  3. Explain problems and solutions with acid rain | Food web posters    Construct a model of a sustainable community eg Energy island or other activity | **Formative:** Starch test lab report |
| **Week** | **Topic** | **Objectives** | **Suggested Activities** | **Assessments** |
| 3 - 6 | Acids and Alkalis | **Acids and Alkalis**  1. Label where acids and alkalis are on the periodic table  2. Describe how to test for an acid or alkali  3. Describe how to tell the difference between an acid and alkali    **Indicators**  1. State what an indicator is  2. Describe how to prepare each indicator  3. Explain which substances are suitable to be used as an indicator    **Neutralisation**  1. Describe how to make a neutral solution  2. State the simple word equation for neutralisation  3. Explain two methods to test for a neutral solution  4. Describe how neutralisation is used in real life situations    **Acids and Metal Carbonates**  1. Describe the reaction between acids and carbonates  2. Explain how we can place elements into a reactivity series  3. Give a simple word equation for the reaction between metals and carbonates  4. Explain how to test for carbon dioxide | Making natural indicators eg red cabbage    Testing acidic and alkaline solutions (litmus, pH paper and UI)    Common reactions of acids ( and acid rain) eg with metals, carbonates, bases etc.    Neutralisation – NaOH and HCl, evaporation to get NaCl | **Criterion B:** Antacid experiment    **Criterion C:** Antacid experiment    **Criterion A:** Written test – Ecology, Acids & Alkalis (SAW) |
| After SAW | Simple Machine**s** | **Simple Machines**  1. Review forces work from year 6  2. Define the following terms:   * Catapults * Lever * Wheel and axle * Pulley * Inclined plane * Wedge * Screw   3. Design a model that includes some simple machines (catapults) | Simple machine model design | **Formative:** Design a model which includes some simple machines |