Rotation 1

Matter 1 Knowledge Grid

Foundation	Intermediate	Higher	Exceptional
Know what the particle model of matter is	Explain the properties of different materials based on the arrangement and movement of their particles	Explain the properties of solids liquids and gases using the particle model	Explain the properties of solids, liquids and gases based on the arrangement and movement of their particles
Recognise the state of a substance in realation to its melting and boining point	Explain simply how changes of temperature or state can be described in terms of particles	Draw before and after diagrams to explain observations about changes of state	Explain changes of state in terms of changes to the energy of the particles
Know what an atom is	Use the particle model to explain diffusion	Explain one difference between evaporation and boiling	Explain how to use melting temperatures to identify pure substances
Know some differences bwtween elements and compounds	Use words to simply explain gas pressure	Draw before and after particles to explain observations about diffusion	Use solubility curves to explain observations about solutions
Name four common substances that are mixtures	Explain unfamiliar observations about gas pressure in terms of particles	Draw before and after diagrams to explain observations about gas pressure	Choose the most suitable technique to separate a mixture of substances
Know why is is possible to separate mixtures	Use diagrams to represent atoms and molecules of elements and compounds	Know the properties of pure substances	Explain why distillation works to separate a particular mixture
Know why filtration works to separate a particular mixture	Explain solutions using key words	Explain how substances dissolve using the particle model	
	Choose when to use filtration to separate mixtures	Explain the meaning of solubility	
	Know how chromatography separates substances	Know why evaporation works to separate a particular mixture	
		Use evidence from chromatography to identify unknown substances and mixtures	

Rotation 1

Force 1&2 Knowledge Grid

Foundation	Intermediate	Higher	Exceptional
Know the unit of force	Explain what happens when the resultant force on an object is not zero	Explain what happens when the resultant force on an object is zero	Explain what is meant by an interaction pair
Know the link between speed and journey time	Know and use the formula for speed	Use a force diagram to explain describe situations involving gravity that are in equilibrium	Explain how the speed of an object depends on the movement of the observer
Know what a straight horizontal and straight sloped line means on a distance -time graph	Know what a curved line means on a distance – time graph	Use a formula to calculate weight on different planets	Rearrange and use the formula for speed
Know the difference between mass and weight	Know the value of g on Earth	Explain factors that affect drag	Explain why objects stay in orbit
Explain the effect forces have on objects	Explain what is meant by a moment	Use Hookes Law	Explain what a linear relationship means
State how liquid pressure changes with depth	Explain how fluids exert a pressure in all directions	Calculate the moment of a force	Explain how solid surfaces provide a supportive force
Know what is meant by stress	Calculate fluid pressure	Explain how atmospheric pressure changes with height	Explain the behaviour of objects using ideas of pressure
Label forces accting on a object	Explain why some things float and others sink	Use ideas of upthrust	Explain how hydraulic machines work
	Illustrate a journey on a distance time graph and label the changes in motion	Calculate pressure	
	Use a formula to calculate weight on different planets	Explain the effect of solid surfaces on each other using ideas about stress	

Rotation 2

Organisms 1 Knowledge Grid

Foundation	Intermediate	Higher	Exceptional
Know examples of tissues, organs and organ systems	Know the order of hierarchy of organisation in a multi-cellular organism	Explain how the properties of bones link to their function in the body	Explain why multi-cellular organisms need organ systems to keep their cells alive
Name the main parts of the skeleton	List the functions of the skeleton	Explain how to measure the force exerted by different muscles	Use a diagram to predict the result of a muscle contraction or relaxation
Know where joints are found in the body	Explain the structure and function of joints	Explain the function of the major muscle groups and explain how antagonistic muscles cause movement	Compare in detail the similarities and differences between plant and animal cells
Know what a cell is	Describe how antagonistic pairs of muscles create movement	Explain why some organs have muscle tissue	Suggest the type of organism or tissue a cell comes from based on its features
Identify a similarity and a difference between plant and animal cells	Match the cell components to their functions	Explain how to use a microscope to observe a cell	Describe the process of diffusion
	Name some examples of specialised plant and animal cells	Explain examples of specialised plant and animal cells	Explain how unicellular organisms are adapted to carry out different functions
	Name some substances that move into and out of cells	Identify structures in an amoeba and euglena	
	Know what a uni-cellular organism is		

Rotation 2

Waves 1&2 Knowledge Grid

Foundation	Intermediate	Higher	Exceptional
Know what sound can and cannot travel through	Know the speed of sound	Explain how sound is produced and travels	Explain observations where sound is transmitted
Know the link between amplitude and loudness	Explain the amplitude of a wave from a diagram or oscilloscope picture	Explain observations where sound is reflected or absorbed by different media	Use drawings of waves to describe how sound waves change with volume
Name the parts of the ear	Know the link between frequency and wavelength	Explain the frequency of a wave from a diagram or oscilloscope picture	Use drawings of waves to describe how sound waves change with pitch
Know how light is relected from a mirror	Explain how the ear works	Explain how the hearing can be damaged	Explain what happens when a light ray meets a different medium
Know the parts of the eye	Know the speed of light	Use ray diagrams of eclipses to describe what is seen by observers in different places	Construct ray diagrams to show how light reflects
Exlain how sound transfers energy	Explain how images are formed in a plane mirror	Use ray diagrams to show hoe light reflects and forms images	Use ray diagrams to explain how light passes through the lens in your eye
	Know what happens when light enters a medium	Use a ray diagram model to describe how light passes through lenses and transparent materials	Explain observations where coloured lights are mixed or objects are viewed in different light
	Use the ray model to explain how objects appear different colours	Explain how lenses may be used to correct vision	Explain how a microphone and a loudspeaker work
	Know the parts of the electromagnetic spectrum	Explain the link between amplitude, frequency and energy	Explain in terms of frequency then difference in damage done by electromagnetic waves
	Compare transverse and longitudinal waves	Use the ray model to explain how light is refracted through a prism	Explain what happens when waves superimpose

Rotation 3

Reactions 1 Knowledge Grid

Foundation	Intermediate	Higher	Exceptional
Know the characteristics of a chemical reaction	Explain why chemical reactions are useful	Compare physical changes and chemical reactions	Identify the best indicator to distinguish between solutions of different pH
Know the hazards of acids and alkalis	Know how to handle acids and alkalis	Compare the properties of acids and alkalis	Explain what factors affect the pH of a solution
Idetify acids, alkalis and neutral solutions on the pH scale	Explain how neutralisation reactions are used	Use data and observations to determine the pH of a solution	Describe an oxidation reaction with a word equation and particle diagram
Name three strong acids and two week acids	Know the products formed in the reaction between an acid and alkali	Use data and observations to determine the pH of a solution and explain what this shows	Describe an oxidation reaction with a word equation and a particle diagram
Name three magnetic elements	Know the products formed during the reaction between an acid and base	Explain how a neutral solution can be made from an acid and an alkali	Describe an oxidation, displacement or metal-acid reaction with a word equation
Name the only metal and only non-metal that are liquid at room temperature	Name the substances formed when metals and non-metals react with oxygen	Choose the salts that are formed when acids react with metals or bases	Describe a metal-acid reaction with a word equation and a particle diagram
Know what is formed when metals react with acids	Compare the reactions of different metals with dilute acids	Identify an unknown element from its physical and chemical properties	
	Know what is formed when metals rect with oxygen	Classify the substances formed when metals and non-metals react with oxygen	
	Compare the reactions of different metals with oxygen	Compare the reactions of different	
	Know what the reactivity series is and what is shows	Place an unfamiliar metal into the reactivity series based on information about its reactions with water	

Rotation 3

Ecosystems 1 Knowledge Grid

Foundation	Intermediate	Higher	Exceptional
Know what food chains and food webs are	Combine food chains to form a food web	Explain the importance of insect pollinators to food supplies	Explain how toxic materials can accumulate in a food web and the effect on different populations
Explain what a food chain and food webs show	Know factors that affect the population of a species	Explain how different organisms co-exist within an ecosystem	Explain the process of fertilisation and germination
List some resources that plants and animals comete for	Know what is meant by ecosystem, community, habitat, environment and niche	Describe the interaction between predator and prey populations	Explain why seed dispersal is important to the survival of the parent plant and its offspring
Name some methods of pollinations	Know where a plan's reproductive system is found	Identify the structures of a flower and link their structure to their function	
Know what seeds and fruits are	Know what is meant by fertilisation	Explain the differences between wind pollinated and insect pollinated plants	
	Know ways seeds can be dispersed	Explain for a seed is adapted to its method of dispersal	