**KS3 Y7 Science Course Overview**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **I can……** | **Date** | | | | | | | | |
| Practical Skills Checklist |  | | | | | | | | |
| Write a hypothesis that can be tested (that includes the independent and dependent variables) |  |  |  |  |  |  |  |  |  |
| Select appropriate apparatus and other materials to test the hypothesis |  |  |  |  |  |  |  |  |  |
| Draw a diagram to summarise the investigation (a snapshot of the equipment in action) |  |  |  |  |  |  |  |  |  |
| Write a method that will enable valid results to be obtained |  |  |  |  |  |  |  |  |  |
| Identify the independent and dependent variables correctly in an experiment |  |  |  |  |  |  |  |  |  |
| Identify other factors to be kept constant, controlled, or monitored to allow a valid comparison to be made |  |  |  |  |  |  |  |  |  |
| Identify appropriate hazards and make a risk assessment to state control measures taken |  |  |  |  |  |  |  |  |  |
| Draw a result table with appropriate headings or labels (with units where appropriate) |  |  |  |  |  |  |  |  |  |
| Record data accurately to an appropriate number of significant figures |  |  |  |  |  |  |  |  |  |
| Identify anomalous results and correctly decide whether to exclude them from your mean calculation |  |  |  |  |  |  |  |  |  |
| Calculate the mean average for repeated results |  |  |  |  |  |  |  |  |  |
| Label axes on graphs, including the correct units |  |  |  |  |  |  |  |  |  |
| Select an appropriate scale to fit the graph paper (so that plot range occupies more than half graph paper) |  |  |  |  |  |  |  |  |  |
| Plot results accurately with a clear small cross (to within ±1mm) |  |  |  |  |  |  |  |  |  |
| Draw a correct line (curve) of best fit on the graph paper (that represents the pattern) |  |  |  |  |  |  |  |  |  |
| Describe the pattern in the results by stating the relationship between the independent and dependent |  |  |  |  |  |  |  |  |  |
| Identify and discuss any limitations and sources of error and their possible effect on the results |  |  |  |  |  |  |  |  |  |
| Make and explain recommendations for improvements (e.g. more repeats, greater range, better apparatus) |  |  |  |  |  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **TERM 1** | | |
| TOPIC: | | |
| **Introduction to science:**  -What is a scientist?  -Work safely in a laboratory and evaluate risks.  -Make predictions using scientific knowledge and understanding  -Select and identify scientific equipment  -Plan and carry out the most appropriate types of scientific enquiries  -Identify independent, dependent and control variables  -Make and record observations and measurements using a range of methods for different investigations  -Evaluate the reliability of methods and suggest possible improvements  -Present and evaluate data  -Understand and use SI units and chemical nomenclature  **Y7 Baseline assessment** | **Cell biologist**  -All living organisms have some common characteristics.  -Living organisms require particular things from their environment to stay alive.  -Organisms are made up of one or more cells, which have common structures that carry out life processes.  -Cells are usually too small to be seen without a microscope.  -Molecules move through the cell cytoplasm by diffusion, and some molecules can enter and leave a cell by diffusing through the cell membrane.  -The cells of multicellular organisms are organized into tissues, organs and organ systems. | **Molecular chemist**  -The particle model of matter can explain the properties of substances in the solid and liquid states.  -The particle model can explain the properties of substances in the gas state.  -The particle model may be used to describe and explain solutions.  -The properties of elements and compounds arise from the structural arrangement of their constituent atoms.  -A chemical formula provides information on the composition of a substance |
| **Science assessment DC1: 1-hour formal assessment**  **Assess: Introduction to Science, Cell Biologist, Molecular Chemist** | | |
| **TERM 2** | | |
| TOPIC: | | |
| **Force scientist 1**  -A force makes things change: the speed, direction and/or shape of an object.  -The resultant force is the sum of the forces acting on the object, taking into account their direction.  -Unbalanced forces change the speed, direction and/or shape of an object.  -Friction is a force generated by an interaction between two surfaces, and which acts to resist movement between them.  -An energy store of some kind is necessary for something to happen, and something happens when energy transfers between energy stores.  -When a force makes things change it mechanically transfers energy between different energy stores. | **Biochemist**  -Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.  -Photosynthesis; the reactants in, and products of, photosynthesis, and a word summary for photosynthesis  -The dependence of almost all life on Earth on the ability of photosynthetic organisms.  -The adaptations of leaves for photosynthesis.  -A word summary 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. | **Acid scientist**  -State what is an Acid and give examples  -State what is an Alkali and give examples  -Identify and use indicators  -Acidic and alkaline solutions may be compared using the pH scale.  -A salt is formed from a neutralisation reaction between an acid and a base.  -Using simple rules to be able to predict salts that are formed from acid reactions. |
| **Science assessment DC2: 1-hour formal assessment**  **Assess: Force Scientist, Biochemist, Acid Scientist** | | |
| **TERM 3** | | |
| TOPIC: | | |
| **Force scientist 2**  -Speed is a measure of how fast an object travels: how far it goes in a given time  -Information about the motion of an object can be summarised on a distance-time graph  -A resultant force on an object can cause it to speed up or slow down, depending on the direction of the force  -The drag force on an object moving through a fluid increases with its speed and can be reduced by making the object more streamlined  -Mass is a measure of the amount of matter an object or substance is comprised of and weight is the force needed to support the object | **Geneticist**  -Similarities and differences between family members can be explained by genetic information and the effects of the interaction with the environment.  -The structure and function of organisms depends on proteins made by cells using instructions stored in the DNA of the genome.  -The process of growth takes place in all living multicellular organisms when existing cells divide to make new cells  -Plants and animals go through a series of changes, together these stages can be described as a life cycle.  -The human male and female reproductive systems produce and release gametes which come together during sexual reproduction.  - Contraceptive methods can be used during human sexual intercourse to prevent transmission of sexually transmitted infections and unwanted pregnancies.  -Flowering plants can reproduce or sexually (by producing gametes, which come together during pollination and fertilisation, followed by the development of seeds). | **Geologist**  There are many different types of rock, each made of minerals or of fragments of rocks and fossils.  Heating by the Earth’s core leads to the very, very slow movement of solid rock, which over millions of years transforms the surface of our planet.  When molten rock cools, the type of igneous rock that it forms depends on its rate of cooling and on the elements it contains.  Sedimentary rocks can contain fossils which are the remains of plants and animals from millions of years ago |
| **Science assessment DC3: 1-hour formal assessment**  **Assess: Force Scientist, Geneticist, Ecologist** | | |
| **Numeracy: Science equations for Y7:**  Magnification = image size / actual size  Speed = distance/time  Weight = mass x gravitational field strength  Energy efficiency = useful energy output/total energy input  Force = Spring constant x extension | | |