Chandlings
PREP • OXFORD

Year 6

Learning Objectives	Learning Outcomes
Electricity and Magnetism	
• To construct series and parallel circuits, and how to measure current and voltage.	• To construct and draw parallel and series circuits, involving cells, lamps, switches (push button, reed switches), motors, buzzers, voltmeters and ammeters. • To know that electric current can be alternating or direct.
• About magnetic fields as regions of space where magnetic materials experience forces. • That like magnetic poles repel and unlike magnetic poles attract. • Magnetic fields by plotting with a compass. • Representation by field lines. • Earth's magnetism, compass and navigation	• That like poles repel and unlike poles attract. • That magnetic forces occur even without contact between the magnets. • That both poles will attract unmagnetised iron. • That lines showing the direction of the field should have arrows pointing away from the north-seeking pole. • The terms north-seeking and south-seeking poles. • How to use plotting compasses and/or iron filings to show a magnetic field. • That the Earth has a magnetic field, and that a freely-suspended bar magnet will align itself north– south

• How electromagnets are constructed. • That a current in a coil produces a magnetic field pattern similar to that of a bar magnet.	• How to construct a simple electromagnet using an iron core and insulated wire. • That the strength of the electromagnet depends on the number of turns on the coil and on the current.
• Matter is composed of atoms. • Electrons may be transferred from one material to the other due to friction.	• That atoms are composed of subatomic particles, including protons carrying a positive charge (+), and electrons carrying a negative charge (-). • When electrons are transferred there is an excess of electrons on one material and this becomes negatively charged. There is also a deficiency of electrons on the other material and this becomes positively charged.
Forces and Speed	
• About some mechanisms, including levers, pulleys and gears, allowing a smaller force to have a greater effect	• About the effects of levers, pulleys and gears on movement.
• About friction as a force which slows moving objects and may prevent objects from starting to move.	• About the concept of friction as a force which opposes the relative movement of surfaces, with reference to everyday situations • How to carry out investigations involving friction
• How to determine the speed of a moving object and to use the quantitative relationship between speed, distance and time.	• About the timing of moving bodies to measure speed. • The relationship between speed, distance and time. • How to use this for simple quantitative work.
• Using force arrows in diagrams, balanced and unbalanced forces.	• That forces can be represented by arrows which can show both the size of the force by the length of arrow and the direction of the force by the direction of the arrow.
• Forces as pushes or pulls, arising from the interaction between two objects. • Forces measured in newtons (N). • Measurements of stretch or compression as force is changed.	• That the unit of force is the newton and that forces can be measured using a force meter (newton meter).
• That unbalanced forces change the speed or direction of objects and that balanced forces produce no change in the movement of an object.	• That an unbalanced force can cause either a change in speed or a change in direction of motion. • That a balanced force causes no change in speed or direction. • Can work out the resultant force from simple force diagrams.
Burning and Energy	

• Combustion Reactions.	• How to use the Bunsen burner for gentle warming, vigorous heating. • About the effect of air supply on the flame. • That when things burn in air they react with oxygen. • How to put out a fire by removing one part of the fire triangle, fuel, oxygen, heat.
• To know the parts of the Bunsen burner, the three flames and use it safely.	• Can change the moveable ring to change the flame. • Know the differences between the flames (safety flame, medium flame, roaring flame) and when to use them. • Can identify parts of a Bunsen burner, including moveable ring, base, chimney.
• About reversible changes, including dissolving, melting, boiling and evaporating.	• That heating and cooling can cause a change of state. • The terms solution, solvent, solute, soluble, insoluble, melting, boiling, evaporating and dissolving. • Can use a tripod, gauze and tongs to boil water in a beaker and a boiling tube. • Can use a thermometer to take accurate readings. • Know that different solids have different melting points and to investigate this using a Bunsen burner.
• To recognise differences between solids, liquids and gases,	• How to use popcorn cooking to represent the arrangement of particles in solids, liquids and gases. • Can use a tripod, gauze and beaker.
• That solutions can be classified as acidic, neutral or alkaline.	• How to make and use natural pigmented indicator e.g. red cabbage on a Bunsen burner and to classify solutions as acidic, neutral or alkaline.
• That burning materials results in the formation of new materials and that this change is not usually reversible.	• About simple burning experiments to demonstrate that burning is not reversible using the flame of a Bunsen burner. • To burn magnesium ribbon and know that it is an irreversible change. • The term fuel. • The term fossil fuel and examples of solid, liquid and gaseous fossil fuels. • Know that a Bunsen burner is fuelled by a gaseous fuel.
Cells and Microbes	
• To recognise that living things can be grouped in a variety of ways.	• That animals and plants are classified into separate kingdoms.

• To classify living things into the major taxonomic groups	• Bacteria, fungi and single-celled organisms are placed in other kingdoms.
• How the growth and reproduction of bacteria and the replication of viruses can affect health. • How the body's natural defences may be enhanced by medicines and vaccines.	• One example of a bacterial disease and one example of a viral disease. • About the importance of cleanliness at personal and community levels as a defence against disease. • That the body's natural defences can be supplemented by medicines and vaccines.
• That micro-organisms are living organisms which are often too small to be seen, and that they may be beneficial (e.g. in the breakdown of waste, in making bread) or harmful (e.g. in causing disease, in causing food to go mouldy).	• That yeast is a micro-organism which is too small to be seen. • Yeast is important in making bread and wine. • Some micro-organisms help to break down the remains of dead organisms.
• That cells are the fundamental unit of living organisms. • The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.	• That in multi-cellular organisms, cells are massed together to form tissues, and tissues can be massed together to form organs; that organs work together in systems; organ systems work together in an organism.
• The similarities and differences between plant and animal cells. • The functions of chloroplasts and cell walls in plant cells and the functions of the cell membrane, cytoplasm and nucleus in both plant and animal cells. • The functions of the vacuole in plant cells.	• That a typical animal or plant cell has a nucleus, cytoplasm and cell surface membrane • That plant cells contain permanent fluid-filled vacuoles. • The function of each component, stated briefly. • That the nucleus contains genes and that genes are made of DNA which determines an organism's characteristics. • How to use a microscope to observe plant and animal cells. • How to prepare a temporary microscope slide, e.g. using iodine as a stain
• The structural adaptations of some cells	• How some cells are adapted to feed, move or exchange gases.
Health for Life	
• To describe the life process of reproduction in some plants and animals.	• About sexual and asexual reproduction in plants compared with sexual reproduction in animals and understand that fertilisation is the fusing of male and female sex cells in sexual reproduction.
• About the main stages of the human life cycle.	• How to compare different types of mammals, looking at the gestation periods of, for example, a mouse and an elephant. • About changes in the length and mass of a baby as it grows. • Features of life cycles which are common to all animals.

• About the physical and emotional changes which take place during adolescence.	• About the principal changes which occur at adolescence and an understanding of why these occur (hormones).
• How the abuse of alcohol, solvents and other drugs affects health. • The effects of recreational drugs (including substance misuse) on behaviour, health and life processes.	• About the effects on the human body of tobacco, alcohol and other drugs, and how these relate to personal health. • About the effects of tobacco, alcohol, and recreational drugs on behaviour and long-term physical and mental health. • The potential for addiction. • The positive effects of exercise and healthy eating.
• The effect of smoking on the lungs.	• Smoking is one of the causes of lung cancer and heart disease. • Smoking reduces the surface area of the lungs, leading to severe breathing difficulties.
• That living things produce offspring of the same kind, but that offspring vary and are not identical to their parents.	• e.g. about different breeds of dogs and the effects of cross breeding.
• Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems. • The menstrual cycle (without details of hormones), gametes, fertilisation.	• The term gamete. • The relative sizes and numbers of eggs and sperm and their roles. • That fertilisation in humans occurs when the head of a sperm (a male cell) enters the ovum (a female cell) and the nuclei fuse together, bringing together through the genes some of the characteristics of both parents • About the structure and functions of the human reproductive system and how sperm and egg are brought together. • The menstrual cycle in outline only.
• Gestation and birth, to include the effect of maternal lifestyle on the fetus.	• That the fetus is protected and nourished in the uterus and that its waste materials are eliminated. • That molecules such as alcohol and nicotine can affect fetal development.
Scientific Enquiry Types	Scientific Enquiry Skills
• Observation over time. • Research. • Pattern seeking. • Problem solving. • Identifying, grouping and classifying. • Comparative/fair tests.	• Understands that scientific theories develop as scientists take account of new evidence and ideas. • Have an understanding of health and safety and evaluate risks. • Can sort and classify according to shared characteristics. • Can make predictions using scientific knowledge and understanding.

	• Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work. • Knows the importance of, and can carry out, a fair test. • Can identify independent, dependent and control variables, where appropriate. • Can make and record careful observations. • Can make and record measurements using a range of methods and apparatus. • Take repeat readings to obtain more accurate results and calculate averages where required. • Understands and uses Standard International units. • Uses simple equations and carries out appropriate calculations. • Presents observations, findings and data using labelled diagrams, tables, line graphs and bar graphs. • Can extrapolate data from a line graph. • Interprets observations, data, and measurements to draw conclusions. • Can use results and conclusions to suggest improvements and raise further questions. • Can understand and use scientific vocabulary appropriately.
Engineering Focus	Engineering Outcomes
• Problem Soving • Improving • Problem Finding • Adapting • Visualising • Thinking	• Coming up with good and new ideas, Making detailed plans, Thinking before doing something, Working successfully in a group, Taking on board other people's ideas • Working hard and practising to get better, even when it's tricky, Working out what I need to do to improve, Making what I've done better, Experimenting with things, just to see what happens, Sticking at doing something until it's the best it can be • Asking lots of questions to make sure I understand, Finding out why something doesn't work, Checking and checking again until I'm happy, Finding mistakes in mine and other people's work, Thinking about the world around me, and how it could be better • Explaining how well I am doing to my teacher or friends, Evaluating how good something is, Sticking up for what I think when talking with other

	people, Deciding how something could be done differently, Listening carefully to other ideas and changing your mind. ● Thinking out loud when I am being imaginative, Making a plan before I start work, Practising something in my head before doing it for real, Making models or drawing diagrams to show my ideas, Explaining my ideas to other people so that they understand ● Using ideas from one subject in another subject, Working out the possible consequences of something, before they happen, Putting things together to make something new, Spotting similarities and difference between things, Spotting patterns and working out what comes next.