

Long Term Plans: Science Threshold concepts

Cells

Interdependence

Forces

Energy

Particles

Within our curriculum design, we have carefully considered how to sequence and interleave the threshold concepts within our subjects so that students are able to build and develop secure schema over time. The table below shows how we have mapped our threshold concepts throughout our science curriculum.

Year 7 Science

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 28/08	W/C 04/09	W/C 11/09	W/C 18/09	W/C 25/09	W/C 02/10	W/C 09/10	W/C 16/10	W/C 06/11	W/C 13/11	W/C 20/11	W/C 27/11	W/C 04/12
	Threshold Concept	Particles	Particles	Particles	Particles	Particles	Particles	Cells	Cells	Cells	Forces	Particles	Particles
	Term 1								Term 2		Data day 24/11		
	Orientation	Science Skills	Science Skills	Science Skills	Particles & Solutions	Particles & Solutions	Particles & Solutions	Cells & Life Processes	Cells & Life Processes	Cells & Life Processes	Forces & Space	Intervention	Intervention
Assess		What lab equipment is used in science and how is it used? WCF Sheet	How do you use a Bunsen burner? Mini Test & DIRT Bouncing Balls	How do Scientists interpret data in an investigation? Mini Test & DIRT Bouncing Balls	How do particles make up everything around us? WCF	How do changes of state happen in our everyday lives? Mini Test & DIRT	How do we separate mixtures? WCF	What are the differences between living & non-living things? WCF Sheet	How is the body organised? Mini-Test DIRT	What are the important processes that happen in living organisms to keep them alive? Mini-Test DIRT	How do forces affect the motion of objects? WCF Sheet		
Cycle 2	W/C 11/12	W/C 18/12	W/C 08/01	W/C 15/01	W/C 22/01	W/C 29/01	W/C 05/02	W/C 19/02	W/C 26/02	W/C 04/03	W/C 11/03	W/C 18/03	W/C 25/03
	Forces	Forces	Particles	Particles	Particles	Cells	Cells	Cells	Energy	Energy	Energy		
			Term 3			Interdependence	Interdependence	Interdependence			Data day 15/03		
	Forces & Space	Forces & Space	Atoms & Elements	Atoms & Elements	Atoms & Elements	Reproduction	Reproduction	Reproduction	Energy	Energy	Energy	Intervention	Intervention

	What was Isaac Newton's work on forces?	Why do we have the seasons and night and day on Earth?	What are the key features of the periodic table?	Why are chemical reactions important in our everyday lives?	How do we represent chemical reactions using equations?	How does the human body allow humans to reproduce?	How do humans reproduce and form offspring?	How do plants reproduce and form offspring?	How is energy stored and transferred?	How can calculating the efficiency of appliances help us select the best appliance for the home?	How is electricity generated?		
		Mini Test & DIRT		WCF	Mini Test & DIRT	WCF		Mini Test & DIRT	WCF		Mini Test & DIRT		
Cycle 3	W/C 15/04	W/C 22/04	W/C 29/04	W/C 06/05	W/C 13/05	W/C 20/05	W/C 03/06	W/C 10/06	W/C 17/06	W/C 01/07	W/C 08/07	W/C 15/07	
	Particles	Particles	Particles	Interdependence	Interdependence	Interdependence				Energy	Energy	Energy	
	Term 5						Term 6					Data day 19/07	
	Acids & Alkalis	Acids & Alkalis	Acids & Alkalis	Ecology	Ecology	Ecology	Trust assessment revision	Trust assessment	Trust assessment	Waves	Waves	Waves	
How do we test the pH of substances?	What is neutralisation?	How do we produce salt crystals?	How are organisms adapted to survive in their habitat?	What is interdependence?	How and why are organisms classified?				How can loud noises damage our hearing?	What is reflection & refraction?	How does the eye allow us to see colour?		
	WCF Sheet	Mini Test & DIRT			WCF Sheet	Mini Test & DIRT	WCF Sheet					Mini Test & DIRT	

Year 8 Science

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 28/08	W/C 04/09	W/C 11/09	W/C 18/09	W/C 25/09	W/C 02/10	W/C 09/10	W/C 16/10	W/C 06/11	W/C 13/11	W/C 20/11	W/C 27/11	W/C 04/12
	Threshold Concept	Cells	Cells	Cells	Particles	Particles	Particles	Forces	Forces	Forces			
	Term 1								Term 2		Data day 24/11		
	Orientation	The Body	The Body	The Body	Metal Reactions	Metal Reactions	Metal Reactions	Forces & Motion	Forces & Motion	Forces & Motion	Plants & Photosynthesis	Intervention	Intervention
		How do the bones, joints & muscles allow us to move?	Why is nutrition important?	How do different organ systems keep us alive?	What is an alloy and how is it made?	What happens when metals react with water, oxygen and acids?	Why do metals need to be recycled?	What is the relationship between force on a spring and extension?	How do we interpret distance time graphs?	How do falling object reach a terminal velocity?	What are the limiting factors of photosynthesis?		
		WCF Sheet		Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		WCF Sheet	Mini Test & DIRT			
Cycle 2	W/C 11/12	W/C 18/12	W/C 08/01	W/C 15/01	W/C 22/01	W/C 29/01	W/C 05/02	W/C 19/02	W/C 26/02	W/C 04/03	W/C 11/03	W/C 18/03	W/C 25/03
	Cells	Cells	Particles	Particles	Particles	Energy	Energy	Energy	Interdependence	Interdependence	Interdependence		
			Term 3					Term 4			Data day 15/03		
	Plants & Photosynthesis	Plants & Photosynthesis	Chemical Reactions	Chemical Reactions	Chemical Reactions	Electricity and Magnetism	Electricity and Magnetism	Electricity and Magnetism	Variation & inheritance	Variation & inheritance	Variation & inheritance	Intervention	Intervention
	How is the structure of the leaf adapted to its function?	Why are pesticides & fertilisers useful in food production?	How do we balance symbol equations?	What affects the rate of reaction and how is it measured?	What is an endothermic and exothermic reaction?	What is the difference between series and parallel circuits?	What is current? What is potential difference?	What is an electromagnet?	How do offspring inherit genetic information from their parents?	What is evolution and natural selection?	Why is selective breeding important?		
		Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		
Cycle 3	W/C 15/04	W/C 22/04	W/C 29/04	W/C 06/05	W/C 13/05	W/C 20/05	W/C 03/06	W/C 10/06	W/C 17/06	W/C 01/07	W/C 08/07	W/C 15/07	
	Forces	Forces	Forces	Particles	Particles	Particles							
	Term 5						Term 6					Data day 19/07	
	Pressure, moments & density	Pressure, moments & density	Pressure, moments & density	Earth, materials & atmosphere	Earth, materials & atmosphere	Earth, materials & atmosphere	Trust assessment revision	Trust assessment	Trust assessment	GCSE science skills	GCSE science skills	GCSE science skills	
	What is pressure?	What are moments?	What is density and how do we investigate it?	How are the 3 types of rocks formed?	What are polymers and composites?	What are the causes and effects of Global Warming?							
		WCF Sheet	Mini Test & DIRT	WCF Sheet		Mini Test & DIRT							

Year 9 Science

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 28/08	W/C 04/09	W/C 11/09	W/C 18/09	W/C 25/09	W/C 02/10	W/C 09/10	W/C 16/10	W/C 06/11	W/C 13/11	W/C 20/11	W/C 27/11	W/C 04/12
	Threshold Concept	Particles	Particles	Particles	Particles	Cells	Cells	Cells	Cells	Particles	Particles		
	Term 1								Term 2		Data day 24/11		
	Orientation	C1 Atomic structure and the periodic table	C1 Atomic structure and the periodic table	C1 Atomic structure and the periodic table	C1 Atomic structure and the periodic table	B1 Cell Biology	B1 Cell Biology	B1 Cell Biology	B1 Cell Biology	B1 Cell Biology	P3 Particle Model of Matter	P3 Particle Model of Matter	Intervention
		What are the fundamental particles that make up an atom?	How has the model of the atom changed over time?	How is the periodic table arranged?	How can we separate mixtures?	How do cells divide and become specialised?	How are substances transported?	How are organisms adapted for exchange?	How do you use a microscope and set up a microscope slide?	What is pressure?	What is density?		
		WCF Sheet	Whole Class Feedback		Mini Test & DIRT		Whole Class Feedback		Mini Test & DIRT		WCF Sheet		
Cycle 2	W/C 11/12	W/C 18/12	W/C 08/01	W/C 15/01	W/C 22/01	W/C 29/01	W/C 05/02	W/C 19/02	W/C 26/02	W/C 04/03	W/C 11/03	W/C 18/03	W/C 25/03
	Particles	Particles	Particles	Particles	Particles	Cells	Cells	Cells	Cells	Cells	Particles		
			Term 3					Term 4			Data day 15/03		
	P3 Particle Model of Matter	C2 Bonding, structure and properties	C2 Bonding, structure and properties	C2 Bonding, structure and properties	C2 Bonding, structure and properties	B2 Organisation	B2 Organisation	B2 Organisation	B2 Organisation	B2 Organisation	B2 Organisation	P4 Atomic Structure	Intervention
What is internal energy?	What is specific heat capacity?	Why does matter change state?	Why do atoms bond?	How is the structure of a molecule related to its properties?	How are cells tissues and organs organised?	How does the digestive system work?	How does the respiratory system work?	How does the circulatory system work?	How does the circulatory system work?	What are the causes and effects of non-communicable diseases?	How has the model of the atom developed?		
Mini Test & DIRT		Whole Class Feedback		Mini Test & DIRT		Whole Class Feedback		WCF Sheet	Mini Test & DIRT				
Cycle 3	W/C 15/04	W/C 22/04	W/C 29/04	W/C 06/05	W/C 13/05	W/C 20/05	W/C 03/06	W/C 10/06	W/C 17/06	W/C 01/07	W/C 08/07	W/C 15/07	
	Particles	Particles	Cells	Cells	Cells	Cells				Particles	Particles	Particles	
							Term 6					Data day 19/07	
	P4 Atomic Structure	P4 Atomic Structure	B3 Infection & Response	B3 Infection & Response	B3 Infection & Response	B3 Infection & Response	Trust assessment revision	Trust assessment	Trust assessment	Intervention	Intervention	C8 Chemical Analysis	C8 Chemical Analysis
What is radioactive decay?	What are uses of radiation?	What are pathogens?	How does the body defend against pathogens?	How can immunity be developed?	What is herd immunity and vaccination?							What is the difference between pure and impure substances?	How different substances be identified?
	Mini Test & DIRT		Whole Class Feedback		Mini Test & DIRT								Mini Test & DIRT

Year 10 Science

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 28/08	W/C 04/09	W/C 11/09	W/C 18/09	W/C 25/09	W/C 02/10	W/C 09/10	W/C 16/10	W/C 06/11	W/C 13/11	W/C 20/11	W/C 27/11	W/C 04/12
		Energy	Energy	Cells	Cells	Cells	Energy	Energy	Energy	Particles	Particles		
		Particles	Particles										
	Term 1								Term 2		Data day 24/11		
	Orientation	C5 Energy changes	C5 Energy changes	B4 Bioenergetics	B4 Bioenergetics	B4 Bioenergetics	P1 Energy	P1 Energy	P1 Energy	C4 Chemical changes	C4 Chemical changes	Intervention	Intervention
Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind			
		What are endothermic and exothermic reactions?	How are bond energies calculated?	How do the limiting factors affect rate of photosynthesis?	How is the rate of photosynthesis investigated?	What is the difference between aerobic and anaerobic respiration?	What are energy stores?	How are different type of energy calculated?	Why are renewable and non-renewable sources of energy both important?	How are strong acids different to strong alkalis? What is neutralisation?	How do metals react?		
	WCF Sheet	Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		Whole Class Feedback			
Cycle 2	W/C 11/12	W/C 18/12	W/C 08/01	W/C 15/01	W/C 22/01	W/C 29/01	W/C 05/02	W/C 19/02	W/C 26/02	W/C 04/03	W/C 11/03	W/C 18/03	W/C 25/03
	Particles	Particles	Cells	Cells	Cells	Cells	Energy	Energy	Energy	Energy	Particles		
			Term 3					Term 4			Data day 15/03		
	C4 Chemical changes	C4 Chemical changes	B5 Homeostasis	B5 Homeostasis	B5 Homeostasis	B5 Homeostasis	P2 Electricity	P2 Electricity	P2 Electricity	P2 Electricity	C3 Quantitative Chemistry	Intervention	Intervention
Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind			
What is displacement?	What is electrolysis?	What affects reaction times?	How does endocrine system work?	How can we control fertility?	How is adrenaline and thyroxine used in the body?	How do circuits work?	How is resistance investigated?	How do we calculate power?	How is electricity generated and moved through the national grid?	What is a mole?			
	Mini Test & DIRT		Whole Class Feedback		Mini Test & DIRT		Whole Class Feedback		Mini Test & DIRT				
Cycle 3	W/C 15/04	W/C 22/04	W/C 29/04	W/C 06/05	W/C 13/05	W/C 20/05	W/C 03/06	W/C 10/06	W/C 17/06	W/C 01/07	W/C 08/07	W/C 15/07	
	Particles	Particles	Particles	Forces	Forces	Forces				Forces	Forces		
	Term 5						Term 6					Data day 19/07	
	C3 Quantitative Chemistry	C9 Chemistry of the atmosphere	C9 Chemistry of the atmosphere	P5 Forces	P5 Forces	P5 Forces	Trust assessment revision	Trust assessment	Trust assessment	P5 Forces	P5 Forces	P5 Forces	
	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind				What is Newton's First & Second Laws?	What is terminal velocity?	How do we calculate change in momentum?	

	How do we use the mole in calculations?	How has the Earth's atmosphere evolved?	What are the causes and effect of the Earth's atmosphere?	What is the difference between weight and mass?	What is Hooke's Law?	How can we use distance-time graphs and velocity-time graphs to map the movement of an object?						
	Mini Test & DIRT		Mini Test & DIRT		Whole Class Feedback				Whole Class Feedback		Mini Test & DIRT	

Year 11 Science

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1 P1	W/C 28/08	W/C 04/09	W/C 11/09	W/C 18/09	W/C 25/09	W/C 02/10	W/C 09/10	W/C 16/10	W/C 06/11	W/C 13/11	W/C 20/11	W/C 27/11	W/C 04/12
	Threshold Concept	Particles	Particles	Interdependence	Interdependence	Interdependence	Energy	Energy	Energy	Particles	Particles		
	Term 1								Term 2		Data day 24/11		
	Orientation	C7 Organic Chemistry	C7 Organic Chemistry	B6 Inheritance, variation and evolution	B6 Inheritance, variation and evolution	B6 Inheritance, variation and evolution	P6 Waves	P6 Waves	P6 Waves	C6 Rates of reaction	C6 Rates of reaction	Intervention	Intervention
	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind		
	Why do we refine oil?	Why do we crack oil?	What is meiosis?	What is genetic inheritance?	What is evolution and natural selection?	What are the properties of waves?	How can we investigate the properties of light?	What are the dangers and uses of electromagnetic spectrum?	How can we measure rates of reaction?	How do different factors affect rate of reaction?			
	WCF Sheet	Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		Whole Class Feedback			
Cycle 2	W/C 11/12	W/C 18/12	W/C 08/01	W/C 15/01	W/C 22/01	W/C 29/01	W/C 05/02	W/C 19/02	W/C 26/02	W/C 04/03	W/C 11/03	W/C 18/03	W/C 25/03
	Particles	Interdependence	Interdependence	Interdependence	Energy	Energy	Particles	Particles					
			Term 3					Term 4			Data day 15/03		
	C6 Rates of reaction	B7 Ecology	B7 Ecology	B7 Ecology	P7 Magnets and electromagnets	P7 Magnets and electromagnets	C10 Using resources	C10 Using resources	GCSE Revision	GCSE Revision	GCSE Revision	Intervention	Intervention
	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind	Topic rewind					
What is Le Chatelier's Principle?	How are organisms adapted to their environments?	What is biodiversity?	How are ecosystems organised?	What are electromagnets?	What are uses of the motor effect?	How can life cycle assessments used to judge sustainability?	How is water and sewage treated?						
Mini Test & DIRT		WCF Sheet	Mini Test & DIRT		Mini Test & DIRT		WCF Sheet						
Cycle 3	W/C 15/04	W/C 22/04	W/C 29/04	W/C 06/05			W/C 03/06			W/C 01/07			
	Term 5												
	GCSE Revision	GCSE Revision	GCSE Revision	GCSE Exams			GCSE Exams continue			GCSE Exams finish			