KS3 Science 2016-17
Age-Related Assessment Objectives

	Year 7	Year 8
Topic 1	Pupils will be able to describe cells as the fundamental unit of living organisms. Pupils will be able to observe, interpret and record cell structure using a light microscope. Pupils will be able to explain the functions of the different parts of a cell. Pupils will be able to show the similarities and differences between plant and animal cells. Pupils will be able to explain the role of diffusion in the movement of materials in and between cells. Pupils will be able to study the structural adaptations of some unicellular organisms. Pupils will be able to explain the hierarchical organisation of multicellular organisms and the functions of the human skeleton. Pupils will be able to explain the function of muscles and give examples of antagonistic muscles. Pupils will be able to learn about reproduction in humans (as an example of a mammal), including the structure and function of the male reproductive system. Pupils will be able to learn about the female reproductive system, the menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, including the effect of maternal lifestyle on the foetus through the placenta. Pupils will be able to discuss reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal. Pupils will be able to investigate some dispersal mechanisms. Pupils will discuss the effects of recreational drugs (including substance misuse) on behaviour, health and life processes.	Pupils will be able to explain the interdependence of organisms in an ecosystem, including food webs. Pupils will be able to explain how organisms affect, and are affected by, their environment, including the accumulation of toxic materials. Pupils will be able to describe heredity as the process by which genetic information is transmitted from one generation to the next. Pupils will be able to explain the importance of genes and DNA in heredity. Pupils will be able to explain differences between species. Pupils will be able to show on a graph the variation between individuals within a species being continuous or discontinuous. Pupils will be able to discuss about natural selection. Pupils will be able to explain that changes in the environment may lead to extinction Pupils will be able to show the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.
Topic 2	Pupils will be able to explain gravity force is different on other planets and stars. Pupils will discuss gravity forces between Earth and Moon, and between Earth and sun (qualitative only). Pupils will be able to explain our sun as a star, other stars in our galaxy, other galaxies. Pupils will be able to understand the seasons and day length at different times of year in different hemispheres. Pupils will be able to explain the light year as a unit of astronomical distance. Pupils will be able to describe the structure and composition of the Earth. Pupils will be able to explain the rock cycle and the formation of igneous, sedimentary and metamorphic rocks. Pupils will be able to recognise Earth as a source of limited resources and the efficacy of recycling. Pupils will be able to describe the composition of the atmosphere. Pupils will be able to demonstrate the production of carbon dioxide by human activity and the impact on climate.	Pupils will be able to describe an atom. Pupils will know the differences between atoms, elements and compounds. Pupils will be able to learn about chemical symbols and formulae for different elements and compounds. Pupils will be able to explain conservation of mass changes of state and chemical reactions.

Topic 3	Pupils will be able to explain atoms and molecules as particles. Pupils will be able to explain the properties of the different states of matter (solid, liquid and gas) in terms of the particle model. Pupils will be able to explain changes of state in terms of the particle model. Pupils will be able to explain diffusion in terms of the particle model. Pupils will be able to discuss similarities and differences (including density differences) between solids, liquids and gases. Pupils will be able to explain Brownian motion in gases. Pupils will be able to show that diffusion in liquids and gases is driven by differences in concentration. Pupils will be able to explain the differences between chemical and physical changes. Pupils will be able to explain the concept of a pure substance. Pupils will be able to identify pure substances. Pupils will be able to explain mixtures, including dissolving. Pupils will be able to demonstrate simple techniques for separating mixtures: filtration, evaporation, distillation and chromatography.	Pupils will be able to explain speed and the quantitative relationship between average speed, distance and time. Pupils will be able to represent a journey on a distance-time graph. Pupils will be able to explain relative motion: trains and cars passing one another forces as pushes or pulls, arising from the interaction between 2 objects. Pupils will be able to use force arrows in diagrams. Pupils will be able to explain balanced and unbalanced forces. Pupils will be able to explain moment as the turning effect of a force. Pupils will be able to explain resistance to motion of air and water. Pupils will be able to explain forces as measurements of stretch or compression. work done and energy changes on deformation Pupils will be able to explain non-contact forces such as gravity forces, forces between magnets, and forces due to static electricity and atmospheric pressure. Pupils will be able to explain pressure in liquids increases with depth. Pupils will be able to explain upthrust effects, floating and sinking. Pupils will be able to explain pressure is measured by ratio of force over area.
Topic 4	Pupils will be able to understand that electric current is measured in amperes. Pupils will be able to investigate series and parallel circuits. Pupils will be able to explain current as flow of charge and it adds where branches meet. Pupils will be able to explain voltage as the potential difference and it is measured in volts. Pupils will be able to explain resistance (measured in ohms) as the ratio of potential difference to current. Pupils will be able to investigate the differences in resistance between conducting and insulating components. Pupils will be able to investigate the separation of positive or negative charges when objects are rubbed together. Pupils will be able to understand the idea of electric field as forces acting across the space between objects not in contact. Pupils will be able to explain attraction and repulsion between magnetic poles. Pupils will be able to plot magnetic fields with compass and represent them by field lines. Pupils will be able to explain the Earth's magnetism and how it is linked to compass and navigation. Pupils will be able to investigate electromagnets.	Pupils will be able to write a word summary for photosynthesis. Pupils will be able to explain how plants and algae use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere. Pupils will be able to describe the adaptations of leaves for photosynthesis. Pupils will be able to explain aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life. Pupils will be able to write a word summary for aerobic respiration. Pupils will be able to explain the process of anaerobic respiration in humans and micro-organisms, including fermentation. Pupils will be able to write a word summary for anaerobic respiration. Pupils will be able to explain the differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.

Topic 5	Pupils will be able to use the pH scale for measuring acidity/alkalinity. Pupils will be able to make their own indicator. Pupils will be able to learn about the varying physical and chemical properties of different elements. Pupils will be able to explain the principles underpinning the Mendeleev periodic table. Pupils will be able to understand the periodic table in terms of periods and groups and metals and non-metals. Pupils will be able to investigate the properties of metals and non-metals. Pupils will be able to investigate combustion, thermal decomposition, oxidation and displacement reactions. Pupils will be able to define acids and alkalis in terms of neutralisation reactions. Pupils will be able to explain the reactions of acids with metals to produce a salt plus hydrogen. Pupils will be able to explain the reactions of acids with alkalis to produce a salt plus water. Pupils will be able to investigate what catalysts do. Pupils will be able to understand how patterns in reactions can be predicted with reference to the periodic table. Pupils will be able to tell the order of metals in the reactivity series.	Pupils will be able to compare energy values of different foods (from labels). Pupils will be able to compare power ratings of appliances in watts. Pupils will be able to compare amounts of energy transferred. Pupils will be able to explain domestic fuel bills, fuel use and costs. Pupils will be able to learn about fuels and energy resources. Pupils will be able to explain heating and thermal equilibrium. Pupils will be able to describe other processes that involve energy transfer. Pupils will be able to compare the initial with the final conditions of a system and describe increases and decreases in the amounts of energy. Pupils will be able to use physical processes and mechanisms, rather than energy, to explain the intermediate steps that bring about the changes in a system. Pupils will be able to explain the similarities and differences between light waves and waves in matter light waves travelling through a vacuum. Pupils will be able to explain the transmission of light through materials. Pupils will be able to use a ray model to explain images in mirrors, the pinhole camera and the refraction of light. Pupils will be able to describe the human eye. Pupils will be able to explain colours, the different frequencies of light, white light and prisms. Pupils will be able to understand that sound needs a medium to travel. Pupils will be able to explain that sound is produced by vibrations of objects. Pupils will be able to describe sound waves are longitudinal. Pupils will be able to compare the auditory range of humans and animals.
Topic 6	Pupils will be able to explain the content of a healthy human diet and why each food group is needed. Pupils will be able to calculate the energy requirements in a healthy daily diet. Pupils will be able to explain the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. Pupils will be able to learn the tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food. Pupils will be able to show the importance of bacteria in the human digestive system. Pupils will be able to investigate plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.	Pupils will be able to explain chemical reactions as the rearrangement of atoms. Pupils will be able to represent chemical reactions using formulae and using equations. Pupils will be able to explain energy changes on changes of state (qualitative). Pupils will be able to explain exothermic and endothermic chemical reactions (qualitative).