Science Domains of Knowledge

My domains of knowledge

- States of matter - Chemistry
- Materials (properties and changes) - Chemistry
- Living things and their environment – Biology
- Reproduction, inheritence and evolution - Biology
- Earth and space - Phsyics
- Energy – Physics
- Forces – Physics
- Scientific skills

Big Ideas of science education (concepts)

1.All matter in the Universe is made of very small particles

2. Objects can affect other objects at a distance

3. Changing the movement of an object requires a net force to be acting on it

4. The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event

5. The composition of the earth and its atmosphere, and the processes occurring within them, shape the earth's surface and its climate

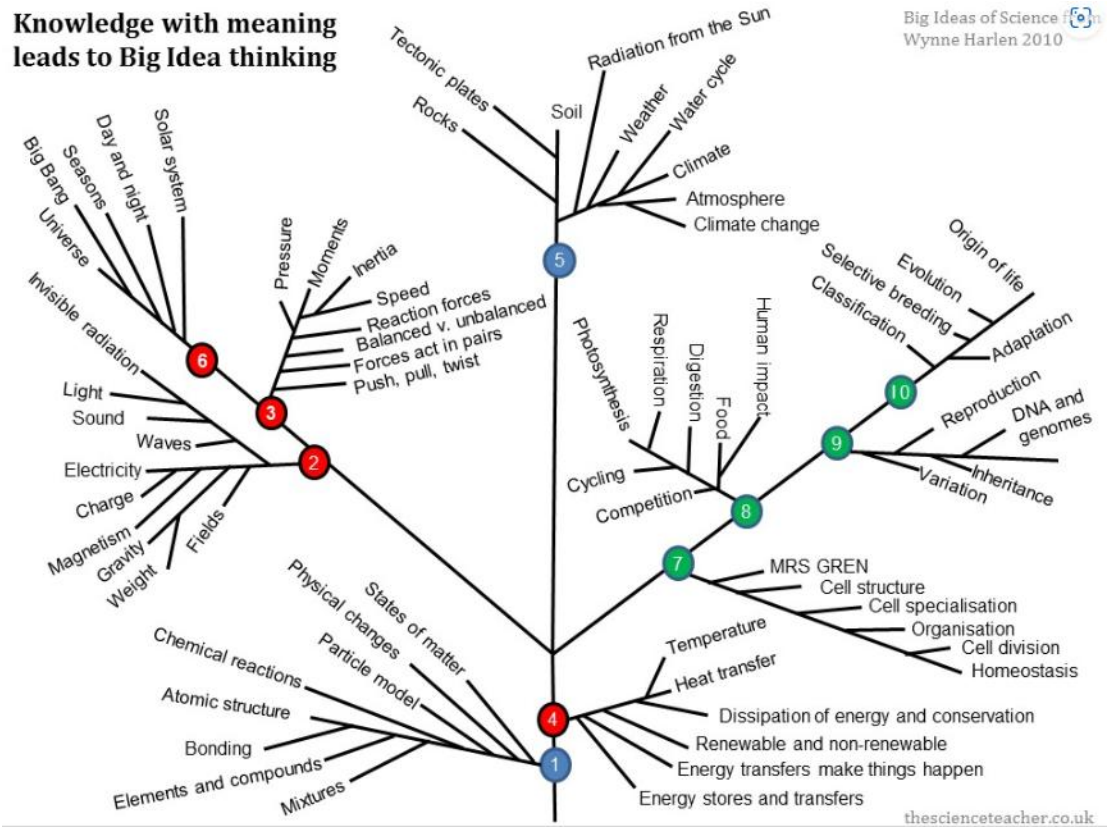
6. Our solar system is a very small part of one of billions of galaxies in the universe

7. Organisms are organised on a cellular basis and have a finite life span

8. Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms

9. Genetic information is passed down from one generation of organisms to another

10. The diversity of organisms, living and extinct, is the result of evolution



End Points

1. Students can remember the relevant knowledge for the specific domain they are studying and can make links between domains.
2. Students can ask questions and make observations about the world around them using scientific knowledge.
3. Students can present findings accurately.
4. Students can analyse data and articulate evidenced conclusions.
5. Students are able to follow and design scientific enquiries.

Crucial Knowledge (substantative)

Y1	***Autumn – Plants (Biology)*** a. Name 3 seasonal changes observed within autumn b. Name 2 deciduous and 2 evergreen trees c. Label the parts of a flower (petal, leaf, stem, root, branch, leaf) ***Spring – seasonal changes and materials (chemistry)*** a. Name 2 changes notice during spring. b. Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water and rock. c. Describe the simple physical properties of a variety of everyday materials. ***Summer – seasonal changes and animals including humans (biology)*** a. Name 3 seasonal changes that occur in Summer b. Identify and name a variety of common animals that are birds, fish, amphibians, reptiles, mammals and invertebrates. c. Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
Y2	**Autumn –Light (Physics)** a. Know that light is reflected from surfaces. b. Know we need light in order to see. c. Know that dark is the absence of light. d. Explain how shadows are formed. ***Spring – Habitats (Biology*** a. Know the difference between things that are alive, dead and have never been alive. b. Know that most living things live in a habitat which provide for their basic needs. c. Identify and name a variety of habitats. d. Construct a simple food-chain. e. Know that animals (including humans) produce offspring which grow into adults f. Describe healthy choices we can make (eating healthily and exercising) ***Summer – Plants - biology*** a. Know the difference between things that are alive, dead and have never been alive. b. Know that a plant needs water, light, suitable temperature to survive and grow c. Make close scientific observations over time. ***d.*** choices we can make (eating healthily and exercising)
Y3	**Autumn – Physics forces and energy** A. Identify everyday materials and their suitability for different uses B. Describe how materials can be changed C. Explain the force of friction D. Identify magnetic materials E. Know that magnets attract and repel

	Spring – Rocks and soils (chemistry) a. Recognise and group different types of rocks (igneous, metamorphic and sedimentary) b. Describe the simple physical properties of different rocks c. Describe the simple makeup of soil d. Explain (in simple terms) how fossils are made ***Summer I – Plants (Biology)*** a. Children can name the parts of a flowering plant and describe their function. b. Children know the conditions that plants need to sustain life (air, light, water, nutrients room) and how the amounts vary with different plants. ***Summer 2 – animals including humans (biology)*** c. Know the function of a skeleton in humans and other animals d. Know that humans get their nutrition from eating a balanced diet.
Y4	***Autumn – animals including humans (biology)*** a. know the simple functions of the basic parts of the digestive system in humans b. Be able to name the different types of teeth in humans and animals and their simple functions c. Know what an omnivore, carnivore and herbivore is and relate this to work on teeth d. Know how to keep teeth healthy ***e.*** Be able to identify producers, predators and prey in a food chain. ***Spring I – Electricity (physics)*** a) Know that electrical energy is one of many forms of energy b) Know how to create a simple circuit where electrical current flows through a complete circuit c) Know that metal is a good conductor of electricity and recognise which materials would work as insulators d) Know that more than one cell, lined up together, is called a battery and that when electrical current flows through a circuit component (E.g. buzzer or bulb) within a circuit it will begin to work. e) Know that a switch works by breaking a complete circuit f) Understand that exposure to high levels of electrical current can be dangerous. ***Spring 2 – states of matter (chemistry)*** a. Understand the concept of solid, liquid and gas and group materials according to their state b. Explain how materials can change state when they are heated or cooled (describe this using the correct technical vocabulary – see vocab) *c.* Describe the water cycle ***Summer I – Classification (biology)*** a. Use a classification key to group living things into different categories b. Understand how habitats can be affected by different environmental factors ***Summer 2 – sound (physics)*** a. Know that sound is generated when an object vibrates b. Know that sound travels in waves through a medium to a person's ear. c. Know that pitch is how high or low a sound is and is determined by how many vibrations per second are being made by the object (frequency) d. Know that volume is how loud or quiet a sound is and is determined by how much energy is in a wave e. Know that volume is quieter the further away from the object you are.
Y5	***Autumn 1 – Earth science - Physics*** A. Know how the ROTATION of the earth affects DAY & NIGHT B. Know that the earth ORBITS the sun once every 365¼ days C. Know that the earth TILTS on its AXIS and this causes the SEASONS. D. Recognise the phases of the moon and know why it happens. ***Autumn 2 – forces - physics*** E. know the effects of gravity and resistance. F. Name some mechanisms and explain how they can be used.

	Spring – life cycles (biology) A. Describe the life cycle of a plant including understanding of pollination, fertilisation and seed dispersal B. Describe the life cycle of a frog compared to a human C. Describe how plants adapt to their conditions D. Describe the changes humans go through as they age (puberty) – covered in SRE. ***Summer 1 – Earth Science (Physics)*** A. Know that the universe comprises all matter and space in existence, it is utterly vast and our solar system makes up a tiny fraction of it. B. Know that a planet is a celestial body that orbits a star (the sun) C. Know that there are eight major planets in our solar system (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune) D. Know that a satellite orbits a planet and that moons are natural satellites ***Summer 2 – separating mixtures (chemistry)*** A. Know how to separate different mixtures, including solids and liquids B. Know that in some solid materials the bonds between the particles, the bonds between the particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution. C. Solids that will dissolve are called soluble; solids that will not dissolve are called insoluble. D. Recognise reversible and irreversible changes E. Know that a chemical reaction is an irreversible change F. Know that materials can be sorted in a variety of different ways according to their properties
Y6	***Autumn – Electricity (physics)*** A. Know different ways electricity is produced B. Know different ways we can access electricity in our homes and the dangers it can pose. C. Identify symbols on a circuit D. Give reasons for the variations in how components function ***Spring – Light (physics)*** A. Know that light travels in a straight line which travels to our eye B. Describe how shadows are created, the reason for their shape and size C. Explain how light refracts to create a rainbow ***Summer I – animals including humans (biology)*** A. Know that blood travels around the body transporting nutrients that have been absorbed into the blood stream (E.g. Oxygen) B. Know that a heart beats pumping blood around the body, arteries carry blood away from the heart and veins carry blood back to the heart C. Recognise the structure of the heart. D. Know how different lifestyle choices affect our health ***Summer 2 – classification and evolution (biology)*** A. Classify living things into plants, animals and micro-organisms; animals into vertebrates and invertebrates; vertebrates into mammals, fish, birds, reptiles and amphibians and invertebrates into smaller groups B. Know that living things change over time and this gradual change is called evolution. C. Know that evolution is caused by natural selection and was first posited by Charles Darwin. D. Know that fossils can be used as evidence of evolution.