

Science Year 7 Scheme of Work

Year 7 Biology Units A and C will be covered in the Autumn Term, B and D will be covered between New Year and May 2017.

7A Tissues and Transplants

Topic 7Aa introduces the unit with a look at heart transplants.

Most pupils will have an understanding of what an organ transplant is, and this provides an interesting topic to give pupils a better understanding of why it is important to learn about organs and their functions.

Topic 7Ab covers using a microscope. It also introduces various skills involved with making slides for microscopic examination.

Topic 7Ac formally introduces the idea of cells and the differences between plant and animal cells.

Topic 7Ad extends the idea of cells by looking at cells that have specific adaptations. There is further work on organ problems, with a specific look at kidney dialysis.

Topic 7Ae completes this unit by looking at organ systems.

7B Sex and Science

Topic 7Ba covers reproduction in animals, which includes a look at using breeding programs and cloning to protect numbers of endangered animals.

Topic 7Bb deals with the names, locations and functions of the human reproductive organs, and the adaptations of the sex cells.

Topic 7Bc covers sexual intercourse, contraception and STDs.

Topic 7Bd deals with the menstrual cycle and pregnancy.

Topic 7Be completes this unit by looking at birth, aftercare, growth and development in humans and other animals

7c Ecology Matters

Topic 7Ca provides revision (from KS2) of what a habitat is and covers the major environmental features of a variety of habitats together with a look at the physical environmental factors that cause these features. This is set within the context of an ecologist doing an environmental impact assessment.

Topic 7Cb considers specific adaptations that animals and plants have for living in certain habitats.

Topic 7Cc covers the changes in physical factors during the course of a day and during the course of a year, and how organisms are adapted to cope with these changes.

Topic 7Cd covers the adaptations that animals have for finding and eating their food sources. Could level material covers parasites and the ways in which sleeping sickness is being tackled using a variety of different technologies.

Topic 7Ce revises food chains and introduces food webs. This is linked to the evidence that is needed to demonstrate feeding relationships within a habitat.

7D Classified

Topic 7Da introduces pupils to the idea that many things around us are sorted into groups. The material then considers what variation is and introduces pupils to the concept of a species. Pupils also practice finding

relationships between features and

Topic 7Db outlines the causes of variation, both inherited and environmental.

Topic 7Dc introduces biological classification by looking at how organisms are described in a range of writing forms. This is then extended to challenge pupils to come up with their own classification systems.

Topic 7Dd covers the development of a system of classification for use in the scientific community before going on to consider the classification of vertebrates.

Topic 7De completes the unit by looking at the classification of invertebrates, insects and metamorphosis.

Chemistry in Year 7

E and G will be covered in the Autumn term, F and H will be covered between New Year and May 2017.

7E Acids and Alkalis

Topic 7Ea uses the manufacture and transport of acids to introduce ideas about hazard warning classifications as used in the laboratory and for the transportation of chemicals.

Topic 7Eb introduces the idea that many familiar and non-hazardous substances are classified as acids, and that these non-hazardous acids can be identified by their taste.

Topic 7Ec introduces acids and alkalis with a practical definition based on their effect on indicators. The practical and historical approach is sustained through the introduction to alkalis.

7Ed progresses from this 'concrete' experience of acids and alkalis to the more theoretical concepts of pH, substance classification and acid strength, by looking at how our understanding of the nature of acids has changed over time. In both Topics 7Ec and 7Ed, familiar substances encountered in the home are used as a context to introduce new scientific ideas. Practical work covers ideas about blind testing in an investigation where only subjective results can be obtained.

Topic 7Ee looks at some applications of neutralisation in more detail, and includes investigations of the way that pH changes when an acid is added to an alkali.

7F Bubbles, bangs and burning

Topic 7Fa uses the context of fairgrounds and fireworks to introduce the difference between physical changes and chemical reactions, and how to tell if a reaction has happened. There is a brief introduction to decomposition reactions using heat and electricity as energy sources.

Topic 7Fb focuses on reactions which produce gases, and includes the tests for hydrogen and carbon dioxide gas.

Topic 7Fc uses examples from cooking and fireworks to introduce the concept of energy transfer, and the idea of energy balance in reactions. This includes an introduction to combustion, introducing the test for oxygen and word equations. This leads on to work on the fire triangle in Topic 7Fd and lays the foundations for more advanced work at KS4.

Topic 7Fd discusses the fire triangle, fire safety and the methods used for putting out different types of fire. It also looks at the burning of fuels, and the products of burning, including word equations for hydrocarbon fuels.

Topic 7Fe considers pollution issues arising from burning fuels. The link between combustion and explosions is also considered, and pupils are asked to reflect on the positive and negative uses of explosives.

7G What a waste

Topic 7Ga introduces the idea that different waste materials are treated in different ways due to their properties. It considers the different properties of the three states of matter, ensuring that pupils are in a position to be able to distinguish between them. The material covers uses of liquids depending on their properties.

Topic 7Gb introduces the idea that theories are ways of explaining evidence. Reference is made to a theory about solids, liquids and gases that explains their different properties. Several more observations are introduced, which particle theory would have to explain.

Topic 7Gc introduces particle theory and uses it to explain the properties of solids, liquids and gases.

Topic 7Gd discusses diffusion through the idea of smells coming off a landfill site, as an example of the use of a

theoretical model to explain a series of observations. It is also a good opportunity to emphasise that scientific observations are not necessarily visual.

Topic 7Ge looks at gas pressure (in the context of gases produced by landfill and the problems that this can cause). Gas pressure is then explained in terms of particle theory. There is extension work on the development of the particle theory with a look at the different ideas that have been put forward over the years to explain the properties of matter.

7H Materials from the Earth

Topic 7Ha introduces the idea that rocks are made of grains, and looks at the characteristic shapes and arrangements of grains in sandstone and granite. Texture is related to permeability, and the relative resistance of rocks to weathering is related to landscape. There is work on interpreting scenery in terms of layers of rock.

Topic 7Hb covers the weathering of rock and compares the weathering of limestone and granite. There is material on the formation of limestone caves.

Topic 7Hc looks at how weathered rock fragments are transported and deposited. This topic also considers the effects of ice on the landscape and how theories about past ice ages were developed.

Topic 7Hd outlines how sedimentary rocks are formed, including the formation of fossils and fossil fuels. The material covers dating rocks using fossils.

Topic 7He explains how geologists can work out how sedimentary rocks form from evidence in the rocks themselves. Students will study work which explains cross-bedding in more detail.

Physics in Year 7

Unit I is studied in the Autumn term and units J, K and L will be studied between New Year and May 2017

7I Energy and Sustainable Living

Topic 7Ia introduces the idea of 'green living' and the need for energy, and looks at how fossil fuels were formed and how long they will last. Extension material looks at the fuel resources used to generate electricity.

Topic 7Ib explains the idea that burning fossil fuels is thought to be leading to global warming, and looks at different ways in which we might reduce our energy use.

Topic 7Ic outlines energy resources other than fossil fuels, and introduces the idea of renewable resources. Students are encouraged to consider the advantages and disadvantages of using different energy resources.

Topic 7Id looks at food as a store of energy.

Topic 7Ie completes this unit by looking at the idea that energy from the Sun is the original source of most of our energy resources, including fossil fuels, wind, waves and hydroelectricity. The unit concludes by considering whether science is the cause of energy-use problems or part of the solution (or both!).

7J Electrical circuits

Topic 7Ja starts by revising some concepts that many pupils will have covered at KS2 – electrical safety at home and in school, and basic circuits and switches – and then goes on to look at using ammeters to measure current in a series circuit and the idea of resistance

Topic 7Jb discusses the heating effect of current and how it is used in electric fires, light bulbs and fuses. Students will study using bimetallic strips to control circuits. The practical on investigating the resistance of different lengths of wire can be used as an embedding practical for KS4.

Topic 7Jc develops a conceptual model for an electric circuit. This is used to emphasise that current is not used up around a circuit and that electricity is a means of transferring energy. A couple of alternative models are presented, and pupils are encouraged to think about their strengths and weaknesses, and which model helps them to think about electricity.

Topic 7Jd introduces parallel circuits in the context of lighting circuits and discusses the differences between series and parallel circuits.

Topic 7Je discusses electricity and the body, including nerves, organs and electric shocks. There is an opportunity to discuss the development of ideas about electricity by looking at the disagreement between Galvani and Volta. The unit concludes by discussing the potential use of electric cars.

7K Forces and their effects

Topic 7Ka introduces the outdoor activity theme for the unit, and revisits ideas about forces first met at KS2: that forces are pushes or pulls, that forces can change the speed or direction of movement of something or change its shape. This topic also looks at the difference between mass and weight.

Topic 7Kb looks at friction, the effects of surface roughness on friction, and lubrication. It also discusses various ways in which friction is helpful and not helpful. We will ask pupils to analyse the results of a weight and friction experiment. A practical activity on investigating the factors affecting friction will be studied.

Topic 7Kc looks at floating and sinking, and emphasises that things float when weight is balanced by upthrust. Students will carry out study on the Plimsoll line and Archimedes, and in looking in more detail at how the use of friction and buoyancy can help to keep outdoor sports safe.

Topic 7Kd looks at balanced forces, and how forces are measured using springs.

Topic 7Ke introduces the idea that different units for speed can be appropriate for different circumstances. Vehicle stopping distances and distance–time graphs are introduced.

7L The solar system

Topic 7La starts by revisiting KS2 work on the shape of the Earth, the reasons we have day and night, and the definitions of years and leap years.

- Topic 7Lb describes the Moon, phases of the Moon and eclipses.
- Topic 7Lc looks at the differences in day length, temperature and Sun elevation through the seasons, and explains why this happens.
- Topic 7Ld discusses the Earth's place in the Solar System, briefly describes the other planets and explains that we can only see the planets because of reflected light.

- Topic 7Le looks at stars and galaxies, and discusses the distances between the stars.