**KS3 Y8 Science Course Overview**

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| **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) |  |  |  |  |  |  |  |  |  |

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| **TERM 1** | | |
| TOPIC: | | |
| **Sound & Light Engineer**  -Objects and materials can be made to vibrate to produce a sound that becomes louder as the size of vibration increases and higher pitched as the rate of vibration increases.  -Sound needs a medium to travel through.  -Light travels in straight lines at very high speeds.  -Light is reflected from all surfaces, and off a flat mirror it is reflected in a single direction  -Objects are seen when light reflects off them into our eyes.  -Daylight and sunlight are made from all the colours of the spectrum, which together we see as ‘white light’.  -Light has colours that are seen when reflected by bodies.  -Only some light rays from each point of an illuminated object can pass through a pinhole, hitting a screen at distinct points to make an inverted image.  -A plane mirror reflects light rays from each point of an object so they appear to come from distinct points behind the mirror and the reflection is seen as if it were behind the mirror. | **Health Scientist**  **-**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 effects of diet and exercise on health  Fundamentals of the unit:  -The physical health and the mental health of an organism can range from good to ill, and are affected by numerous factors.  -The good health of organisms can be compromised by infectious and non-infectious diseases, which can be caused by germs, lifestyle, environment, or information in the genome.  -Good physical and mental health in humans depend on eating appropriate amounts of different types of food  -Human life depends upon the tissues and organs of the circulatory, digestive and gas exchange systems working together to support the life processes of the cells from which we are made. | **Analytical Chemist**  -During a chemical reaction a new substance (or substances) are formed which have different properties.  -When two solutions react, a product may be insoluble, resulting in the formation of a precipitate.  -During combustion new products are formed from the combination of oxygen with the fuel, resulting in an increase in measured mass.  -During a chemical reaction energy may be transferred to or from the surroundings. |
| **Science assessment DC1: 1-hour formal assessment**  Assess: Sound & Light Engineer, Health Scientist, Analytical Chemist | | |
| **TERM 2** | | |
| TOPIC: | | |
| **Astronomer**  **-**In the Solar System: eight planets orbit a star called the Sun; moons orbit most of the planets; and the planets spin on their axes. We live on the Earth where: a year is defined as the time for the Earth to orbit the Sun; a day as the time it takes the Earth to spin on its axis; and the Moon orbits in about 28 days. The planets are very small compared to the huge distances between them.  -The temperature is higher in the summer because the tilt of the spinning Earth increases the length of a day and increases the heating effect of the Sun’s radiation.  -The Sun is one of billions of stars in our galaxy and our galaxy is one of many billions of galaxies in the universe  -Gravity is the force that holds the Solar System together | **Physiotherapist**  -Bones and muscles are tissues that work together with organs in organ systems to support the life processes of cells to keep organisms alive.  -Good physical and mental health in humans depends on getting appropriate amounts of exercise. | **Evolution Scientist**  -There is variation between individuals of the same species, caused by differences in the genomes, lifestyles and environments of the individuals  -The fossil record provides evidence that species change over time, but it is incomplete and there are limitations to the conclusions that can be drawn from it.  -Organisms can be identified and classified into hierarchical groups based on their characteristics at the macroscopic and cellular levels |
| **Science assessment DC2: 1-hour formal assessment**  Assess: Astronomer, Physiotherapist, Evolution Scientist | | |
| **TERM 3** | | |
| TOPIC: | | |
| **Pharmacist**  -A chemical substance has a characteristic melting and boiling point and can exist in different states.  -A solution consists of one or more solutes dissolved in a solvent.  -Changes in state may be used to separate solutions.  Solubility is a property of a substance that varies with temperature. | **Heating Engineer**  -Temperature is a measure of the average speed at which the particles in a substance or material are moving  -If two objects at different temperatures are in contact, energy will move spontaneously from the object at the higher temperature to the object at the lower temperature.  -Heating makes the particles in a material move more quickly. Heating raises the temperature quickly throughout a good thermal conductor, and very slowly through a good thermal insulator.  -Each different material will have more energy in its thermal store if either its temperature or mass is increased.  -An object that is surrounded by a fluid (liquid and/or gas) floats if its overall density is less than the density of the fluid.  -Pressure increases with depth in a fluid, so the force exerted by a fluid is larger on the lower surface of an immersed object than on the upper surface. This results in an upward force on the object.  -Convection is a process that transfers energy through a fluid, as warmer less dense regions of fluid rise and cooler denser regions of fluid sink. | **Ecologist**  **-**Feeding relationships within a community of organisms can be modelled using food chain and food web diagrams.  -An ecosystem is made up of interdependent populations of organisms interacting with each other and the environment in which they live.  **-**The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops  -The importance of plant reproduction through insect pollination in human food security  -How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.  -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  -The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material**.** |
| **Science assessment DC3: 1-hour formal assessment**  Assess: Force Scientist, Geneticist, Ecologist | | |