



Science Scheme of Learning

Year 8 – Term 6/Units 12

Intent – Rationale

Students will develop an understanding of their own immune system, learning the difference between different types of microbes and their affect on the human body. They will learn how antibodies form and how our body is adapted to fighting diseases.

In chemistry they will learn about the properties of different materials, learning how to describe properties and their use in different situations. Ceramics, polymers and composite are some of the materials investigated. Thermochromic, photochromatic and nanotechnology are among the smart materials that students will discover.

Space is one of the most interesting topics within Physics, and students will learn about our place in the universe, the history of our perception of the solar system and delve in to the life cycle of a star.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
Builds upon prior learning from Ks1 and Ks2 National curriculum	Biology – Leads to GCSE Topic B5 Communicable diseases, B6 Preventing and treating disease Chemistry – Leads to GCSE Topic C10 – using resources Physics – Leads to GCSE topic P16 - Space
What are the links with other subjects in the curriculum?	What are the links to SMSC, British Values and Careers?
<ul style="list-style-type: none"> History – when learning about the history of the model of the solar system, ideas, views and influences of the time play a role in how the model was put together. 	C8.12 L2 Choosing Materials SP2 C8.12 L3 Smart and Small SP3, SP4 B8.12 L4 Data Handling GB4a, GB4e, GB4g P8.12 L3 Changing ideas about the solar system C1
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	What are the opportunities for developing mathematical skills?
FROM THE LIBRARY <i>Epidemic</i> ; Brian ward-614 <i>Human Body</i> ; S Setford-612 <i>The Human Body</i> ; A Fullick-612 <i>1001 Facts About Space</i> ; Carole Stot-520 <i>DK Guide to Space</i> ; Peter Bond-523 <i>Earth and Beyond</i> ; Chris Oxlade-523 <i>Journey to the Stars</i> ; S Clark-523	<ul style="list-style-type: none">



Science Scheme of Learning

Year 8 – Term 6/Units 12

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

Know

Use ideas about properties to explain why a material is used for a certain purpose
State that nanotechnology involves making tiny particles of a substance that have useful properties
Give some examples of the uses of nanotechnology
State the three microbe types and describe their key features.
State the ways in which microbes can enter the body
State that antibiotics kill fungi and bacteria but not viruses.

Apply

Describe the formation, lifecycle and death of a star
Understand and use key terms such as protostar, fusion, and supernova
Describe some earlier models of the solar system and explain how evidence has disproved them
Describe some of the methods used by scientists to gather new evidence about space
Describe some uses for artificial satellites and space stations
Describe some of the challenges to space travel and exploration
Use a model to describe the relative motion and position of the Sun, earth and moon
Describe how vaccination protects the patient from future illness.
Describe the body's external and internal defences against microbial infection.
Describe simple aseptic technique
Describe two ways in which new materials are developed by scientists
Describe typical properties and uses of ceramics
Describe typical properties and uses of polymers
Describe typical properties and uses of composites
Use property words to describe some important materials

Extend

Use the model to explain: Day and night, Year, Seasons, Moon phases, Eclipses [solar and lunar]
Interpret scientific data to reach a conclusion
Discuss some issues surrounding the use of antibiotics
Suggest a use for thermochromic and photochromic pigments
Explain why crude oil reserves should be conserved
Give some examples of smart materials and suggest what they might be used for



What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
<p>Black Hole Possible fate of a star at the end of a supernova explosion. Incredible gravity prevents even light escaping.</p> <p>Galaxy A system of billions of stars held together by gravity.</p> <p>Geocentric Model of the solar system with the earth at the centre.</p> <p>Heliocentric Model of the solar system with the sun at the centre.</p> <p>Light Year Distance travelled by light in a year.</p> <p>Lunar Eclipse Earth cast shadow on moon.</p> <p>Nebula Vast cloud of dust and gas in space.</p> <p>Neutron star Possible fate of a star at the end of a supernova.</p> <p>Nuclear Fusion Hydrogen nuclei fuse to form helium.</p> <p>Orbit Path of object travelling round another object. ie planet round sun.</p> <p>Protostar Sphere of gas formed in a nebula by gravity. When hot enough fusion will start and a star is born.</p> <p>Red Dwarf Small cool star.</p> <p>Red Giant Giant star that has used up all its hydrogen fuel.</p> <p>Satellite Object that orbits a planet. Moon is earth's natural satellite.</p> <p>Solar Eclipse Moon casts shadow on earth.</p> <p>Supernova Explosion at the end of a giant stars life.</p> <p>White Dwarf Core of a star that is left after a red giant has lost its outer layers.</p> <p>Micro-organism Living thing that spends its whole life at a size too small to be seen with the naked eye</p> <p>Bacteria Unicellular organism with no proper nucleus.</p> <p>Virus Very simple micro-organism. Can only live and reproduce in host cells.</p> <p>Fungus Complex unicellular or multicellular organism. Has nucleus.</p> <p>Pathogen Organism capable of causing illness in its host.</p> <p>Unicellular An independently living cell.</p> <p>Multicellular A living thing in which different cells live and co-operate together.</p> <p>Phagocytes White blood cells that engulf and digest pathogens.</p>	<p>Summative assessment</p> <p>C8.12 L4 Designer materials - practical skills – P8.12 L3 Changing ideas about the solar system Skills task_ZH, P8.12 L4 To the Moon and beyond</p>



Phagocytosis The process by which phagocytes operate.
Lymphocyte White blood cells that produce antibodies.
Antibody Chemicals which bind to and kill or inhibit pathogens.
Immunity A state of being able to resist infection by a specific pathogen.
Antitoxin A chemical released by white blood cells to counter toxins produced by pathogens.
Vaccination An injection of dead or disabled pathogen to produce antibodies and so immunity to that pathogen
Vaccine The contents of a vaccination.
Antibiotic A medicine that can kill either bacteria or fungi. These do not kill viruses.

Absorbency The amount of liquid that a material can hold. Absorbency is measured in units of cm³ water per kilogram of substance (or equivalent units).

Biodegradable A substance that can be broken down in the environment by the action of living organisms (particularly bacteria).
 Paper, cotton and wood are all biodegradable. Glass and most plastics are not biodegradable.

Density A measurement of an object's mass compared to its volume. Density is calculated by dividing the mass by the volume, so a substance or object with a high density has a large mass in a small volume. If something is denser than water, it will sink in water. If it is denser than mercury, it will sink in mercury.

Nanotechnology The control of matter on an atomic and molecular scale, or the use of nanoparticles. Nanoparticles are very small particles that have very different properties from the same substance on a normal scale.

Properties The characteristics of a substance that make it well suited (or poorly suited) for a particular purpose.
 Examples of properties include high melting point, good conductor of heat, flexible, malleable and poor conductor of electricity.

Smart material A material that changes its properties depending on the environment it is in.

Synthetic Manufactured (made by humans).
 For example, polyester clothing is synthetic, but cotton is a natural fibre.

Ultraviolet light Electromagnetic radiation that has a frequency slightly higher than that of visible light. It is often abbreviated to UV. Ultraviolet radiation causes suntan and sunburn and can cause skin cancer. It is not visible to humans but it is visible to some insects and birds.



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Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
C8.12 L1 Fit for purpose	Can I use property words to describe some important materials?	Can I use ideas about properties to explain why a material is used for a certain purpose?	
C8.12 L2 Choosing Materials	Can I describe typical properties and uses of ceramics? Can I describe typical properties and uses of polymers?	Can I evaluate typical properties and uses of composites?	
C8.12 L3 Smart and Small	Can I state that nanotechnology involves making tiny particles of a substance that have useful properties? Can I give some examples of the uses of nanotechnology ?	Can I give some examples of smart materials and suggest what they might be used for?	
C8.12 L4 Designer materials	Can I describe two ways in which new materials are developed by scientists? Can I suggest a use for thermochromic and photochromic pigments?	Can I explain why crude oil reserves should be conserved?	



B8.12 L1 Types of microbes	Can I state the three microbe types and describe their key features?	Can I describe simple aseptic technique?	
B8.12 L2 Defence against disease	Can I state the ways in which microbes can enter the body?	Can I describe the body's external and internal defences against microbial infection?	
B8.12 L3 Vaccines and antibiotics	Can I describe how vaccination protects the patient from future illness? Can I state that antibiotics kill fungi and bacteria but not viruses?	Can I discuss some issues surrounding the use of antibiotics?	
B8.12 L4 Data Handling	Can I interpret scientific data to reach a conclusion?	Can I analyse scientific data to reach a conclusion?	
P8.12 L1 Sun, Earth and Moon	Use a model to describe the relative motion and position of the Sun, earth and moon	Use the model to explain: Day and night, Year, Seasons, Moon phases, Eclipses [solar and lunar]	



<p>P8.12 L2 The lives of the stars</p>	<p>Understand and use key terms such as protostar, fusion, and supernova</p>	<p>Describe the formation, lifecycle and death of a star</p>	
<p>P8.12 L3 Changing ideas about the solar system</p>	<p>Describe some of the methods used by scientists to gather new evidence about space</p>	<p>Describe some earlier models of the solar system and explain how evidence has disproved them</p>	
<p>P8.12 L4 To the Moon and beyond</p>	<p>Describe some uses for artificial satellites and space stations</p>	<p>Describe some of the challenges to space travel and exploration</p>	