

St Marys Science Curriculum Big Ideas, Key Concepts and Disciplinary Knowledge

THE BIG IDEAS OF SCIENCE

Physics

P1: The universe follows unbreakable rules that are all about forces, matter and energy.

P2: Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.

P3: Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.

Chemistry

C1: All matter (stuff) in the universe is made up of tiny building blocks.

C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc).

C3: Matter can change if the arrangement of these building blocks changes.

Biology

B1: Living things are special collections of matter that make copies of themselves, use energy and grow.

B2: Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.

B3: The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

Earth science

E1: The Earth is one of eight planets that orbit the sun.

E2: The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate.

E3: The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)

Key Concepts	Disciplinary Knowledge (Working Scientifically)
<ul style="list-style-type: none"> • absorption • birth • bond • circuit • component • condensation • conductor • decay • dissolving • energy • evaporation • extinction • freezing • growth • habitat, • insulator • irreversible • matter • melting • orbit • particle • property • reflection • reproduction • reversible • wave 	<p>Key Stage 1</p> <ul style="list-style-type: none"> • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions. <p>Lower Key Stage 2</p> <ul style="list-style-type: none"> • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes <p>using straightforward scientific evidence to answer questions or to support their findings.</p>

Key Concepts	Disciplinary Knowledge (Working Scientifically)
<ul style="list-style-type: none"> • structure • function • evolution/Adaptation • change • cause and effect • variation/variety • similarity and difference • best fit • fair test • theory • technology 	<p>Upper Key Stage 2</p> <ul style="list-style-type: none"> • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments. <p>Additionally:</p> <ul style="list-style-type: none"> • Explain things that we see in the natural world by attempting to understand their causes. • Scientific theories as explanations of what we see in the natural world that best fit with evidence that has been gathered. Because of this, theories can be changed when new evidence is found. • knowledge produced by science leads to new technology that humans find useful. These technologies don't always necessarily make the world better so we have to think carefully about how – and whether – we use them.