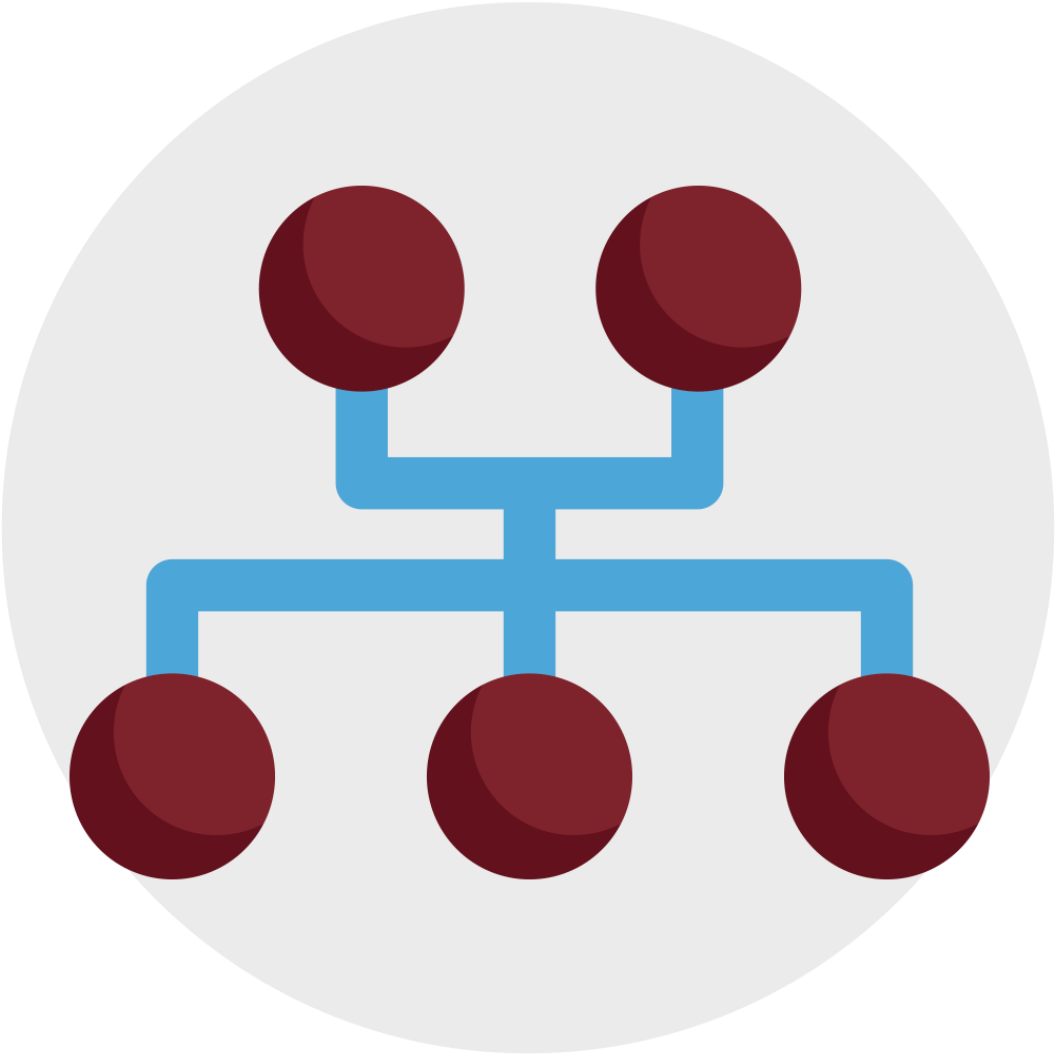
The Holy Family Catholic School

Science

Curriculum Mapping

2021



Big Ideas in Science

- Our strands thread throughout the curriculum from KS3 to KS5.
- These strands are the common themes – the key concepts that run through the three disciplines of biology, chemistry and physics.
- We have organised our curriculum as a spiral design that returns to these concepts time and time again as demonstrated by the organisation behind our teaching plans.

- Biology

Organisms and the Environment

Organisms

Cells

Genetic Information

Plants

Ecosystems

- Chemistry

Physical Changes

Atoms, Elements and the Periodic Table

Chemical Change

Physical Change

- Physics

Energy

Waves

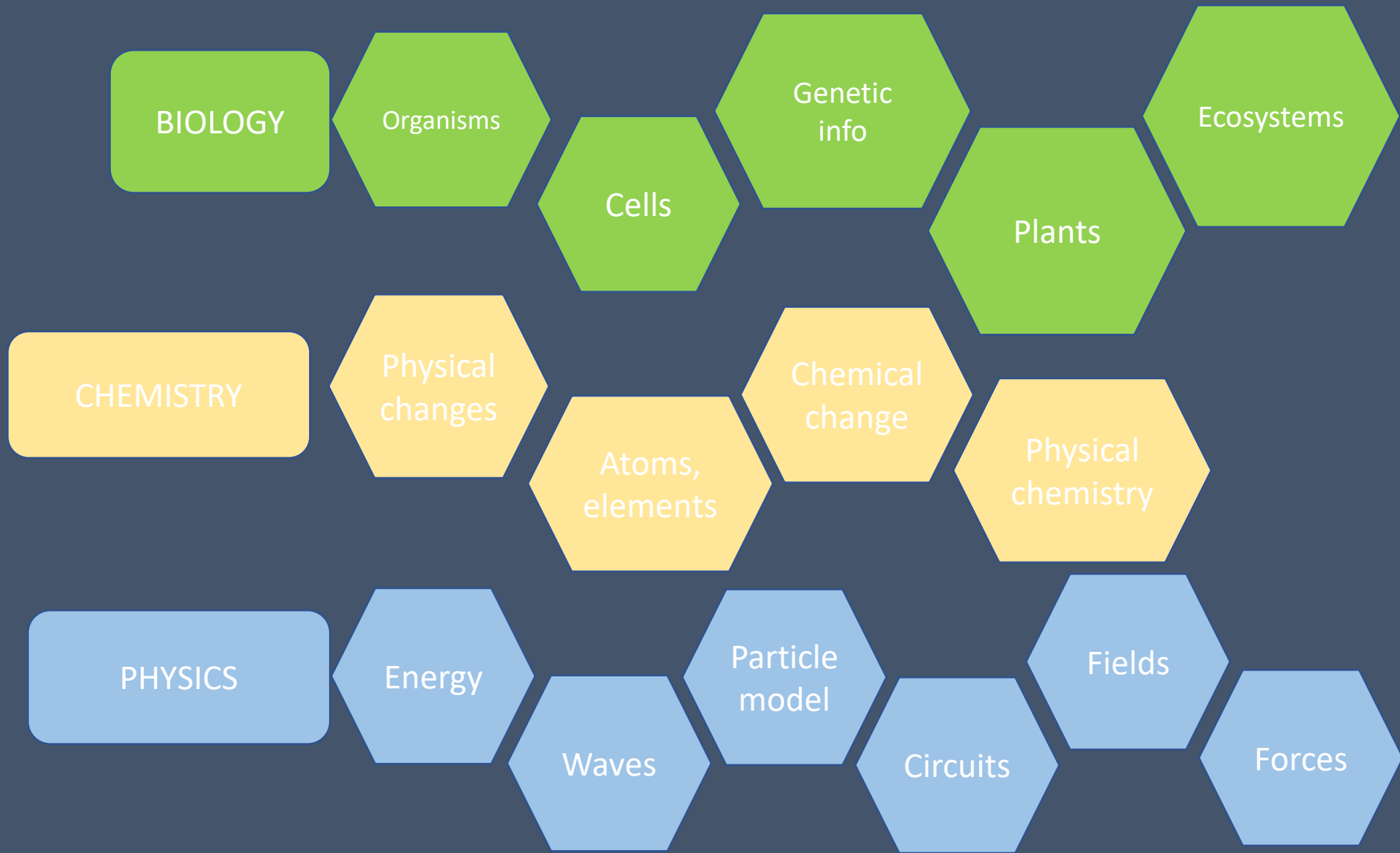
Particle Model

Circuits

Fields

Forces

Key concepts that thread throughout the science curriculum (KS3-5)



Organisms

Living organisms may form populations of single speciess, communities of many species and ecosystems, interacting with each other, with the environment and with humans in
many different ways

Cells

The fundamental units of living organisms are cells, which may be part of highly adapted structures including tissues, organs and organ systems, enabling living processes to be performed effectively. Organic compounds are used as fuels in cellular respiration to allow the other chemical reactions necessary for life

Genetic info

The characteristics of a living organism are influenced by its genome and its interaction with the environment. Evolution occurs by a process of natural selection and accounts both for biodiversity and how organisms are all related to varying degrees

Plants

Life on Earth is dependent on photosynthesis in which green plants and algae trap light from the Sun to fix carbon dioxide and combine it with hydrogen from water to make organic compounds and oxygen

Ecosystems

The chemicals in ecosystems are continually cycling through the natural world. Living organisms are interdependent and show adaptations to their environment

Physical changes

Matter is composed of tiny particles called atoms and there are about 100 different naturally occurring types of atoms called elements
Elements show periodic relationships in their chemical and physical properties

Atoms, elements

These periodic properties can be explained in terms of the atomic structure of the elements
Atoms bond by either transferring electrons from one atom to another or by sharing electrons

Chemical change

There are barriers to reaction so reactions occur at different rates
Chemical reactions take place in only three different ways:
- proton transfer
- electron transfer
- electron sharing

Physical chemistry

Energy is conserved in chemical reactions so can therefore be neither created nor destroyed. The shapes of molecules (groups of atoms bonded together) and the way giant structures are arranged is of great importance in terms of the way they behave

Waves

Energy

That proportionality, for example between weight and mass of an object or between force and extension in a spring, is an important aspect of many models in science

That physical laws and models are expressed in mathematical form.

Particle model

The use of models, as in the particle model of matter or the wave models of light and of sound

Circuits

That differences, for example between pressures or temperatures or electrical potentials, are the drivers of change

Fields

Forces

The phenomena of ‘action at a distance’ and the related concept of the field as the key to analysing electrical, magnetic and gravitational effects

The concept of cause and effect in explaining such links as those between force and acceleration, or between changes in atomic nuclei and radioactive emissions

Holy Family Science curriculum BIOLOGY

	Strand/Concept	Year 7		Year 8		Year 9				Year 10	Year 11
Organisms and the Environment	Organisms	7A Multicellular organisms: Cells, tissues, organs, microscopy,	7C Muscles, skeletons, drugs				Unit 1 Key concepts in biology Cells and microscopy				
				8A Food and digestion				Unit 1: Key concepts in Biology: Enzymes and digestion		Unit 8 Exchange and transport in animals	
	Cells				8C Breathing and respiration						
				8D Unicellular organisms				Unit 5 Health and disease Link to year 7			
	Genetic Information							Unit 2 : Cells and control, nervous system			
			7B Animal reproduction								
						9A Genetics and inheritance		**Unit 3 Part 1 DNA**	Unit 4 Natural selection and genetic modification	**Unit 3 part 2 Inheritance**	
	Plants			8B Plant reproduction		9B Plant growth				Unit 6 Plant structures and their functions	
											Unit 9 Ecosystems and material cycles
	Ecosystems	7D Ecosystems									

Holy Family Science curriculum CHEMISTRY

Strand/ Concept	Year 7		Year 8	Year 9		Year 10	Year 11
Physical changes	7G The particle model						
	7E States and mixtures				Topic 2 States of matter and mixtures	Topic 1 (part 3) Bonding and structure	
Atoms, elements and The periodic table	7H Atoms elements and compounds				Topic 1 (part 1) Key concepts in chemistry Atomic structure		
						Topic 1 (Part 4) Calculations involving masses	
			8F The periodic table		Topic 1 (Part 2) The Periodic Table		Topic 6 Groups in the periodic table
				9F Reactivity		Topic 4 Extracting metals and equilibria	
Chemical change			8G Metals and their uses				
		7F Acids and alkalis				Topic 3 Acids and electrolytic processes * Links to topic 1 part 3	
			8E Combustion				Topic 8 Fuels and Earth Science
				9E Making materials			
			8H Rocks				
Physical chemistry						Topic 7 Rates and energy changes	

Holy Family Science curriculum PHYSICS

Strand/ Concept			Year 7		Year 8		Year 9			Year 10			Year 11	
Energy		Particle model			8I Fluids					Topic 6 Radioactivity			Topic 14 The particle model	
	Waves			7L Sound				Topic 4 Waves	Topic 5 Light and the EM spectrum					
						8J Light								
	Energy		7I Energy		8K Energy transfers			Topic 3 conservation of energy						
	Circuit			7J Current electricity			9J Current electricity and electromagnetism					Topic 10 Electricity and electrical circuits		
	Fields												Topic 12 Magnetism and the motor effect	Topic 13 EM induction
						8L Earth and space		Topic 2 (Part 1) Forces and motion		Topic 2 (Part 2) Forces and motion				
	Forces		7K Forces				9I Forces and motion				Topic 8 Forces doing work	Topic 9 Forces and their effects		Topic 15 Forces and atter