

CURRICULUM CORE KNOWLEDGE PLAN

SUBJECT: Science -KS4 Physics
term

YEAR GROUP: 10

DATE: Autumn

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
Autumn term 1- Energy	Substantive knowledge: - Describe all the changes involved in the way energy is stored when a system changes, for common situations - Describe the energy transfers in a closed system - Describe how in all system changes energy is dissipated -wasted energy - explain ways of reducing unwanted energy transfers - Explain the process of conduction and convection and link to thermal conductivity and the insulation - Know the amount of energy associated with a moved object, stretched spring and an object raised above the ground. - Know what the specific heat capacity of a substance is and that the amount of energy stored or released from a system as its temperature changes can be calculated - Give examples that illustrate the definition of power - Know the main sources of energy resources. - For each energy resource students need to be able to; distinguish between renewable and non renewable, compare ways they are used, reliability, advantages and disadvantages, environmental issues. - Know how effective thermal insulation of materials is Disciplinary knowledge - Use and recall the equations for; Kinetic energy, elastic potential energy and gravitational potential energy - Use and recall the equations for efficiency	thermal/heat sound/vibrational chemical electrical mechanical kinetic elastic potential gravitational potential insulation thermal conductivity conduction convection particles efficiency energy transfer wind wave tidal solar geothermal hydroelectric renewable fossil fuels coal oil natural gas nuclear reliability mass	Students have previously been taught: - Know the different stores of energy and their descriptions - Describe how items are efficient - Describe conduction, convection and infrared radiation in terms of particles - infrared radiation - Know what fossil fuels are and the impact these have on the environment - Describe the renewable forms of energy and some of their advantages and disadvantages	communicative wider thinking self aware

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	● Use the equation involving specific heat capacity ● Complete investigation to determine the specific heat capacity of one or more materials (required practical activity 1) ● use scientific theories and explanations to develop hypotheses. ● plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. ● apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. ● carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. ● make and record observations and measurements using a range of apparatus and methods. ● evaluate methods and suggest possible improvements and further investigations. ● present observations and other data using appropriate methods. ● translate data from one form to another. ● carry out and represent mathematical and statistical analysis. ● represent the distribution of results and make estimations of uncertainty. ● interpret observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. ● present reasoned explanations including relating data to hypotheses. ● be objective, evaluate data in terms of accuracy, precision, repeatability and reproducibility and	specific heat capacity temperature joules		

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	identify potential sources of random and systematic error. - communicate the scientific rationale for investigations, methods used, findings and reasoned conclusions through written and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms. - recognise the importance of scientific quantities and understand how they are determined. - use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. - use an appropriate number of significant figures in calculation. - use an appropriate number of significant figures. - find arithmetic means. - change the subject of an equation. - substitute numerical values into algebraic equations using appropriate units for physical quantities. - Investigate the effectiveness of different materials as thermal insulators and the factors that may affect the thermal insulation properties of a material. - use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. - use an appropriate number of significant figures in calculation - construct and interpret frequency tables and diagrams, bar charts and histograms. - plot two variables from experimental or other data. - calculate areas of triangles and rectangles, surface areas and volumes of cubes.			
Autumn term 1 -	Substantive knowledge:	Solid liquid	Students have previously been taught:	curious wider thinking

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Structure of matter	- Properties of solids, liquids and gases including particle diagrams, forces of attraction and energy. kinetic energy and potential energy of a system. - Recall the equation for specific latent heat - determine the difference between specific latent heat and specific heat capacity. - Interpret and describe heating and cooling graphs that include changes of state and the specific latent heat for fusion and vaporisation - Explain the differences in density between different states of matter in terms of the arrangement of atoms - Recall the equation for density - Describe how, when substances change state including how mass is conserved. - Explain how the motion of the molecules in a gas is related to both its temperature and pressure - explain qualitatively the relation between the temperature of a gas and its pressure at constant volume - Use the particle model to explain how increasing the volume in which a gas is contained, at constant temperature, can lead to a decrease in temperature - Calculate the change in the pressure of a gas or the volume of a gas when either the pressure or volume is increased or decreased - Explain how, in a given situation, doing work on an enclosed gas leads to an increase in the temperature of the gas. Disciplinary knowledge - Draw particle diagrams of solids, liquids and gases - Use the equation for density	gas particle particle model kinetic energy potential energy vibration forces of attraction energy specific heat capacity specific latent heat fusion vaporisation density mass volume melting evaporating boiling condensation freezing balance/scales regular irregular eureka can measuring cylinder displacement temperature pressure motion	- Describe the particle model - Know the properties of solids, liquids and gases - Identify if a material is a solid, liquid or gas - Describe the different changes of state that occur	resilient

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	● Use appropriate apparatus to make and record the measurements needed to determine the densities of regular and irregular solid objects and liquids. ● use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts. ● use scientific theories and explanations to develop hypotheses. ● plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. ● apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. ● carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. ● make and record observations and measurements using a range of apparatus and methods. ● evaluate methods and suggest possible improvements and further investigations. ● present observations and other data using appropriate methods. ● interpret observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. ● communicate the scientific rationale for investigations, methods used, findings and reasoned conclusions through written and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms.			

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	● recognise the importance of scientific quantities and understand how they are determined. ● use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. ● use an appropriate number of significant figures in calculation. ● use an appropriate number of significant figures. ● find arithmetic means. ● calculate areas of triangles and rectangles, surface areas and volumes of cubes ● Use the equation including specific latent heat ● Apply the equation $pV = \text{constant}$			

CURRICULUM CORE KNOWLEDGE PLAN

SUBJECT: Science -KS4 Physics

YEAR GROUP: 10

DATE: Spring term

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
Spring term 2- Electricity	Substantive knowledge: - Know and use and draw the following symbols; switch, cell, battery, diode, resistor, variable resistor, LED, filament lamp, fuse, voltmeter, ammeter, thermistor and LDR. - Know how voltage and current changes in a series and parallel circuit - Explain qualitatively why adding resistors in series increase the total resistance whilst adding in parallel decreased the total resistance - Recall the equation for resistance and explain how resistance changes within a circuit# - Explain the relationship between voltage and current, including the graphical drawing for; a fixed resistor, a diode, and a filament lamp. - Explain how to measure the resistance of some components; thermistor and LDR. - Explain graphs for the above components including linear and non linear relationships - Know that mains electricity has a voltage of 230V and frequency of 50Hz, this is an alternating supply - Explain the difference between alternating and direct current - Explain the structure of a plug and the coding and position of each wire. - Explain the dangers of electrocution and how this can be caused. - Recall the equations that link, power, current and voltage and power, current and resistance. - Know what the national grid is, what each of the parts are and the functions for the step up and step down transformers	switch cell battery diode resistor variable resistor LED filament lamp fuse voltmeter ammeter thermistor LDR series circuit parallel circuit voltage current resistance I-V characteristics linear relationship non linear relationship frequency alternating current direct current plug neutral wire Earth wire Live wire fuse circuit breaker electrocution	Students have previously been taught: - Identify and draw the different circuit symbols - Describe the different types of circuits-series and parallel and construct these - Describe the definition of voltage, current and resistance	communicative curious

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
	- Describe who static electricity is produced - Describe with evidence that charged objects exert forces of attraction or repulsion when not in contact - Explain how the transfer of electrons can explain the phenomena of static electricity - Explain the concept of an electric field Disciplinary knowledge - Using science equipment to measure - Know and use the circuit symbols - Use circuit diagrams to set up and check appropriate circuits to investigate factors affecting the resistance of electrical circuits; length of wire at constant temperature, combinations of resistors in series and parallel - use scientific theories and explanations to develop hypotheses. - plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. - apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. - carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. - recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative. - make and record observations and measurements using a range of apparatus and methods. - evaluate methods and suggest possible improvements and further investigations. - present observations and other data using appropriate methods. - translate data from one form to another.	national grid step up transformer step down transformer efficiency static electricity friction electrons attraction repulsion electric field point charge		

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	● carry out and represent mathematical and statistical analysis. ● represent the distribution of results and make estimations of uncertainty. ● interpret observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. ● present reasoned explanations including relating data to hypotheses. ● be objective, evaluate data in terms of accuracy, precision, repeatability and reproducibility and identify potential sources of random and systematic error. ● communicate the scientific rationale for investigations, methods used, findings and reasoned conclusions through written and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms. ● recognise the importance of scientific quantities and understand how they are determined. ● use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. ● use an appropriate number of significant figures in calculation. ● use an appropriate number of significant figures. ● find arithmetic means. ● understand that $y = mx + c$ represents a linear relationship. ● plot two variables from experimental or other data. ● determine the slope and intercept of a linear graph ● Use circuit diagrams to construct appropriate circuits to investigate the I-V characteristics of a variety of elements including; filament lamp, a diode and a fixed resistor at constant temperature. ● use a scatter diagram to identify a correlation between two variables ● understand that $y = mx + c$ represents a linear relationship			

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	● Use the equations that link, power, current and voltage and power, current and resistance. ● Draw an electric field pattern for an isolated charged sphere			

CURRICULUM CORE KNOWLEDGE PLAN

SUBJECT: Science -KS4 Physics
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YEAR GROUP: 10

DATE: Summer

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
Summer term 3- Waves	Substantive knowledge: - Describe the frequency, wavelength and amplitude and period of a wave. - Explain the properties of longitudinal waves and the difference between the 2. - Recall the equations for wave speed - Describe the method to measure the speed of sound waves in air. - Show how changes in velocity, frequency and wavelength, in transmission of sound waves from one medium to another, are inter-related. - Know that waves can be reflected, transmitted or absorbed at boundaries between different materials - Describe the effects of reflection, transmission and absorption of waves at material interfaces - Explain how waves are used for detection and exploration, including echo location, earthquakes (p and s waves) and ultrasound - Know the different parts of the electromagnetic spectrum including, their wavelength and properties of each part, uses and dangers for each part and how to prevent them. - know the difference between converging and diverging lenses including how the light	Wave frequency wavelength amplitude longitudinal transverse perpendicular parallel oscillations energy transfer velocity medium density reflection transmission absorption incident ray reflected ray normal mirror refracted ray angle of incidence angle of refraction angle of reflection converging diverging focal length focal point light ray echo location ultrasound	Students have previously been taught: - Describe the properties of Light and sound - Know the auditory ranges in humans - Know the 2 different types of waves - Describe some of the properties of waves, eg wavelength, amplitude and frequency - Know the light can be reflected and refracted	aspirational communicative self motivated

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
	travels through each one and the focal point and focal length ● know the rules for drawing converging and diverging lens ray diagrams ● Visible light-know how the colour is related to absorption, transmission and reflection, the effect of filters and why opaque objects are a certain colour ● Perfect black bodies and radiation-know that all bodies emit radiation and that the temperature and wavelength of the body depends on its temperature ● The above information should be linked to the temperature of the Earth and draw diagrams of this Disciplinary knowledge ● Use and rearrange the equation that links; wave speed, frequency and wavelength ● Make observations to identify the suitability of apparatus to measure the frequency, wavelength or speed of waves in solid and liquids. ● apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. ● make and record observations and measurements using a range of apparatus and methods. ● communicate the scientific rationale for investigations, methods used, findings and reasoned conclusions through written and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms.	electromagnetic spectrum radio waves microwaves infrared visible light ultra violet x-rays gamma ray cancer ionising filters opaque transparent translucent perfect black body radiation emit temperature atmosphere		

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
	● recognise the importance of scientific quantities and understand how they are determined. ● use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. ● Construct ray diagrams to illustrate the reflection of a wave at a surface ● Investigate the reflection of light by different types of surface and the refraction of light by different substances ● use scientific theories and explanations to develop hypotheses. ● plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. ● carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. ● evaluate methods and suggest possible improvements and further investigations. ● present observations and other data using appropriate methods. ● represent the distribution of results and make estimations of uncertainty. ● present reasoned explanations including relating data to hypotheses. ● use a scatter diagram to identify a correlation between two variables. ● plot two variables from experimental or other data. ● use angular measures in degrees.			

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	- visualise and represent 2D and 3D forms including two dimensional representations of 3D objects. - Draw converging and diverging ray diagrams accurately and describe the image produced.			

CURRICULUM CORE KNOWLEDGE PLAN

SUBJECT: Science -KS4 Physics

YEAR GROUP: 11

DATE: Autumn term

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
Autumn term 1- Forces and motion	Substantive knowledge: ● know the difference between displacement and distance ● Recall the average speeds of people walking, running and cycling ● Recall the equation distance = speed x time, use the above quantities in this equation ● Describe motion in a circle linking to changing velocity but constant speed ● Understand a distance time and velocity time graphs and translate information from graphical to numerical form ● Describe parts of a distance time and velocity time graph ● Explain terminal velocity using a velocity time graph including the forces acting on the object. ● Know, use and apply Newton's 3 laws to different situations ● know the definition and equation for stopping distance ● Explain the factors that affecting thinking distance and braking distance and the forces linked to the latter ● Interpret graphs relating speed to stopping distance for different vehicles ● Recall the equation for momentum ● Describe conservation of momentum (eg collision) ● Link conservation of momentum to equation. ● Explain safety features in cars, playgrounds, gyms and link to momentum (air bags, seat belts) Disciplinary knowledge	displacement distance speed velocity motion accelerating decelerating constant speed stationary equal opposite thinking distance braking distance stopping distance momentum conservation collision	Students have previously been taught: ● Knowing the names and descriptions of each of the different forces ● Examples of each of the different forces ● Drawing accurate free body diagrams ● Calculating moments and work done ● Hooke's law and the elasticity of objects	resilient self aware

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
	● Use and rearrange the equation that links speed, distance and time ● Draw a distance time graph from data given ● Use a distance time graph to calculate the speed over a period of time and at a set point using a tangent. ● Use a velocity time graph to calculate the acceleration and distance travelled ● Recall, use and rearrange the equation for Newton's second law ● Investigate the effect of varying the force on the acceleration of an object of constant mass and the effect of varying the mass of an object on the acceleration produced by a constant force ● use scientific theories and explanations to develop hypotheses. ● plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena. ● apply a knowledge of a range of techniques, instruments, apparatus, and materials to select those appropriate to the experiment. ● carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. ● make and record observations and measurements using a range of apparatus and methods. ● evaluate methods and suggest possible improvements and further investigations. ● present observations and other data using appropriate methods. ● translate data from one form to another. ● carry out and represent mathematical and statistical analysis.			

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	● represent the distribution of results and make estimations of uncertainty. ● interpret observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions. ● present reasoned explanations including relating data to hypotheses. ● be objective, evaluate data in terms of accuracy, precision, repeatability and reproducibility and identify potential sources of random and systematic error. ● communicate the scientific rationale for investigations, methods used, findings and reasoned conclusions through written and electronic reports and presentations using verbal, diagrammatic, graphical, numerical and symbolic forms. ● recognise the importance of scientific quantities and understand how they are determined. ● use SI units (eg kg, g, mg; km, m, mm; kJ, J) and IUPAC chemical nomenclature unless inappropriate. ● use an appropriate number of significant figures in calculation. ● use an appropriate number of significant figures. ● use a scatter diagram to identify a correlation between two variables. ● translate information between graphical and numeric form. ● understand that $y = mx + c$ represents a linear relationship. ● plot two variables from experimental or other data. ● Use the equation that links momentum, mass and velocity ● Use the equation and rearrange the equation for changes in momentum			

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Autumn term 1 - magnetism and electromagnetism	Substantive knowledge: - Know the names of the pole of a magnet and like poles repel and unlike attract - know the difference between permanent and induced magnet - Describe how to plot a magnetic field of a bar magnet using both iron filings and plotting compass. Including strength and direction - Explain how a compass works linking to the Earth's iron core. - know the magnetic field of a solenoid and straight wire and how it can be used to create an electromagnet - Explain how different uses of electromagnets work. - Describe what each finger represents in Fleming's left hand rule and what this shows - know factors that affect the size of the force on a conductor - Explain how a loudspeaker works - Explain how the generator effect is used in an alternator and dynamo. - Explain how a microphone works - Explain the composition of a step up and step down transformer and how these work-link this to ratio Disciplinary knowledge - Use Fleming's left hand rule. - Calculate the size of the force on a conductor using the equation that links Force, magnetic field, current and length - Plan an investigation that looks at strength of an electromagnet and to be able to test a hypothesis for this. - Use the transformer equation to link pd and number of turns to current a power transform.	permanent poles repel north south attract like unlike permanent induced magnetic field strength iron filings plotting compass solenoid electromagnet Fleming's left hand rule conductor force current length alternator dynamo transformer alternating current direct current potential difference microphone primary coil secondary coil	Students have previously been taught: - Know that magnets have both north and south poles - Describe the magnetic field of a bar magnet - Know how to construct an electromagnet - Describe the Earth's magnetic field	resilient curious communicative

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
	● Use ratios, fractions and percentages			

CURRICULUM CORE KNOWLEDGE PLAN

SUBJECT: Science -KS4 Physics

YEAR GROUP: 11

DATE: Spring term

Term and unit	Core knowledge	Core vocabulary	Revisiting prior knowledge	Links to Walney Ways & Employability, Careers
Spring term 2- Atomic structure	Substantive knowledge: - Know the basic structure of an atom, the radius of a nucleus is less than 1/10000 of the radius of an atom. Most of the mass is concentrated at the centre - Explain that electrons are arranged t different distances and this can change with the absorption and emission of electromagnetic radiation - know the atomic number mass number and isotopes of elements in the periodic table and the production of ions. - Development of the model of the atom including; new experimental data can lead to a model being changed, the discovery of the nucleus from the alpha scattering experiment and the results from this. The similarities and differences between the plum pudding and the nuclear model - know that unstable nuclei emit radiation, this process is random. A geiger counter measures the rate at which nuclei decay. - know the following properties of alpha, beta and gamma radiation; composition, penetration through materials and air and their ionising power - Uses of radiation for each type and the best source of radiation for each use. - Solve nuclear equations using the atomic and mass numbers for alpha, beta and gamma radiation - Explain the nature of half-life and that it is a random process	atom proton neutron electron nucleus energy level/shells charge mass ion isotope absorption emission atomic number mass number alpha scattering experiment plum pudding model nuclear model unstable nuclei geiger counter random alpha beta gamma half-life nuclear equation radioisotope irradiation contamination background radiation	Students have previously been taught: - Describe and draw the structure of the atom - Know the charges and masses of the sub atomic particles - Know the advantages and disadvantages of nuclear power This is common content with Chemistry	curious wider thinking

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	- determine the half life of a radioactive isotope from given information (eg half life graph) - Explain the difference between irradiation and contamination and how to protect against the presence of radiation. - Background radiation, where it comes from and how the level of background radiation can be measured, - Explain why the hazards associated with radioactive substances differ according to the half life of a substance - Uses of nuclear radiation, evaluate the uses of nuclear radiation and the perceived risks of using nuclear radiation in relation to given data and consequences. - Describe the process of nuclear fission, that it can cause a chain reaction and how this can be controlled. Diagrams need to be drawn and labelled of the process - The process of nuclear fission and the comparisons to nuclear fusion Disciplinary knowledge - Calculate the net decline, expressed as a ratio, in an radioactive emission after a given number of half-lives. - Use a variety of models to make predictions and develop scientific ideas - Recognise the importance of peer review of results and of communicating results to a range of audiences - Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences - translate information between graphical and numerical form	fission uranium plutonium fusion hydrogen helium chain reaction		

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	- Solving simple algebraic equations - Recognise and use expressions in standard form - Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano).			
Spring term 2- Space Physics	Substantive knowledge: - Know that within our solar system there is one Sun with planets the orbit the sun and moons that orbit the planets-this is part of the milky way and the differences and similarities between plants, moons and artificial satellites - Explain how at the start of a star's life cycle the dust and gas are drawn together by gravity, caused by a fusion reaction - Fusion reactions lead to an equilibrium between the gravitational collapse of a star and the expansion of the star due to fusion energy - Life cycle of a star is determined by its size, and describe the life cycle of a star of the mass of the sun and those larger - fusion process in a star produces elements up to and including iron and those heavier formed in a supernova - Orbital motion-the force of gravity can lead to changing velocity but unchanged speed - for stable orbits the radius must change if the speed changes - Red shift; Explain that the change of a galaxy's speed with distance is evidence of an expanding universe - how redshift provides evidence for the big bang	solar system Sun Star milky way natural satellite artificial satellite fusion gravity nebula protostar main sequence star red giant red supergiant white dwarf black dwarf supernova neutron star black hole elements circular motion velocity acceleration big bang red shift cosmic microwave background radiation dark mass dark energy	Students have previously been taught: - Know the names and some properties of each of the different planets starting with the one closest to the Sun - Describe the order of the life cycle of a star and the different paths taken by both small and large stars. - Describe the process of nuclear fusion - Describe the properties of light and sound waves.	curious self aware

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	- How scientists are able to use observations to arrive at the theories such as the big bang - there is still much about the universe that is not understood eg dark matter and energy Disciplinary knowledge - Use a variety of models such as representational, spatial, descriptive, computational and mathematical to solve problem, make predictions and to develop scientific explanations and understanding familiar and unfamiliar facts			