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; these can be found in our 'Intent' document link.

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:

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 rolling programmes.

Table 1 : Key Stage 1

Key Stage 1 Rolling Programme Science 'Plants'			*Seasonal Changes to Include
	Autumn	Spring	Summer

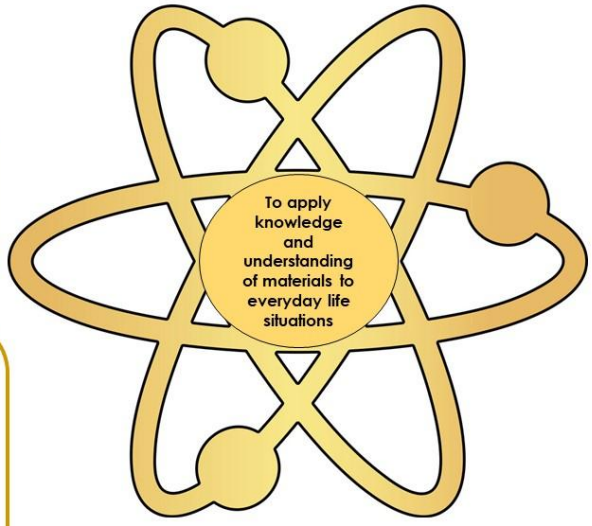
1	Se aso nal cha nge s*	All About Me Humans – The Body	Seas onal chan ges*	Materials (Plastic)	Animals (sea)	Seas onal chan ges*	Material (Wood)	Animals (Farm)
2	Seas onal chang es*	All About Me Humans – The Body	Seas onal chan ges*	Materials (Metal)	Animals (Wild)	Seas onal chan ges*	Materials (Fabric)	Animals (Pets)

Table 2: Key Stage 2

Key Stage Two Rolling Programme Science			
	Autumn	Spring	Summer
1	Animals Inc Humans – Animals	Materials and their properties	STEM
2	Earth and Space (Investigations)	Animals inc Humans – Humans (Excluding Teeth and Digestion)	States of Matter

3	STEM	Forces and Magnetism	Plants (Seasonal Changes)
4	Electricity and light	Animals inc Humans – Teeth and Digestion	Living Things and their Habitats

Materials



Key Vocabulary

Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent, Translucent, Brick, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil, Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing

Opportunities for Scientific Investigation

Properties of materials- testing
Suitability of materials for everyday use - What is best to stir a hot drink? Etc
Waterproof or not?
Fire retardant or not?
Dissolve or not? Salt Water Vs Tap Water Vs 'Pure Water'
What makes a good....boat?
Float or sink?
Reversible and irreversible changes - toast/milk tie-dye/gummy bears/melting crayons/making cakes/ etc..
Separating materials - sieve/filer/mixing/salt crystal extraction

Conscious Connections

Intra-Curricular:
Earth and Space
States of matter
Cross Curricular:
Art
Design Technology

Progression

- ❑Handles and tests materials (squash/squeeze/tear/ pull etc - not the vocab- just actions of testing)
- ❑Begins to sort objects simply (e.g. by size, by colour, by use)
- ❑Begin to take part in exploration experiments which test simple properties
- ❑Begin to use Key Vocab - simple property descriptions and names of materials
- ❑Understand that some things always happen (e.g. water makes paper wet)
- ❑ distinguish between an object and the material from which it is made
- ❑ identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- ❑ describe the simple physical properties of a variety of everyday materials with increasing complexity (e.g. see through to transparent)
- ❑ compare and group together a variety of everyday materials on the basis of their simple physical properties.
- ❑ identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- ❑ Understand that a material is suitable for a particular use, begin to identify and explain this.
- ❑ find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
- ❑ compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- ❑ know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- ❑ use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- ❑ Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- ❑ demonstrate that dissolving, mixing and changes of state are reversible changes
- ❑ explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Table 3: Key Stage 3

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

Table 4, 5 and 6: Key Stage 4 - Three curriculum intents dependent upon ability

Key Stage Four Rolling Programme Science **– HIGHER ABILITY** – Entry Level 3 In Year 11 Pupils will study 'Sex and Relationship Education when they have completed accreditation.			
	Autumn	Spring	Summer
1	Science and Our Universe 3 credits	Introduction to Animal Care – Entry Level 3 3 credits	STEM
2	Science: Health and Safety 3 credits	Working with Electrical Circuits 3 credits	STEM
3	Variation and Adaptation 3 credits	Science and the Human Body 3 credits	STEM
Key Stage 4 Rolling Programme Science – **Middle Ability** – Entry Level 2.			
	Autumn	Spring	Summer

1	Introduction to Animal Care – Entry Level 2 3 Credits	Looking after our planet And/or Energy in the home and workplace -Science skills for life-	STEM
2	Looking after ourselves – Science skills for life-	Introduction to Plant Care 3 Credits	STEM
Key Stage Four Rolling Programme Science – MIDDLE ABILITY In Year 11 Pupils will study 'Sex and Relationship Education when they have completed accreditation.			

Key Stage Four Rolling Programme Science – **Lower Ability** - 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