Curriculum Rationale Underpinning Intent

As a science department we aim to base our curriculum on a combination of current academic research in education and personal knowledge, understanding and experience. When considering our curriculum intent, we define four elements, **'Mastery', 'Longitudinal Learning', 'Conscious Connections'** and **'Golden Threads'**.

PCA has a whole school commitment to follow a curriculum based on the current National Curriculum in England (Department for Education, 2014). The research for the review of the National Curriculum (2011) concluded that a successful curriculum should "focus on fewer things in greater depth, in secure learning which persists, rather than relentless, over-rapid progression"; this is known as a '**Mastery Curriculum'**. Pupils should repeat the content as many times as possible across the key stage and gradually deepen their understanding. 'Mastery' is, therefore, not a style of teaching or a standard to meet. It is a concept of **gradual deepening of understanding**. The aim is not to 'achieve' learning in a lesson as if this is a final destination. Instead, pupils should have multiple opportunities to return to content, over time, in order to **gain a growing developmental understanding**

Chris Quigley led whole school training and as a department we consider two of his fundamental principles when considering curriculum intent. Firstly, **longitudinal learning** which he describes as:

> "how pupils may take their time to learn the things that matter across a much longer period of time than a lesson, perhaps even a whole key stage."
>
> (Quigley, 2017)

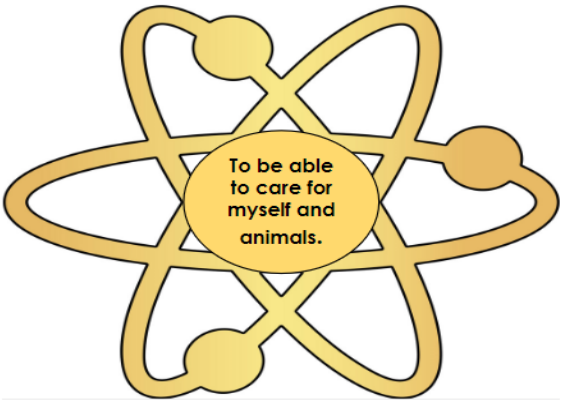
Secondly, Quigley accentuates the importance of '**conscious connections**' which he explains "shows how several aspects of the curriculum can be learned at the same time" This includes links between subjects (cross-curricular) and within subjects (intra-curricular). His principles are reinforced by the research of Brooks, 2002; Fletcher-Campbell, 2000; Reason, 2003; Schmidt et al., 2002.

Recently, as a department, we rigorously scrutinised each National Curriculum science theme, and from this, identified '**Golden Threads**' in each subject area which in turn link to our overarching Golden Threads; subject Golden Threads can be seen in figure 1.

3 - Curriculum Intent

A combination of the principles outlined in our rationale (above) allowed us to produce the documents for each science topic which clearly shows our intent in each science topic and identifies golden threads, conscious connections, key vocabulary and opportunities for scientific investigations. An example is shown below and larger copies of all science topics can be found in the appendix attached to the back of this policy.

Animals including humans



Opportunities for Scientific Investigation

Comparing ourselves (feet size etc..)
Senses Investiation- what can you hear, smell, taste etc…
Bendy Bones
Smoking Susan
Birdwatching (animals watching)
Making your own pooter
Sweet and sour
Pond dipping
Identification and classification games
Investigating camouflage
Making a wormery
Food testing (protein, fats, starch, sugar)
Teeth- jobs /food
Toothpaste Investigation
Eggs – brushing
Disclosure tablets

Conscious Connections

Intra-Curricular:
Animals and their habitats
Materials
Seasonal Changes
Cross Curricular:
Art- Animal print etc
Drama - Animal Movement
PHSE
Geography - The world - animals in it and where they live

Science Progression Steps

Animals inc. Humans

Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8	Step 9	Step 10	Step 11	Step 12
Points to the main features on a person's face when asked Names own sex Names a range of common animals Echoes a member of staff to produce animal sounds Points to parts of their body when asked Draws a person with a	Gives an animal or human more than one attribute, e.g. a bird has feathers and flies Identifies human needs, e.g. food/drink Names the main parts of a human body Sequences a series of three pictures showing human life cycle Identifies that different people are different	Describes a familiar animal from memory Draws a human with the main body features Names a range of pets Names a range of wild animals Names a range of farm animals Names and labels the main external parts of the body Names and labels the main parts of the face	Lists the five human senses Explains how different parts of their body are moving, e.g. bending Names the parts of the human body they can see, e.g. knee, elbow Gives examples of some of the life processes inherent to humans	Orders simple life cycles Describes the importance of hygiene Describes the importance of a balanced diet and exercise Lists what all animals and humans need to live, e.g. air, food, water Describes the main changes of young animals	Names and labels parts of the human skeleton Describes and simply explains the purpose of the skeleton in humans and some animals Recognises that animals including humans need a certain amount of different types of nutrition Describes the basic needs of animals for survival and the main	Recognises how they change through the human life cycle and that change is on-going Identifies physical differences between females and males Names and labels the organs which are protected by different parts of the skeleton, e.g. ribs Identifies, names and labels the different teeth in	Recognises how human bodies change in old age Records the general order of the main changes that girls and boys experience in puberty Classifies changes in puberty which are different and similar in both sexes Identifies that puberty occurs so that the reproductiv	Identifies different ways a variety of living things protect themselves from predators, Demonstrates understanding of the consequences of imbalances in the diet, e.g. obesity, starvation, deficiency diseases Demonstrates understanding of reproduction in humans, e.g. the reproductive systems,	Describes of the two types of digestion - mechanical (mastication) and chemical Demonstrates understanding of the structure and functions of the human skeleton, to include support, protection, movement and making blood cells Demonstrates understanding of the content of a healthy human diet: carbohydrates, lipids, proteins,	Demonstrates understanding of calculations of energy requirements in a healthy daily diet Demonstrates understanding of the mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume Demonstrate	Demonstrates understanding of the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts Demonstrates understanding of cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope

This in turn led to our rolling programmes which, again, took the principles outlined in the rationale into consideration. The following tables show our current science programmes.

Key Stage 1 Programme Science					*Seasonal Changes to Include 'Plants'			
	Autumn		Spring			Summer		
	Seasonal changes*	Animals inc. Humans (Humans)	Seasonal changes*	Materials	Animals inc. Humans (Animals)	Seasonal changes*	Materials	Animals inc. Humans (Animals)
KS1 is a skills based curriculum and is broken down in further detail in the KS1 long term curriculum plans based on the EYFS skills and early introduction to KS1 skills in working scientifically.								

Key Stage Two Rolling Programme Science			
	Autumn	Spring	Summer
4	Animals Inc Humans – Animals	Materials and their properties - Everyday materials	Materials and their properties (reversible and irreversible changes)
1	Earth and Space (Investigations)	Animals inc Humans – Humans (excluding Teeth and Digestion)	States of Matter
2	Forces and Magnetism	Plants (Seasonal Changes)	Sound
3	Animals inc Humans – Teeth and Digestion	Electricity and light	Living Things and their Habitats

Key Stage Three Rolling Programme Science				
	Autumn		Spring	Summer
1	Electricity and Light		Animals inc Humans – Humans (including Teeth and Digestion)	States of Matter
2	Animals inc. Humans - Animals	Evolution and inheritance	Materials	Earth and Space
3	Forces and Magnetism		Plants	Sound

Key Stage Four Programme Science

Pupils in KS4 work towards achieving a WJEC award or certificate in Science from the WJEC Science Today Entry Pathways Qualifications.

Award = 8 Credits - 6 Credits from Science, 2 required from linked studies

Certificate = 13 credits – 12 credits from Science, 1 required from linked studies

Pupils are assessed and units are selected to suit both their needs and level.

Units that may be selected:

- Introduction to Plant Care
- Introduction to Animal Care
- Science: Health and Safety
- Science and our Universe
- Science and the Human Body
- Variation and Adaptation
- Working with Electrical Circuits
- Energy in the Home and Workplace
- Renewable Energy

All of the above mentioned units can be delivered as an Entry Level 3 level option for higher ability pupils or as an Entry 2 Level option for middle ability pupils

Example of a rolling programme for accreditation in science for KS4 pupils of higher ability; Entry Level 3 Certificate in Science

	Autumn	Spring	Summer
1	Science and Our Universe 3 credits	Introduction to Animal Care – Entry Level 3 3 credits	STEM Crest Awards
2	Science: Health and Safety 3 credits	Working with Electrical Circuits 3 credits	STEM Crest Awards
3	Variation and Adaptation 3 credits	Science and the Human Body 3 credits	STEM Crest Awards

Example of a rolling programme for accreditation in science for KS4 pupils of middle ability; Entry Level 2.Award in Science

	Autumn	Spring	Summer
1	Introduction to Animal Care – Entry Level 2 3 Credits	Looking after ourselves - Food and Health	STEM Crest Awards

2	Looking after ourselves – Science skills for life-	Introduction to Plant Care 3 Credits	STEM Crest Awards
3	Energy in the Home and Workplace 3 credits	Looking after ourselves – Health and Safety	STEM Crest Awards
In Year 11 Pupils will study 'Sex and Relationship Education when they have completed accreditation.			

Key Stage Four Rolling Programme Science for SLD pupils -- Personal Progress Units In Year 11 Pupils will study 'Sex and Relationship Education when they have completed accreditation.			
	Autumn	Spring	Summer
1	**Science** 6074 Developing self awareness: all about me	6066 Developing skills for the workplace: health and safety	STEM
2	**Science** 6063 Developing independent living skills: being healthy	Looking after ourselves science skills for life	STEM