



Curriculum Intent

Faculty of Science

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Subjects included: Science

Science Curriculum Intent

At Red Moor School our science curriculum aims to promote a lifelong interest in science. We aim to show that science is ever present in our lives and helps us make informed decisions; from our nutritional choices, to road safety and the use of the latest technology.

We aim to create a maximum number of opportunities to do relevant practical work and learn how things work together. Where possible, students work in groups to promote **social skills, tolerance** and **respect**.

We pose questions to encourage curiosity and promote discussion.

We aim to promote **resilience** by realising together that not every experiment works, and often this allows us to reflect and try again.

Staff role model scientific vocabulary through discussion.

Through investigation, students learn to plan and carry out safe experiments making predictions based on their previous learning and knowledge.

Students are guided in recording good quality data and encouraged to reflect on whether or not their processes could be improved.

Students learn the important life skill of interpreting data presented in a variety of ways including graphs and tables.

We plan for all students to **achieve their personal best** academically, which means our learning journey aims to prepare students for the GCSE. Students will also be entered for other qualifications such as the Entry Level certificate and ASDAN courses as appropriate.

In science cross curricular opportunities are frequent. For example:- the use of maths in physics, science in sport and training, science in catering and healthy living.

We aim to bring Outside Providers into Red Moor School and work with small groups to provide a wider experience of science.

Assessment is regular and informs all parties of progress, however, is often informal to avoid causing any anxiety for the young people we work with.

Teaching & Learning In Science

What does excellent teaching and learning look like in science?

We believe that the best science teaching will foster an enthusiasm and enjoyment for the subject. We think that the best lessons will see children actively involved in finding out about the world around them—sometimes working independently and sometimes together .

Whilst lesson outcomes are structured we plan for a flexible approach so that lessons are adaptable to the individual needs and curiosity of students at the time.

We think that the best teaching will allow children to grow their knowledge sequentially so they leave us at the end of Year 11 with the very best outcomes.

How is science taught in the Foundation Curriculum (KS2 & 3)?

In the foundation curriculum, students are taught in small groups and work is differentiated for each child depending upon the current attainment in science and their individual needs. Seven schedules are planned across the science foundation curriculum and each of these is banded so teachers can differentiate appropriately. This allows foundation learners to build on their knowledge sequentially so achievers can work towards the best qualifications and outcomes. Students often achieve AQA Accredited Unit Award Schemes (UAS) during the foundation curriculum.

How is science taught in the Options curriculum (KS4)?

In the Options curriculum, students are again taught in small groups and are working towards achieving accreditation through GCSE's, ASDAN awards or Entry Level schemes—depending upon ability and the needs of the child. We always have the highest expectations and strive to help our children achieve their best.

How is reading promoted in science?

All teacher's of science are expected to be aware of each child's current reading age and blank level assessment. This will allow staff to differentiate all learning resources so independent reading can be encouraged every lesson and appropriate questioning of knowledge is utilised so each learner is more able to build upon their scientific knowledge.

Measuring Impact in Science

At Red Moor School, staff use an online platform called SOLAR (Special On Line Academic Records) to record student attainment in science. This system uses the RMS Steps Assessment Framework.

The RMS Steps covers a broad range of ability, from the 'Foundation Learning Skills' (FLS) that cover Early Years education, through to the main 'Steps' curriculum that takes students from Year 1 through to Year 11. This helps to provide staff with additional guidance on the sequence and progression of knowledge and skills within the science curriculum, helping to ensure that learning builds upon prior attainment.

Each Step of the framework represents the corresponding academic year – so a child working on Step 5 would be working broadly in line with students in Year 5 at a mainstream school. A child who masters all 11 steps will be expected to leave the school with an excellent GCSE grade in science.

The expectation for progress for students is that they will master 80% of the curriculum each year to achieve mastery of that step, before moving on to the next step.

Students are encouraged to gain external accreditation for their learning from the earliest opportunity. This can be through a range of awarding bodies, such as the AQA Unit Award Schemes, ASDAN's and Entry Level Qualifications. The aspirational goal for all students is that they leave with GCSEs, or the highest level of appropriate qualifications they can access, within their areas of interest and ability.

Skills and Progression

All the knowledge and skills that we would like our learners to achieve by the end of Year 11 are set out in sequential order on SOLAR. It is our intention to ensure that all children progress at the expected rate so they are able to achieve their personal best.

We have ordered the knowledge and skills in a sequential way and these can be seen on the following pages.

Skills and Progression 'snap-shot'

SOLAR: Biology – Animals.	
Step 1	Name a range of different animals, including pets.
Step 2	Identify food that different animals will eat.
Step 3	Know common names of some fish, amphibians, reptiles, birds and mammals; be able to describe them.
Step 4	Identify animals that eat both plants (herbivore) and animals (carnivore) or both (omnivore).
Step 6	Identify if an animal is a herbivore, carnivore or omnivore.
Step 7	Begin to group vertebrate animals (e.g. into fish, reptiles, amphibians, birds or mammals) or invertebrates (e.g. snails, slugs, worms, spiders or insects).
Step 7	Identify different types of teeth in humans and their simple functions.
Step 7	Construct and interpret a variety of food chains, identifying producers, predators and prey.
Step 8	Describe factors that animals compete for in a given habitat.

Skills and Progression 'snap-shot'

SOLAR: Biology – Cells.	
Step 2	All living things are made up of cells.
Step 3	Know cells are the basic building blocks of all animals and plants
Step 4	Name the parts of a plant cell and animal cell.
Step 4	Name the 7 characteristics of living things: Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion and Nutrition.
Step 9	Compare: diffusion, osmosis and active transport in animal and plant cells.
Step 9	Identify similarities and differences between animal and plant cells.
Step 9	Identify the function of cell wall, cell membrane, cytoplasm, nucleus, vacuole, chloroplasts and mitochondria.
Step 10	Aware of the three types of micro-organisms and their basic characteristics.
Step 11	Describe the function of endoplasmic reticulum and ribosomes in cells.

Skills and Progression 'snap-shot'

SOLAR: Biology – Environment.	
Step 9	Identify greenhouse gases in the atmosphere maintain temperatures on Earth high enough to support life.
Step 9	Recall materials are recycled through the abiotic and biotic parts of an ecosystem.
Step 9	Aware that poor waste management causes pollution in: the air, the water and on land.
Step 9	Explain how the change in land use impacts on biodiversity.
Step 9	Describe some of the biological consequences of global warming.
Step 9	Describe four potential effects of global climate change.
Step 9	Evaluate the environmental implications of deforestation.
Step 10	Describe two human activities that increase the amounts of each of the greenhouse gases.
Step 10	Describe the importance of the carbon and water cycles to living organisms.
Step 10	Describe positive and negative human interactions in an ecosystem and their impact on biodiversity.
Step 11	Explain and evaluate the conflicting pressures on maintaining biodiversity.
Step 11	Explain how waste, deforestation and global warming have an impact on biodiversity.
Step 11	Explain all materials in the living world are recycled to provide the building blocks for future organisms.

Skills and Progression 'snap-shot'

SOLAR: Biology – Evolve, classify, variation.	
Step 1	I am aware some things are living/not living.
Step 2	Begin to group plants and animals giving reasons.
Step 3	Group plants and animals giving reasons.
Step 4	State some simple differences between animals and plants.
Step 4	Describe and compare some fish, amphibians, reptiles, birds and mammals (this should include pets).
Step 7	Use classification to identify and name a variety of living things.
Step 8	Describe how living things are classified into groups giving common features (vertebrate and invertebrate groups).
Step 8	Identify how animals and plants are adapted to their environment.
Step 9	Recognise that offspring of a species shows variation.
Step 9	Identify simple adaptations of animals and plants to suit a specific environment.
Step 9	Recognise fossils show how animals have evolved.
Step 10	Explain how adaptations can lead to evolution (survival of the fittest).
Step 10	Explain how natural selection can lead to extinction.
Step 10	Investigate, measure and create graphs on continuous and discontinuous variation within a species.
Step 11	Explain and evaluate Lamarck's and Darwin's theory of evolution.
Step 11	State and describe the evidence for evolution (geology, fossils, anatomy).

Skills and Progression 'snap-shot'

SOLAR: Biology – Health & diet.	
Step 1	I am aware of healthy and unhealthy lifestyle - food and teeth, and that movements maintains health (exercise).
Step 1	I am aware that movements maintains health (exercise).
Step 2	Aware of healthy and unhealthy lifestyle choices; drugs, smoking, exercise.
Step 4	Carry out a simple test to see how exercise impacts on the body.
Step 5	State water, food and oxygen are essential for survival in animals.
Step 5	Describe the importance of exercise, a balanced diet and hygiene for humans.
Step 6	State the names of the three main food groups and what humans need them for; carbohydrates, energy, protein - growth and repair, fat - store of energy and insulation.
Step 7	Identify how teeth can be damaged and how to look after them.
Step 8	Recognise the impact diet, exercise, drugs and lifestyle can have on the way the body functions.
Step 9	Identify the 7 parts needed for a balanced diet and why they are needed
Step 10	Describe the importance of bacteria in the digestive system,

Skills and Progression 'snap-shot'

SOLAR: Biology – Life cycle, Repro.	
Step 1	I can sequence a series of more than three pictures to describe the process of life e.g. human life cycle or physical processes.
Step 3	Describe the life cycle of flowering plants.
Step 4	Begin to match up adult animals to an image of their offspring.
Step 5	Observe and describe how seeds/bulbs grow into mature plants.
Step 5	Notice animals (Including humans) have offspring which grow into that animal.
Step 6	Explore the role the different flower parts play in the life cycle to include: Pollination; Seed formation; Seed dispersal.
Step 8	Describe asexual and sexual reproduction in plants.
Step 8	Describe sexual reproduction in animals.
Step 8	Observe and describe the life cycle of different animals (mammal, amphibian, bird, insect).
Step 9	Evaluate and compare the life cycles of mammals, amphibians, birds and insects.
Step 9	Identify the materials an organism requires from their surroundings and other living things to survive and reproduce.
Step 10	Aware of the importance of plant reproduction through insect pollination in human food security.
Step 10	Understand the term gametes, know that they contain chromosomes with genes on them to create individuals.

Skills and Progression 'snap-shot'

SOLAR: Biology – Life cycle, Repro.	
Step 11	Begin to use punnet square diagrams to explain inheritance in species.
Step 11	State what a mutation is and give possible causes of this.
Step 11	State and describe differences between sexual and asexual reproduction.

SOLAR: Biology – Organs & systems.	
Step 2	Name main face parts.
Step 3	Name main body parts (head, neck, arm, elbow, leg, knee, face).
Step 4	Say which body part is associated with each sense.
Step 6	Identify some animals have a skeleton and muscles for support, protection and movement.
Step 6	Know different organs have a specific function (heart, lungs and brain).
Step 7	Identify and describe simple functions of parts of the digestive system (mouth, tongue, oesophagus, stomach, small intestine and large intestine).
Step 8	Know co-ordination and control mechanisms in humans.
Step 8	Identify and name the main parts of the human circulatory system.
Step 8	Describe the function of the heart, blood vessels and blood.
Step 9	Name reactants and products of respiration.

Skills and Progression 'snap-shot'

SOLAR: Biology – Organs & systems.	
Step 10	Describe how adaptation of the small intestine and enzymes aid digestion.
Step 10	Describe the importance of bacteria in the digestive system.
Step 11	Describe the structure and function of the heart - to include muscular contraction and valves.
Step 11	Describe the structure and function of the nervous system; describe the route of a nerve impulse and explain its importance.

SOLAR: Biology – Plants.	
Step 1	Name the basic parts of a variety of common flowering plants and trees.
Step 2	Devise a simple test to see what happens if a plant has no water.
Step 4	Devise a simple test to see what happens if a plant has no light.
Step 5	Know plants need water, light and correct temperature to grow and stay healthy.
Step 5	Compare plant growth in different conditions and record changes.
Step 6	Observe and describe the function of different parts of a flowering plant through investigation (root, stem, leaves, flowers).
Step 7	Recognise environments can change seasonally and by compare effects of human impact.
Step 9	Describe the role of leaf stomata in gas exchange in plants.
Step 9	Name reactants and products of photosynthesis.
Step 9	Describe factors that plants compete for in a given habitat.
Step 10	State plants make carbohydrates in the leaf (test leaf for starch).

Skills and Progression 'snap-shot'

SOLAR: Chemistry – Acids-Alkali.	
Step 9	Know the pH scale is used for measuring acids/alkalis.
Step 9	Recall - acid + metal = salt and hydrogen gas - and - acid + alkali = salt and water.

SOLAR: Chemistry – Atmosphere.	
Step 10	Recall the composition of the atmosphere.
Step 10	Aware of how carbon dioxide is produced by human impact and the impact this is having.
Step 10	Describe the carbon cycle.
Step 11	Aware of common pollutants in the atmosphere and their sources - to include Carbon monoxide, Sulphur dioxide and Ozone.

SOLAR: Chemistry – Bunsen.	
Step 2	State what a Bunsen burner might be used for.
Step 2	Begin to identify parts of Bunsen burner.
Step 4	State main parts of Bunsen burner.
Step 4	Describe what happens to the colour of a Bunsen flame when you change the air hole.
Step 4	Try and give a reason why colour of flame changes.

Skills and Progression 'snap-shot'

SOLAR: Chemistry – Change.	
Step 6	Classify changes as to whether they are reversible or irreversible.
Step 7	Compare and group materials on their solubility.
Step 7	Demonstrate or identify that dissolving, mixing and changing state can be reversible.
Step 7	Identify that if a new material has been made then it is an irreversible change.
Step 8	Be aware that there is a limit to the amount of a solid that may be dissolved in a liquid (saturated solution).
Step 9	Know the differences between atoms, elements and compounds.
Step 9	Describe chemical reactions as the rearrangements of atoms.
Step 9	Identify exothermic and endothermic reactions using temperature change.
Step 9	Recall order of the reactivity series.
Step 10	Use chemical symbols and formulae for elements and compounds.
Step 10	Represent chemical reactions using equations and formulae.
Step 10	Describe displacement reactions using knowledge of the reactivity series.
Step 10	Represent chemical reactions using equations and formulae.
Step 10	Describe displacement reactions using knowledge of the reactivity series.

Skills and Progression 'snap-shot'

SOLAR: Chemistry – Change.	
Step 11	Identify protons, neutrons and electrons in the atomic structure and recall the charge of each sub-atomic particle.
Step 11	Know the difference between ionic, covalent and metallic bonding.
Step 11	Know the difference in REDOX reactions (adding of losing electrons).
Step 11	Describe endothermic and exothermic reactions in terms of bonds being made or broken.
Step 11	Describe the position of elements in the periodic table in relation to their atomic structure.
Step 11	Identify and state the differences between alkanes and alkenes.

SOLAR: Chemistry – Mixture.	
Step 6	Know that some solids dissolve in a liquid and others do not, know that solids will dissolve in a liquid to form a solution.
Step 6	Filter mixtures such as sand/water.
Step 6	Know some mixtures cannot be separated by filtering.
Step 7	Carry out evaporation to recover a substance from a solution.
Step 7	Use knowledge of S, L, G to decide how mixtures can be separated by filtering, sieving and evaporating.
Step 8	Describe how mixtures may be separated.

Skills and Progression 'snap-shot'

SOLAR: Chemistry – Materials.	
Step 1	I can identify a range of objects made from wood, metal, glass.
Step 1	I can sort materials by simple criteria, e.g. size, shape, appearance, texture.
Step 1	I can choose materials for specific purposes, e.g. transparency, waterproof etc.
Step 1	I can describe some of the properties of materials I have observed, e.g. it is big/hard/shiny.
Step 1	I can begin to measure changes in materials using simple scientific equipment with support, e.g. timers, thermometers, microscope.
Step 2	When describing materials use the terms ; transparent, opaque.
Step 2	Explore objects that are bendy/not bendy, shiny/dull.
Step 3	Describe objects that are opaque/transparent.
Step 3	Identify and describe objects as opaque, transparent or translucent.
Step 3	Identify objects as transparent.
Step 3	Identify and describe objects as opaque, transparent or translucent.
Step 3	Identify objects as transparent.
Step 3	Describe objects that are bendy/not bendy, shiny/dull.
Step 3	Sort objects into groups.
Step 3	Give reasons for above grouping stating physical properties.

Skills and Progression 'snap-shot'

SOLAR: Chemistry – Materials.	
Step 3	Talk about what objects are used for.
Step 3	Begin to give a reason why an object is used for a purpose (with support or choices).
Step 4	Explore and observe objects that are heated and cooled.
Step 4	Explore and describe objects that can be stretched.
Step 4	Explore if objects float or sink.
Step 4	Explore if objects are light or heavy, rigid or flexible, hard or soft.
Step 5	Give reasons why materials are used for a specific purpose independently.
Step 5	Know that some materials are changed by heating and cooling.
Step 5	Know some materials are changed by bending and stretching.
Step 5	Aware that some changes are permanent and others are not.
Step 5	Describe a range of properties of objects as: light/heavy/rigid/burnable/float/sink from experiments.
Step 7	Compare and group materials on their conductivity (electrical and thermal).
Step 8	Identify uses of changes in material in everyday life e.g. superglue, plaster.

Skills and Progression 'snap-shot'

SOLAR: Chemistry – Materials	
Step 10	Describe properties of metals and non-metals.
Step 10	Identify metals/non-metals and periods/groups on the periodic table.
Step 11	Describe and evaluate the use of polymers.

SOLAR: Chemistry – Rock.	
Step 2	Identify objects made of rock.
Step 6	Observe rocks and group rocks according to properties e.g. grains/crystals/layers.
Step 6	Observe and describe how fossils are formed in simple terms.
Step 6	Explore different soils and identify similarities and differences.
Step 6	Recognise that soils are made from rocks and other organic matter.
Step 6	Know some uses of rock.
Step 8	Group rocks according to appearance, texture and use the words sedimentary, igneous and metamorphic.
Step 8	Know what permeable and impermeable mean, and use it to describe rocks.
Step 8	Give simple characteristics of sedimentary, metamorphic and igneous rocks.

Skills and Progression 'snap-shot'

SOLAR: Chemistry – Rock.	
Step 8	Describe how each rock type if formed.
Step 8	Describe the rock cycle.
Step 9	Describe the structure of the Earth.
Step 11	Describe the limestone cycle and uses of Calcium carbonate.
Step 11	Know the use of carbon compounds as fuels and describe how crude oil can be separated for use.

SOLAR: Chemistry – State.	
Step 6	Classify objects as solid, liquid or gas and give basic properties.
Step 7	Use correct terminology when describing changing state.
Step 7	Measure temperature at which changing state of materials can happen (to include water).
Step 7	Identify where evaporation occurs in the water cycle.
Step 7	Observe some materials change state when heated and cooled.
Step 8	Identify when condensation occurs in a water cycle.
Step 8	Consider the effect of temperature on evaporation.
Step 9	Describe changes of state using the particle model.
Step 9	Describe S, L, G using the particle model.
Step 10	Describe diffusion in terms of the particle model.

Skills and Progression 'snap-shot'

SOLAR: Physics - Electricity.	
Step 1	I can observe changes e.g. in light, sound, movement that results from an action e.g. making a shadow, using a dimmer switch.
Step 1	I can identify some simple electrical components.
Step 3	Be aware that the misuse of electrical equipment can be dangerous.
Step 4	State why misuse of electrical equipment is dangerous.
Step 4	Be able to identify basic electrical components using scientific symbols.
Step 4	Be aware that the circuit has to be complete for electrical devices to work.
Step 5	Create a simple electrical circuit using batteries, bulbs, buzzers and wires.
Step 5	Investigate which materials can make wires.
Step 6	Be able to draw a simple circuit.
Step 7	Construct and draw a simple circuit using the correct electrical symbols.
Step 7	Explore and identify conductors and insulators.
Step 8	Discuss the relationship between bulb brightness and the voltage in a circuit.
Step 8	Construct and draw a simple series and parallel circuit using the correct electrical symbols with support.
Step 9	Describe how current and voltage behave in series and parallel circuits.
Step 10	Explain whether objects will attract or repel depending on static charges they possess.

Skills and Progression 'snap-shot'

SOLAR: Physics - Electricity.	
Step 10	Perform calculations using electrical formula - e.g. $V=IR$, $Q=IT$.
Step 11	Describe the process and energy transfers at each stage of electrical production (power station, national grid, home).
Step 11	Explain why power lines have to transmit at such a high voltage.
Step 11	Calculate current, voltage, resistance and power in series and parallel circuits.

SOLAR: Physics - Energy.	
Step 2	Identify the source of heating at home and at school.
Step 2	Discuss how we could save energy.
Step 9	Describe energy transfer via conduction, convection and radiation.
Step 10	Identify simple energy transfers and wasted/lost energy from a system.
Step 10	Discuss the advantages/disadvantages of renewable and non-renewable energy.
Step 10	Calculate Some energy stores. e.g. gravitational, kinetic, work done.

Skills and Progression 'snap-shot'

SOLAR: Physics - Force.	
Step 2	Aware that different things move at different speeds.
Step 2	Identify things that: roll, fly, slide.
Step 3	Know that some things can be moved by pushing and pulling.
Step 4	Compare the speed of objects moving down a ramp and identify which was the fastest.
Step 5	Describe movement in terms of speed and acceleration.
Step 5	Know a force can change the shape/speed/direction of an object.
Step 6	Compare how things move on different surfaces.
Step 6	Name and investigate the effects of contact and non contact forces. e.g. air resistance, friction, magnetic, push, pull, gravity.
Step 7	Know that gravity is force that acts at a distance.
Step 7	Know gravity causes objects to have weight - calculate weight with support $W=mg$.
Step 7	Knowledge of friction, water resistance and air resistance and understanding that these can slow objects down.
Step 8	Be able to correctly use physics equations.
Step 8	Explore effects of levers, pulleys and gears.
Step 8	Know moment is a turning force and show understanding of balancing a see-saw.
Step 8	Be able to correctly manipulate equations for their use.

Skills and Progression 'snap-shot'

SOLAR: Physics - Force.	
Step 8	Awareness and use of simple measurement units e.g. Hz, J, W, N.
Step 9	State why levers, pulleys and levers are useful (small force for greater effect).
Step 9	Interpret and represent a journey on distance-time graphs.
Step 9	Investigate Hooke's law.
Step 10	Identify the difference between speed and velocity.
Step 10	Interpret speed-time graphs.
Step 10	Explain the motion of objects with a resultant force acting, and those in equilibrium.
Step 11	Aware of Newtons laws of motion.

Skills and Progression 'snap-shot'

SOLAR: Physics - Light.	
Step 2	Can describe a rainbow and how it is formed.
Step 5	Know how light travels from its source.
Step 5	Know dark is the absence of light - can identify if it is dark or light.
Step 6	Know light is reflected of shiny surfaces.
Step 6	Recognise shadows are formed when light is blocked by a solid object.
Step 6	Find patterns in the way size of shadows change.
Step 7	Know as the sun appears to move, shadows change.
Step 8	Describe that light travels in straight line and we are only able to see an object because the light enters our eyes.
Step 9	Use light ray model to describe reflection.
Step 9	Use light ray model to describe refraction.
Step 10	Explain dispersion into the different colours/ wavelengths of light.

Skills and Progression 'snap-shot'

SOLAR: Physics - Magnet.	
Step 1	I can observe the use of a magnet and begin to identify material as being magnetic or non-magnetic.
Step 2	Sort objects into magnetic or non-magnetic using a magnet.
Step 6	Describe magnets as having 2 poles and identify if magnets will attract or repel based on the poles.
Step 6	Explore the strength of a magnet.
Step 9	Investigate the strength of an electromagnet.

SOLAR: Physics - Pressure.	
Step 9	Calculate pressure on solid surfaces and describe situations where surface pressure is high / low.
Step 10	Explain what causes gas pressure and describe how it changes with temperature.

Skills and Progression 'snap-shot'

SOLAR: Physics - Radiation.	
Step 10	Recall the electromagnetic spectrum and give a use for each.
Step 10	Know what ionisation is.
Step 10	Describe alpha, beta and gamma radiation.
Step 11	Investigate half-life.
Step 11	Describe the use of nuclear fission as an energy source.
Step 11	Aware of the hazards of radiation on the human body.

SOLAR: Physics - Sound.	
Step 2	Make a simple musical instrument - state how it works.
Step 2	Create simple sound effects.
Step 5	Know that sounds move from the source.
Step 5	Know sound becomes quieter as we move away from a source.
Step 7	Describe how pitch can be changed.
Step 7	Describe how volume of sound can be changed.
Step 9	Describe that sound needs a medium to travel through and identify the relative speeds through different media.
Step 10	Explain how waves can be used for energy and describe longitudinal and transverse waves.

Skills and Progression 'snap-shot'

SOLAR: Physics - Space.	
Step 1	I can show that I know day is light and at night it is dark.
Step 1	Know that the Sun appears to move across the sky.
Step 3	Observe weather associated with the four seasons at home (keep log).
Step 3	Identify appropriate clothing for the different seasons.
Step 3	Observe changes across the four seasons including weather in different countries.
Step 3	Aware of weather in some different countries.
Step 3	State why it's not safe to look directly at the Sun.
Step 4	Describe simple changes across the four seasons including day length and temperature.
Step 4	Recall the names of some planets and know we live on planet Earth.
Step 6	Know that the Earth spins on its axis to create day and night.
Step 6	Know that day and night occur at different times in different places.
Step 7	Know the Earth orbits the Sun once a year.
Step 8	Recall the order of the planets and know that they orbit the Sun.

Skills and Progression 'snap-shot'

SOLAR: Physics - Space.	
Step 9	Know that the Sun is a star, and our galaxy is the Milky Way.
Step 10	Aware of the uses of satellites and describe circular motion with support.
Step 10	Describe red shift and what it implies about the movement of galaxies.
Step 11	Explain how red-shift is evidence for the Big Bang.
Step 11	Describe why there are still unanswered questions for the expansion of the Universe.
Step 11	Describe the life cycle of a Star.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Conclusion.	
Step 2	Attempt to give a reason for what happened.
Step 2	Begin to describe an event they were involved in.
Step 3	Describe an observed event.
Step 3	Attempt to give a reason for what happened and offer a reason why.
Step 4	Begin to draw a conclusion from collected data.
Step 5	Give a simple conclusion based on an investigation.
Step 6	Ask questions about the tests/results.
Step 6	Identify why an investigation is fair or not.
Step 7	Draw a simple conclusion by selecting relevant quantitative or qualitative data.
Step 8	Use observations, measurements and data to draw conclusions.
Step 9	Use conclusions to create simple, test-able hypothesis.
Step 10	Present data appropriately, identify patterns and trends in results and use them to draw conclusions.
Step 11	Communicate scientific rationale for an investigation, methods used, findings and conclusion through written reports and/or electronic presentations.
Step 11	Begin to comment on the validity of a conclusion based on the method/s.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Investigate.	
Step 6	Use a variety of methods to record information e.g. graphs, diagrams, drawing.
Step 7	Plan and carry out a simple investigation.
Step 8	Decide on techniques, materials and experiments to use for investigations.
Step 9	Carry out sampling techniques.
Step 10	Plan an investigation to test a hypothesis.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Measure/ analyse.	
Step 4	Take simple measurements with support.
Step 5	Take simple measurements.
Step 6	Measure length/mass accurately.
Step 8	Use a range of methods to present quantitative data e.g. bar chart, line graph etc.
Step 8	Identify anomalies in observations and measurements.
Step 9	Undertake basic data analysis e.g. calculate mean.
Step 10	Be able to convert units.
Step 11	Begin to perform complex scientific equations.
Step 11	Begin to critically analyse qualitative data to draw well-evidenced conclusions.
Step 11	Begin to critically analyse quantitative data to draw well-evidenced conclusions.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Equipment.	
Step 2	Use senses as appropriate.
Step 4	Select equipment using images to carry out an experiment correctly.
Step 5	Able to select and name equipment needed to do an experiment.
Step 5	Begin to use data loggers with support.
Step 8	Use ICT for data logging.
Step 10	Use light microscope to observe cells independently.

SOLAR: Science Enquiry - GCSE Grade.	
Step 5	Working at GCSE Grade 1.
Step 6	Working at GCSE Grade 1.
Step 7	Working at GCSE Grade 2.
Step 8	Working at GCSE Grade 3.
Step 9	Working at GCSE Grade 4.
Step 10	Working at GCSE Grade 5.
Step 11	Working at GCSE Grade 6+.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Investigate.	
Step 1	I can make some contribution to planning by suggesting what I will do "now" and "next".
Step 1	I can contribute to a record of what happens in an investigation (this can be by using a combination of symbols/word cards/verbal and signed responses).
Step 2	Fill in a simple results chart with help.
Step 2	Show a reaction to something.
Step 3	Fill in a results chart.
Step 3	Take part in a group or class test.
Step 3	Contribute to class or group recording.
Step 4	Create a simple results chart with support.
Step 4	Identify variables that we have to control.
Step 5	Observe objects and make comparisons
Step 5	Observe investigation and record findings/results.
Step 5	Observe an investigation and identify variables.
Step 6	Suggest how an investigation may be adjusted.
Step 6	Read information using data loggers and digital thermometers.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Predict.	
Step 1	I can make a simple prediction.
Step 2	Make predictions and consider what will happen.
Step 3	Say what might happen using a short phrase or sentence.
Step 4	Give a reason for your prediction.
Step 4	Discuss the question - what will happen if?
Step 5	Use knowledge to make predictions and check results.
Step 8	Ask questions that can be investigated scientifically.
Step 9	Make predictions using scientific knowledge and understanding.
Step 10	Use scientific theories, models and explanations to begin to develop hypotheses.
Step 11	Identify and investigate a further question proposed arising from investigation results.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Safety.	
Step 1	I can consider simple safety rules for practical work.
Step 2	Identify a simple risk associated with an experiment.
Step 3	Follow simple instructions.
Step 4	Identify a way of reducing a potential danger of an experiment.
Step 6	Use simple equipment correctly and safely.
Step 7	Identify a risk and take action to control it.
Step 7	Consider how what they find out may affect themselves/the environment/other living things.
Step 11	Be able to adapt method and apparatus of an investigation when problems arise, particularly health and safety.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Sources.	
Step 1	I can begin to look at pictures for information.
Step 2	Say what they have seen happen giving yes or no answers.
Step 3	Tell an adult what they have seen.
Step 3	Observe closely using simple equipment.
Step 4	With support begin to read information to gather ideas about Science.
Step 6	Relate information to personal experience/real world.
Step 6	Observe simple patterns in quantitative and qualitative data.
Step 7	Use secondary resources to obtain information.
Step 8	Use secondary sources to help support their conclusion.
Step 9	Consider the validity of any secondary sources used.
Step 11	Use primary and secondary sources to fully evaluate an investigation.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Write-up.	
Step 2	Give a reason why they think a test is fair/ not fair.
Step 2	Draw their observations (if applicable).
Step 5	Builds on present knowledge.
Step 7	Provide an explanation for results obtained.
Step 7	Identify trends and patterns in results.
Step 7	Identify variables that need to be kept constant (fair testing).
Step 8	Use line graphs, diagrams and keys where appropriate.
Step 8	Consider significance and limitations of own work (evaluate).
Step 9	Identify control, independent and dependent variables in an investigation.
Step 9	Identify anomalies and discuss if they were random or a systematic error.
Step 9	Evaluate investigation work and say how it could be improved.
Step 10	Give improvements to investigation to overcome random and systematic errors.
Step 10	Understand the power of limitations of Science and potential ethical questions and debates

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Write-up.	
Step 10	Begin to identify further questions arising from their investigation results.
Step 10	Begin to write up simple scientific investigations.
Step 11	Understand scientific methods and theories develop as scientists modify earlier explanations to take into account of new evidence and ideas.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Required - Biology.	
Step 9	Use a microscope to observe and record animal and plant cells.
Step 9	Investigate the effect of light wavelength on photosynthesis in pondweed.
Step 10	Investigate the effect of a range of concentrations of salt/ sugar solutions on the mass of plant tissue.
Step 10	Investigate the effect of pH on the rate of reaction of amylase enzyme.
Step 10	Food tests for a range of carbohydrates, lipids and proteins.
Step 10	Investigating whether caffeinated drinks affect human reaction times.
Step 10	Use sampling techniques to investigate the population size of a common species in a habitat.
Step 10	The effect of light and gravity on the growth of germinating seeds.
Step 11	Investigate the effect of antibiotics on the growth of bacteria.
Step 11	Investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Required - Chemistry.	
Step 9	Making salts - preparation of a pure, dry sample of a soluble salt.
Step 9	Temperature changes - when an acid is neutralised by an alkali.
Step 9	Rates of reaction - how the concentration of a solution affects the rate of chemical reaction.
Step 9	Chromatography - using paper chromatography to separate and identify a mixture of colourings.
Step 9	Water purification - distillation of salt water to produce potable water.
Step 9	Investigate the elements formed at each electrode when different salt solutions are electrolysed.
Step 10	Neutralisation - find the volume of dilute acid needed to neutralise a known volume of alkali solution.
Step 11	Identify the ions in a single ionic compound using chemical tests.

Skills and Progression 'snap-shot'

SOLAR: Science Enquiry - Required - Physics.	
Step 9	Specific heat capacity of a material.
Step 9	Resistance - how does the resistance of a wire depend on its length?
Step 9	Investigate what happens to the current through a component when the p.d. across it changes.
Step 9	Use density to identify what something is made of.
Step 10	Investigate the relationship between force and extension for a spring.
Step 10	Investigate acceleration using an air track and light gates.
Step 10	Observe, measure waves in a ripple tank and stretched string/cord.
Step 10	Investigate the amount of infrared radiation emitted by different surfaces.
Step 11	Investigate the effectiveness of different materials as thermal insulators and factors that may affect their properties.
Step 11	Light - investigate the reflection/ refraction of light by different surfaces/ substances.

Skills and Progression 'snap-shot'

SOLAR: — ASDAN - Short Course - Section A and/ or B Challenges.	
Step 9	ASDAN - Module 1: Human Machine - Credit 1 - 2.5 hours.
Step 9	ASDAN - Module 1: Human Machine - Credit 1 - 2.5 hours.
Step 9	ASDAN - Module 1: Human Machine - Credit 1 - 2.5 hours.
Step 9	ASDAN - Module 1: Human Machine - Credit 1 - 2.5 hours.
Step 9	ASDAN - Module 2: Force and Motion - Credit 2 - 2.5 hours.
Step 9	ASDAN - Module 2: Force and Motion - Credit 2 - 2.5 hours.
Step 9	ASDAN—Module 2: Force and Motion - Credit 2 - 2.5 hours.
Step 9	ASDAN - Module 2: Force and Motion - Credit 2 - 2.5 hours.
Step 9	ASDAN—Skills Sheet 1: Plan & Review.
Step 9	ASDAN - Module 3: Chemical Change - Credit 3 - 2.5 hours.
Step 9	ASDAN - Module 3: Chemical Change - Credit 3 - 2.5 hours.
Step 9	ASDAN - Module 3: Chemical Change - Credit 3 - 2.5 hours.
Step 9	ASDAN - Module 3: Chemical Change - Credit 3 - 2.5 hours.
Step 9	ASDAN - Module 4: Biological Changes - Credit 4 - 2.5 hours.
Step 10	ASDAN - Module 4: Biological Changes - Credit 4 - 2.5 hours.
Step 10	ASDAN - Module 4: Biological Changes - Credit 4 - 2.5 hours.
Step 10	ASDAN - Module 4: Biological Changes - Credit 4 - 2.5 hours.
Step 10	ASDAN - Skills Sheet 2: Plan & Review.

Skills and Progression ‘snap-shot’

SOLAR: — ASDAN - Short Course - Section A and/ or B Challenges.	
Step 10	ASDAN - Module 5: Space - Credit 5 - 2.5 hours.
Step 10	ASDAN - Module 5: Space - Credit 5 - 2.5 hours.
Step 10	ASDAN - Module 5: Space - Credit 5 - 2.5 hours.
Step 10	ASDAN - Module 5: Space - Credit 5 - 2.5 hours.
Step 10	ASDAN - Module 6: Performance in Sport - Credit 6 - 2.5 hours.
Step 10	ASDAN - Module 6: Performance in Sport - Credit 6 - 2.5 hours.
Step 10	ASDAN - Module 6: Performance in Sport - Credit 6 - 2.5 hours.
Step 10	ASDAN - Module 6: Performance in Sport - Credit 6 - 2.5 hours.
Step 10	ASDAN - Skills Sheet 3: Plan & Review.
Step 10	ASDAN—Summary of Achievement and Personal Statement.