Swindon Academy Curriculum Map

Intent

At Swindon Academy we recognise the importance of Science in every aspect of life. As one of the core subjects taught in Primary schools, we give the teaching and learning of Science the prominence it requires. Our curriculum offers coherent, substantive knowledge of the scientific disciplines of biology, chemistry and physics that provides pupils with a secure, deep understanding of the nature, processes and principles of science through clear instruction and deliberate practice. As well as, grounding in core disciplinary knowledge, and the ability to systematically approach challenging, scientifically valid questions through scientific attitudes & planning, measuring & observing, recording & presenting and analysing & evaluating. It ensures that substantive and disciplinary knowledge from the National Curriculum (2014) is delivered in subjects, not topics. The knowledge and units within each subject are sequenced very carefully so that the substantive and disciplinary knowledge builds gradually across the subjects and years, and subject-specific 'big ideas' are revisited and developed regularly. This helps children to build knowledge into the long-term memory. Purposeful interdisciplinary links allow pupils to make meaningful connections and understand the world around them. Our curriculum prioritises pupils mastering foundational concepts and knowledge before moving on and it has lots of opportunities to revisit and apply this knowledge in new contexts. It is designed to be inclusive and engaging for all pupils so that every child, regardless of their background, is taught the full content of the curriculum to which they are entitled. We intend for it to be inspiring and generate excitement and curiosity in pupils. We want to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science, today and for the future.

Implementation – Rosenshine principles of instruction

Daily Review

Daily review is an important component of instruction. It helps strengthen the connections of the material learned. Automatic recall frees working memory for problem solving and creativity

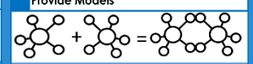
New Material in Small Steps

Our working memory is small, only handling a few bits of information at once. Avoid its overload—present new material in small steps and proceed only when first steps are mastered.

Ask Questions

The most successful teachers spend more than half the class time lecturing, demonstrating and asking questions. Questions allow the teacher to determine how well the material is learned.

Provide Models



Students need cognitive support to help them learn how to solve problems. Modelling, worked examples and teacher thinking out loud, help to clarify the specific steps involved.

Guide Student Practice

Students need additional time to rephrase, elaborate and summarise new material in order to store it in their long-term memory. More successful teachers build in more time for this.

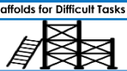
Check Student Understanding

Less successful teachers merely ask "Are there any questions?" no questions are taken to mean no problems. False. By contrast, more successful teachers check on all students.

Obtain High Success Rate

A success rate of around 80% has been found to be optimal, showing students are learning and also being challenged. Better teachers taught in small steps followed by practice.

Scaffolds for Difficult Tasks



Scaffolds are temporary supports to assist learning. They can include modelling, teacher thinking aloud, cue cards and checklists. Scaffolds are part of cognitive apprenticeship.

Independent Practice

Independent practice produces 'overlearning" - a necessary process for new material to be recalled automatically. This ensures no overloading of students' working memory.

Weekly and Monthly Review

The effort involved in recalling recently -learned material embeds it in long-term memory. And the more this happens, the easier it is to connect new material to such prior knowledge.

Key Stage 1									
Year 1		**Term 1**	**Term 2**		**Term 3**	**Term 4**		**Term 5**	**Term 6**
		Plants	**Seasonal changes**		**Everyday materials**	**Consolidation and review**		**Animals**	**Humans**
		Biology	Biology / Physics		Chemistry			Biology	Biology
		• *Identifying and naming common plants.* • *Describing basic structures* of plants.	• *Observing changes across four seasons.* • *Describing associated weather.*		• *Distinguishing objects from the material it's made from.* • *Describing simple properties .*	•		• *Identifying and naming fish, amphibians, reptiles, birds and mammals.* • *Differentiating between carnivores, herbivores and omnivores.*	• *Identifying human body parts.* • Understanding the 5 senses

Key Stage 1									
Year 2		**Term 1**	**Term 2**		**Term 3**	**Term 4**		**Term 5**	**Term 6**
		Biology	**Needs of animals**		**Uses of everyday materials**	**Living things & their habitats**		**Solids, liquids and gases**	**Consolidation and review**
		Plant growth	Biology		Chemistry	Biology		Chemistry	
		• Plants grow from seeds, and require water, light and a suitable temperature	• *Animals need water, food and air to survive and to have offspring.*		• *Comparisons of an object's material with its use.* • *Impact of bending, twisting on solid objects.*	• *Basic introduction to habitats and micro-habitats, and simple food chains*		• *Understanding how the same substances can exist as solids, liquids and gases.*	•

Lower Key Stage 2									
Year 3		**Term 1**	**Term 2**		**Term 3**	**Term 4**		**Term 5**	**Term 6**
		Rocks	**Light**		**Living organisms**	**Plants**		**Forces & motion**	**Friction & magnetism**
		Chemistry	Physics		Biology	Biology		Physics	Physics
		• Comparisons of types of rocks and how fossils are formed.	• *Relationship between light and how we see; the formation of shadows.*		• *The role of muscles and skeletons; the importance of nutrients.*	• *The key features of flowering plants and what they need to survive.*		• *Introducing pushes and pulls; opposing forces, and balanced forces.*	• Contact and non-contact forces, including friction and magnetism.

Lower Key Stage 2								
Year 4		**Term 1**	**Term 2**		**Term 3**	**Term 4**		**Term 5**	**Term 6**
		Classifying organisms	**Food & digestion**		**Living organisms**	**Sounds**		**Electricity**	**Properties of materials**
		Biology	Biology		Chemistry	Physics		Physics	Chemistry
		• Introduction to classifying animals and their environment.	• *The human digestive system and simple food chains.*		• *States of matter in relation to particle arrangement.*	• *Relationship between strength of vibrations and volume of sound.*		• *Simple series circuits.*	• Considering physical and chemical properties.

Upper Key Stage 2								
Year 5		**Term 1**	**Term 2**		**Term 3**	**Term 4**		**Term 5**	**Term 6**
		Separating mixtures	**Energy**		**Life cycles**	**Human development**		**Forces**	**Earth and space**
		Chemistry	Biology, Chemistry, Physics		Biology	Biology		Physics	Physics
		• Identifying and separating mixtures; difference between reversible and non-reversible changes.	• *Introducing the concept of energy stores and energy transfers, and relating this to prior knowledge.*		• *Life cycles of a mammal, amphibian, insect and bird, and some reproduction processes.*	• *Human development to old age.*		• *Gravity, air and water resistance and friction; introduction to pulleys.*	• Movements of planets and the Moon, and relationship to day and night.

Upper Key Stage 2								
Year 6		**Term 1**	**Term 2**		**Term 3**	**Term 4**		**Term 5**	**Term 6**
		Evolution	**Electricity**		**Light**	**Further classification**		**Functions of the human body**	**Physical and chemical changes**
		Biology	Physics		Physics	Biology		Biology	Chemistry
		• Fossils; introduction to the idea that adaptation may lead to evolution.	• *Investigating variations in series and parallel circuits, and how electricity is generated.*		• *How light travels and is reflected, and how this allows us to see.*	• *Further classification of living organisms based on characteristics.*		• *Human circulatory system; transport of nutrients within the body.*	• Identifying physical and chemical changes.