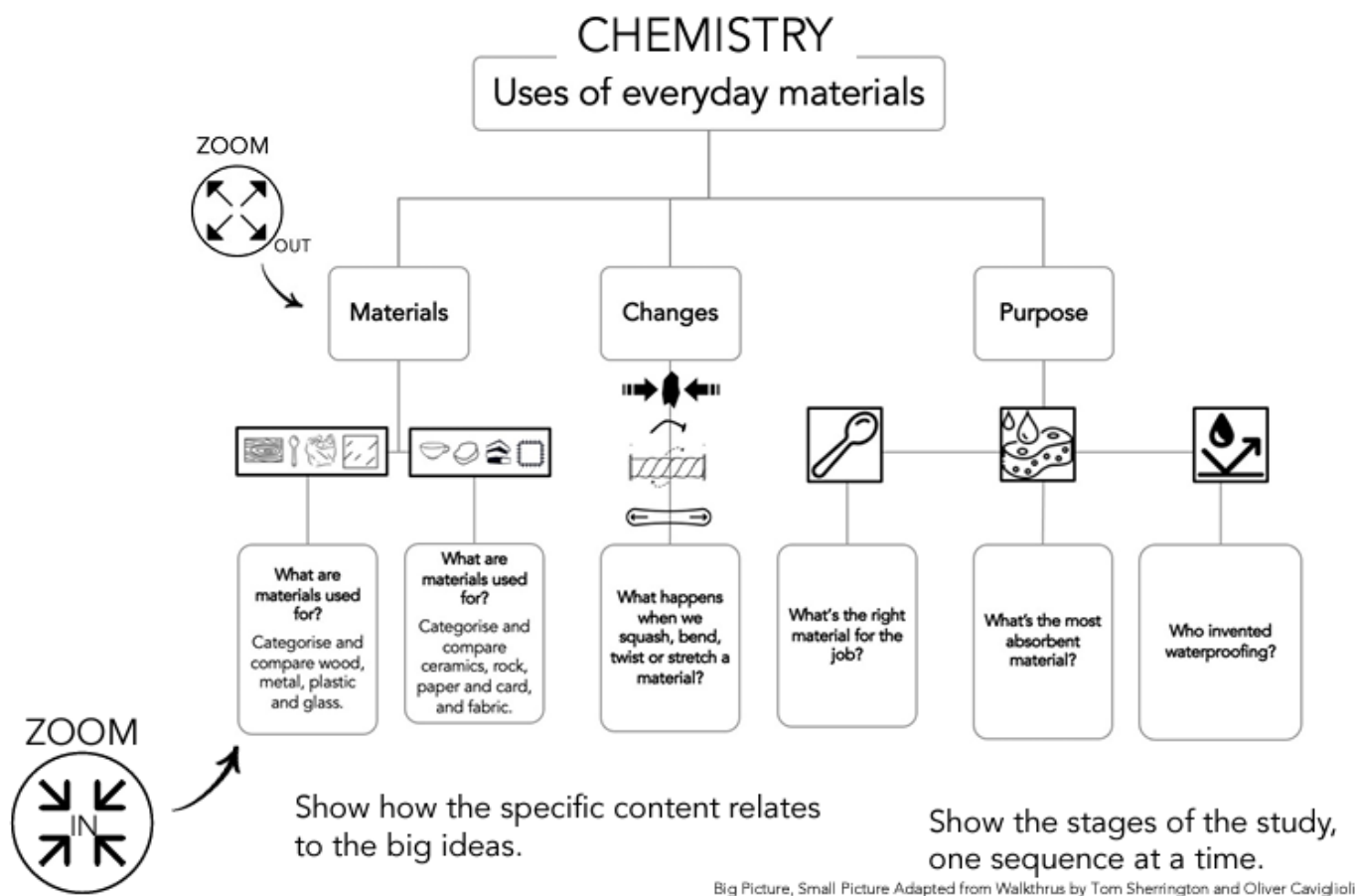


## Science at St Mary's Catholic Primary School





Children become 'a little more expert' in Science as they progress through the curriculum, accumulating, connecting and making sense of the rich substantive and disciplinary knowledge. When planning a learning module teachers can identify which substantive and disciplinary knowledge they are going to focus on within that lesson. To support identifying the substantive skill teachers can focus on the 'big idea':



In order to teach the disciplinary skills- teachers can refer to the 'Working Scientifically skills':

Asking simple questions and recognising that they can be answered in different ways	Observing closely, using simple equipment	Performing simple tests	Identifying and classifying	Using their observations and ideas to suggest answers to questions	Gathering and recording data to help in answering questions

There are also the IPROF statements: I – identifying and classifying, P – pattern seeking, R – research using secondary sources, O – observing, F – fair and comparative testing. These can be seen on the 'Thinking Tasks', so teachers can ensure that children are developing a range of disciplinary skills in Science:

<b>Comparing</b> 	<b>IPROF</b>
<p>Work together to set up a simple scientific test to compare how stretchy different materials are.          Ask pupils to make predictions before testing the materials.          If appropriate, discuss how the test could be improved.</p>	
<b>Observing</b>  <b>Applying</b> 	
<p>Why is it important that some parts of plants bend? Look outdoors or watch a video to observe how stems flex rather than break even in strong winds. Look at examples of plant tendrils (which are able to twist easily around whatever they come into contact with). Why is it vital that they can bend and twist?</p>	
<b>Observing</b> 	<b>IPROF</b>
<p>Ask pupils: Can modelling clay or a similar material, be squashed, bent, twisted <b>and</b> stretched?          Challenge: Can you name other materials that can be squashed, bent, twisted <b>and</b> stretched.</p>	

Substantive knowledge is split into the following subcategories:

	EYFS Understanding the world	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Biology (53% of Science content)	The Natural World Explore the natural world around them, making observations and drawing pictures of animals and plants.		Living things and their habitats (+ revisit modules)		Living things and their habitats	Living things and their habitats	Living things and their habitats
		Plants (AT / ST)	Plants (ST)	Plants (ST)			
		Animals, including humans (+ revisit modules)	Animals, including humans (+ revisit modules)	Animals, including humans	Animals, including humans	Animals, including humans	Animals, including humans
							Evolution and inheritance
Physics (29% of Science content)	Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.  Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	Seasonal changes (+ revisit module)		Light			Light
				Forces and magnets		Forces	
					Electricity		Electricity
					Sound		
Chemistry (18% of Science content)		Everyday materials	Use of everyday materials			Properties and change of materials	
				Rocks (AT) (+ revisit module)			
					States of matter		

### Revisiting prior learning

Before each learning module teachers should acknowledge the prior learning the children have received-how does this fit into what we are about to teach? Is this a new skill or have the children been exposed to this before? How can you make reference to prior learning in order to help teachers identify this skill?

## Pupils should be taught to:

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

### Previous learning: curriculum narrative

#### ELG: The Natural World

Explore the natural world around them, making observations and drawing pictures of animals and plants.

Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class

#### Year 1

Everyday materials

### Connect (Revisit prior learning)

Children have the opportunity to revisit prior learning this can be in the form of:



- CUSP retrieval tasks

- Quiz questions from previous lesson

Connect

- Designing a task to revisit learning from previous lesson e.g. labelling parts of a flower

### Explain (Explicit vocabulary teaching)



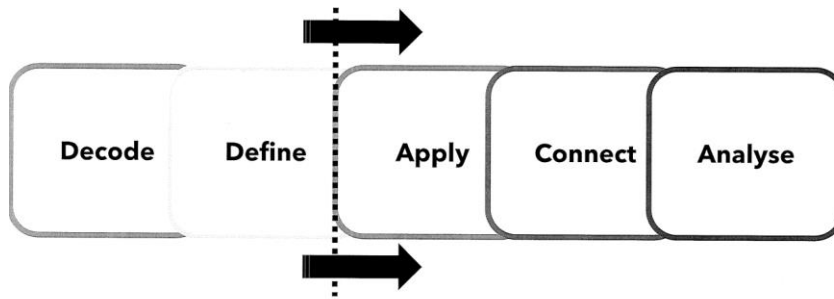
Here the children should be exposed to subject specific vocabulary that will need to use within the lesson. These are split into tier 1 and tier 2 vocabulary:

Explain

#### Vocabulary for explicit instruction

Tier 2 multiple meaning or high frequency		Tier 3 subject specific	
artificial	made to copy something; not real	ceramic	made from clay and hardened by heat
brittle	hard but can break	durable	long lasting
extracted	removed or taken out	inflexible	not able to be bent
fabric	cloth	reflective	throwing back light or heat
manufactured	made using machines	rigid	unable to be bent or forced out of shape
natural	found in nature; not made by humans	translucent	allowing light to pass through partially

It is important that children are not only introduced and exposed to this vocabulary but that they also have the opportunity to unpick the word meaning and apply it within a given context:



During the explain section of a lesson children should be made aware of how this next learning module fits in with our prior learning and how it will enable to take our learning further within the next lesson. The learning journey should be made clear to the children- the big ideas support this!

### **Example (My turn- teacher modelling):**



In this part of the lesson the children will be exposed to clear worked examples and key substantive knowledge supported by the use of the vocabulary explored earlier in the lesson.

**Example** Here is where children receive the new knowledge they will need in order to answer the learning question at the end of the session. During the example videos, Curriculum Visions and other sources can be used to support children in accessing the key learning themes. Here are some examples of ways children can be encouraged to engage with the information they are given:

- Highlight their knowledge note as they hear key vocabulary referred to
- Highlight key words on PowerPoint slides, when you come to these words children can stand up (great movement break), clap etc. to show they are following
- Get children to draw images to represent what you are talking about e.g, symbols to represent MRS GREN
- Children can take notes from the information they are being given
- Use of models for children to look at and refer to

### **Attempt (Our turn):**



**Attempt**

Children will attempt to use the things you have shown such as vocabulary, language, practise, organising and selecting the content. Children can refer to their knowledge note to support them. This does not always have to be written down- it can be rehearsed. Here is the opportunity for diagnosing through questioning and observation. Teachers have the opportunity to intervene and address misconceptions. Here children can use resources such as:

- Maps
- Wordwall or physical tasks
- Image resources to reinforce vocabulary
- Practise saying, identifying and locating

### **Apply:**



**Apply**

Children start to consolidate and apply what they know through the use of thinking hard tasks. Pupils should select, organise and integrate their learning.

## Challenge:



Questions and retrieval practise- asking questions around the content and of themselves. Use what you know and show how you can answer those questions. This could be in the form of:

### Challenge

- Quizzes
- Summary
- Explanation
- Self-questions about the content

## Books

- Knowledge organiser stuck in the book at the beginning of each new learning module
- Always use a double page spread per lesson
- Always have the date at the top of the page (long date) (KS1 can use labels)
- Knowledge note to be stuck on either the left hand side, middle or right side for children who are left handed (adaptation)
- Children have the opportunity to attempt to apply their substantive knowledge
- Thinking hard tasks included to give children the opportunity to enhance their disciplinary knowledge and skills

## Working walls:

- Science big idea
- Reference to what the children are learning about
- Key vocabulary with definitions
- Diagrams/images relevant to subject
- An example of children's learning

## SEND: Adaptations in Science include but are not exclusive to:

- Use of the securing knowledge note
- Chunking/cutting/folding or adapting the knowledge note further
- Use of widgeo to support understanding
- Highlight key information
- Use of visuals e.g. hexagons
- Reducing content e.g. less hexagons and focusing on 3 main parts
- Partially completed paths
- Wordwall resources
- Labelling tasks
- Clearly labelled diagrams
- Photographs
- Mindmaps
- Physical resources to explore
- Pre-teaching

Be mindful that just because a child is on the SEND register that they can achieve in-line with their peers- there will be individual adaptations in these cases- **children with SEND have the right to think hard too!**

### **Further challenge:**

It is crucial that children have the opportunity to deepen their knowledge and understanding through further opportunities to challenge. This can be presented as:

- Comparative tasks (slightly more challenging)
- Children to think of their own questions to challenge another to think deeply about the content within the lesson
- Scenario/case study tasks
- Compare current learning to prior learning
- Creating and conducting their own investigations, based on questions children have generated
- Considering real-life application for substantive knowledge (e.g. how can we use what we have learned about plants to help a gardener?)
- Cross-curricular links across the curriculum, using Science in every aspect of our lives. For example, Maths (data handling), DT (using scientific knowledge to design products), PSHE (keeping our bodies healthy)
- Explaining new information learned in an adaptive way, through diagrams, posters, presentations

**Assessment:** Teachers have a blue assessment folder where assessment records are kept. For each lesson teachers will identify children who required support and those who exceeded the lesson expectations. Lesson plans will also be included to show assessment notes/annotations to guide the next the lesson.

**Presentation:** Always have high expectations of presentation and address as necessary- make adaptations where needed (for example where a child has a special educational need).