Science at Abingdon Primary School

Our Bespoke Drivers

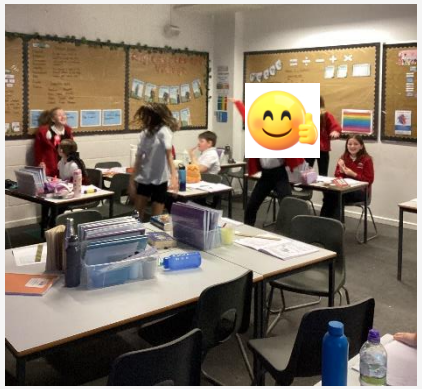
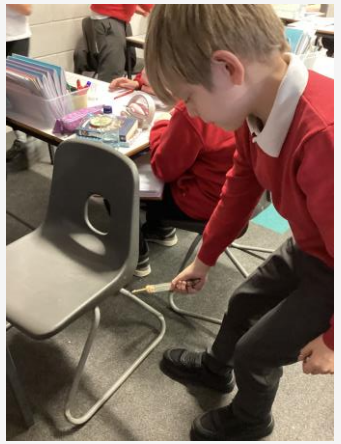
Role Models of all protected characteristics

Accessing our local area and all it offers

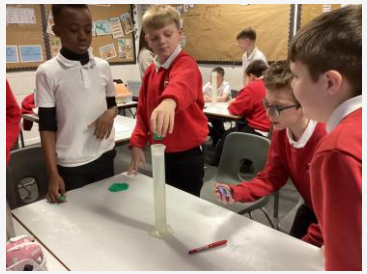
The Power of Word

Science lessons at Abingdon are fun and practical…

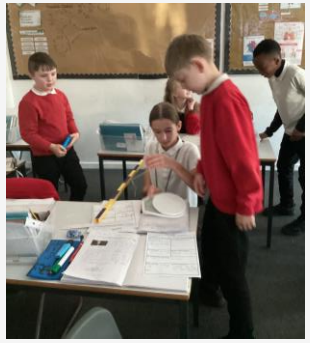


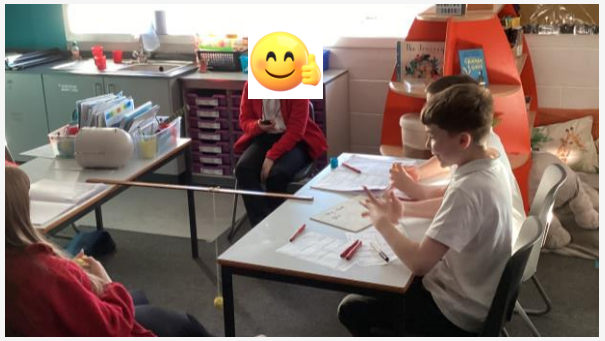













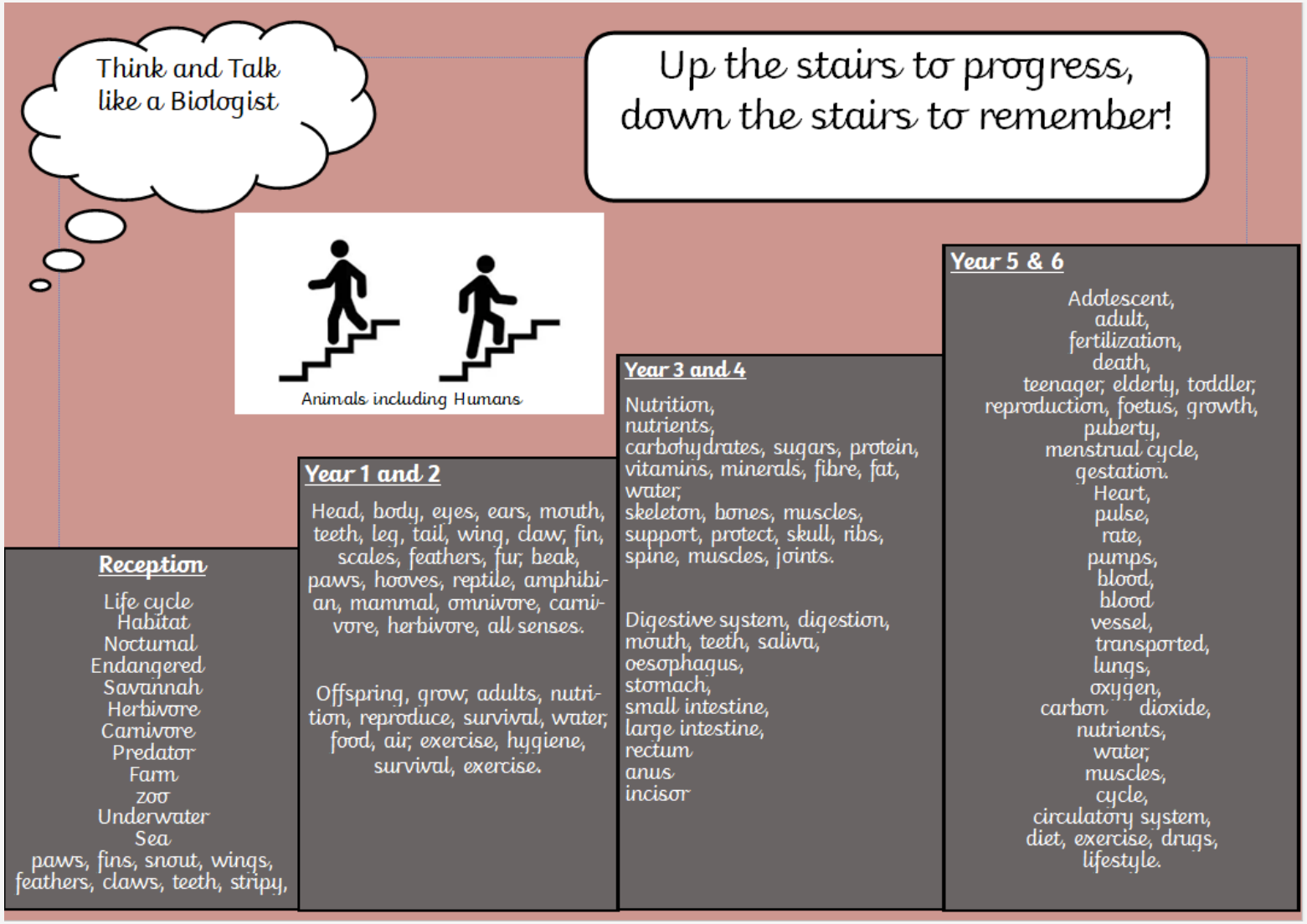
How is Learning Across Our School Sequenced?

NEW	ABINGDON PRIMARY SCHOOL – Science Yearly overview Cycle A						
CURRICULUM AREA	FS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Autumn 1	**All About Me!** Seasons/weather	The Great Fire of London Animals including humans (Y1)		Eureka! Living things and their habitats (Y4)		Behind Enemy Lines Animals, including humans (Y5)	
Autumn 2	**Festivals and Celebrations** Seasons/weather	Animals including humans (Y1)		Animals including humans (Y3)		Electricity (Y6)	
Spring 1	**When I Grow Up...** Keeping healthy and materials	Sensational Stockport Plants (Y1)		Globetrotters Forces and magnets (Y3)		What a Wonderful World! Living things and their habitats (Y5)	
Spring 2	**Who Lives Where?** Mini beast and growing and animals	Plants (Y2)		Electricity (Y4)		Living things and their habitats (Y6)	
Summer 1	**Growth and Change** People who help us and Under the sea	Going on Safari Plants (Y2)		Tomb raiders Animals including humans (Y3)		Rotten Romans Evolution and inheritance (Y6)	
Summer 2	**Once Upon a Time...** People who help us and Under the Sea	Seasonal changes (Y1)		Animals including humans (Y4)		BSW – renewable energy (Y5)	

How is Learning Across Our School Sequenced?

	ABINGDON PRIMARY SCHOOL – Science Yearly overview Cycle B						
CURRICULUM AREA	**FS**	**YEAR 1**	**YEAR 2**	**YEAR 3**	**YEAR 4**	**YEAR 5**	**YEAR 6**
Autumn 1	**All About Me!** Seasons/weather	Down in the Deep, Dark Woods Animals including humans (Y2)		Stones n Bones States of matter (Y4)		Fight for your rights Properties and changes of materials (Y5)	
Autumn 2	**Festivals and Celebrations** Seasons/weather	Animals including humans (Y2)		Sound (Y4)		Animals, including humans (Y6)	
Spring 1	**When I Grow Up…** Keeping healthy and materials	Amazing Adventurers Materials (Y1)		Extreme Earth Rocks (Y3)		Time travellers Forces (Y5)	
Spring 2	**Who Lives Where?** Mini beast and growing and animals	Materials (Y1)		BSW Carbon footprint (Y4)		Earth and space (Y5)	
Summer 1	**Growth and Change** People who help us and Under the sea	A taste of India Materials (Y2)		Mad as a Hatter Plants (Y3)		Tomorrow's World Light (Y6)	
Summer 2	**Once Upon a Time…** People who help us and Under the Sea	Living things and their habitats (Y2)		Light (Y3)		BSW air pollution (Y5)	

Vocabulary Progression



This links to The Power of Word – understanding the power that vocabulary can have.

How are knowledge and skills built on through school?

The science knowledge and skills are mapped out for each year group/key stage to show the progress of each element of the science curriculum. This is an example.

Progression of Disciplinary and Substantive strands.

STRAND		EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Substantive Knowledge	Plants (Biology)	Make observations and drawings of plants. Know similarities and differences between the natural world and contrasting environments. Can plant seeds and care for growing plants. Understand basic plant lifecycle. Know leaf, stem, petals.	Can name common plants and describe the basic parts of flowering plants (deciduous/evergreen) Can describe kkey features of trees and plants e.g. shapes of leaves, colour of flower, blossom. Can use photos to talk about how plants change. Can talk about plant lifecycles. Know basic parts of plant e.g. leaf, stem, petal, flower, stalk, bud, roots, fruit, bark, blossom.	Can describe how plants have grown from seeds and bulbs and how they have developed over time. Know conditions for plant growth. Can spot similarities and differences in bulbs and seeds. Confident in ordering parts of the plant lifecycle. Know all parts of the plant and their function. Know terms: light, shade, sun, warm, grow, healthy, growth, germinate.	Can explain the function of the parts of a flowering plant. Can explain the life cycle of a flowering plant lifecycle including pollination, seed formation, seed dispersal and germination. Know different methods of seed dispersal. Know the requirements of plant growth and how water is transported through the plant. Know how the sun helps plants photosynthesis. Know terms: photosynthesis, pollen, pollination, absorb, nutrients, reproduce, germination, stamen and style.	Can classify plants in different ways (Living things)	Can explain the lifecycles and processes of a range of different plants and trees. Can use ID guides to identify plants. (Living things)	Can classify plants in different ways using observable characteristics/ similarities and differences. Give reasons for classifying plants based on characteristics (Living things)
	Animals including humans (Biology)	Can name a range of animals e.g. farm/jungle. Can group using basic characteristics e.g. land/sea, 4 legs, can fly/cant fly. Can name and point to different body parts e.g. head, body, tummy, knees, legs, arms, toes, eyes, ears, mouth, nose, hair, fingers. Know basic senses e.g. touch, taste, hear, see.	Can name a range of animals which include animals from each of the vertebrate groups. Understand and categorise animals who are herbivore, carnivore and omnivore. Describe and compare animals based on observable characteristics. Know terms: reptile, amphibian, mammal. Can name, draw and label parts of the human body and say what sense is associated. Can name the 5 senses.	Can describe how animals change as they get older. Know names of animals and their offspring e.g. goat- Kid. Can order the lifecycle of different animals e.g. butterfly. Can explain what humans and animals need to survive e.g. food, sleep, exercise, water, shelter. Know about microorganisms and how to keep hygienic. Understand the term balanced diet and can identify some food groups. Understand the effects of exercise on the body. Know terms: offspring, nutrition, reproduce, exercise, hygiene, microorganism, germs.	Can name the main bones in the skeletal system such as skull, ribs, humerus, vertebrae, pelvis, ulna, carpals, radius, femur, phalanges, patella, tibia, tarsals, fibula, metatarsals. Know the function of the skeletal system. Can describe how muscles and joints help to move. See similarities and differences in skeletons can classify into endoskeleton, exoskeleton and hydrostatic skeleton. Can name different nutrients found in food. Know the different food groups and why we need to eat a balanced diet.	Can identify and label and draw main parts of the digestive system and explain the process. Know the different types of teeth in their mouth: molars, pre-molars, canines and incisors and their function. Can identify animals and classify based on their teeth whether they are herbivore, omnivore and carnivore. Can order and draw a range of lifecycles and food chains. Can identify the producer, predators and prey.	Can explain the changes that take place in boys and girls during puberty. Can explain how a baby changes physically as it grows and what it is able to do at each stage. Understand that different animals have different gestation periods. Know the importance of physical and mental health.	Can identify, label and draw parts of the circulatory system e.g. heart, blood vessels, capillaries, arteries, blood. Understand the function of the different parts. Understand how nutrients are transported around the body within animals and humans. Know the impact of a balanced diet, exercise and lifestyle on the way their body's function. Recognise the impact on all body systems learned so far.
	Living things/ Evolution and inheritance (biology)	Can name some plants and animals. Can explore habitats and know where some animals live. Can compare and describe plants and animals.	Know common plants and trees (plants) Identify and name common animals (animals) Know herbivore, carnivore and omnivore (animals) Describe and compare variety of animals (animals)	Can find a range of items which are dead, living and never been alive. Know what a habitat and micro habitat is and identify animals which live in different habitats. Can talk about features of animals and plants and how they are suited to live in particular habitats.	Identify and describe functions of different plants. (Plants) Identify and describe different animals and how they are adapted to live in different environments. Understand the term climate (Animals) Can explain how a fossil is formed (Rocks).	Can name living things in a range of habitats, giving key features that helped identify them. Can give examples of how an environment might change both naturally and due to human impact. Explain how changes in environment can be dangerous to animals and	Describe the lifecycles of mammals, amphibians and insects using diagrams. Can describe similarities and differences between them. Understand the term reproduction in plants and animals.	Can give examples in the five vertebrate groups and some in the invertebrate group. Can give key characteristics of these groups. Can give examples of flowering and non-flowering plants. Can identify unknown plants using ID and classification charts. Can explain why animals

Medium term plan example-Year 1/2 Cycle B- Materials

Plymouth Science

MEDIUM TERM PLANNING

Lesson 1 **LO: I can distinguish between an object and the material from which it is made** **WS: I can identify and group using my observations.**  **SE- I can identify materials and classify items.** 	Slide 3- Do children know what these materials are? Can they label them? Can they add some uses of them? Pre assessment opportunity. Children stick this in their books as pre assessment. This could be scribed for them. You could provide a word bank for children of needed. This could be done in small groups where adult scribes ideas and assesses children's pre-understanding of the topic. Slide 4- This is the objectives of the session. Stick this in the front of the floor book after the topic title. Slide 5- Share LO for the session. Use the Symbols for Working Scientifically and Scientific Enquiry on a learning display, to make these a focus. Slide 6- Add to floor books and add post it notes through the unit. One colour for what they know and another for what they want to find out. Children to add questions on post it notes. Display throughout the topic and put on 'what we know' section once answered. Links to science capital with adding in scientists and jobs. Slide 7- Share children the animation and the focus/problem of the session. Slide 8- Read to children. This puts the problem into context using Tim Peake. Slide 9- Place ALL materials in a table/floor all jumbled up. Teacher may want to make the glass one as an example using glass beads, bottles. Type of materials e.g. Metal- aluminium foil, nuts, bolts, screws, coins, wire, paper clips, metal bottle tops, keys etc Wood- wooden lolly sticks, skewers, cocktail sticks, pegs, twigs, tree bark, wooden spoons, small pieces of wood. Plastic- Plastic bags, cling film, bubble wrap, plastic cutlery, plastic	This can be done in small groups or independently Whole class talk. This can be done as a whole class activity. Mixed ability groupings	Note any children with exceptional knowledge or children who are struggling to participate. Question children's	Floor book (optional). Post it notes. Concept Map in resources Unit title page Metal- aluminium foil, nuts, bolts, screws, coins, wire, paper clips, metal bottle tops, keys etc Wood- wooden lolly sticks, skewers, cocktail sticks, pegs, twigs, tree bark, wooden spoons, small pieces of wood. Plastic- Plastic bags, cling film, bubble wrap, plastic cutlery, plastic. Paper- writing paper, sugar paper, crepe paper,

Medium term plan example-Year 3/4 Cycle A- Animals including humans

Plymouth Science

MEDIUM TERM PLANNING

Learning Objectives	Whole Class Teaching including key questions	Recording of outcomes (Differentiated where appropriate)	Assessment Opportunities	Resources
Pre-assessment opportunity (PP Slide 1) Slide 2- Choose the pre assessment that suits your class e.g. Concept cartoon (provided) Plickers Assessment (online quiz) Mind mapping, KWL chart, Knowledge retrieval quiz, sorting activity, matching activity, modelling activity. This should not be a whole lesson and should take no longer that 15 mins. **Note- Session 1 is a long session and may require the pre assessment to be done prior to the main lesson depending on time.**				
Lesson 1 **LO: I can describe the simple functions of the digestive system in humans** **WS: I can interpret my model to demonstrate how the digestive system works.**  **SE- I can identify organs in digestive system** 	Slide 3- Recap Y3 learning: skeletal system. Can children complete the STEM sentences? Slide 4- Play video. Children can simply watch, can make notes on a whiteboard or have a blank copy of the human body if they wish to label as they watch the video. Make sure you have the bone names displayed as children may need this to scaffold their writing. Slide 5- Simon Says 'Skeletal System' (If you are limited with time- miss out this activity: you can revisit throughout unit.) Play 'Simon says' and children have to pint to where the bones can be found in the body. This can be a good recap activity to use e.g. when lining children up. (Skull, spinal cord, humerus, ribs, femur, jaw bone or mandible, clavicle, vertebrae, shoulder blade/scapula, ulna, radius, sternum, pelvis, kneecap/patella, tibia, fibula. Cross curricular links- also refer to these bones in PE lessons. Slide 6- Share objectives for the unit. Slide 7- Children to look at the pictures on the concept map. Can they add their learning? Children to stick in books as they will revisit at the end of the unit. Slide 8- Share Lesson Objective (LO), Working Scientifically (WS) and Scientific Enquiry (SE) for the lesson. Slide 9- Ask- what do you want to know about the digestive system, including teeth? Children to add questions on post it notes. Display throughout the topic and put on 'what we know' section once	Children complete concept map. Children to watch video and take notes or add labels to the human body template. Children could write their own post it note or teacher/TA could scribe ideas.	What bones can children remember from Year 3? Challenge any misconceptions.	Concept map in resources. Human body template (optional) Post it

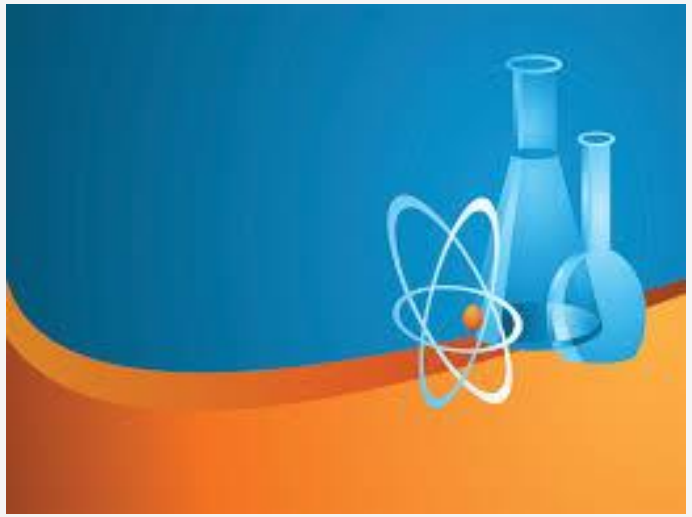
Medium term plan example-Year 5/6 Cycle A- Living things and their habitats

Plymouth Science

MEDIUM TERM PLANNING

Lesson 1 L.O:I can describe the differences in life cycles of a mammal, an amphibian, an insect and a bird. WS I can use oral and written forms to report conclusions  SE: I can identify patterns that might be found in the natural environment 	Slide 1 introduce the topic Slide 2 an idea of pre assessments to do before starting the topic Slide 3- concept map- what do you think when you hear the words living things? Allow the children time to complete this activity. This can be done prior to starting the unit. Slide 4- record children's ideas of what they want to find out. Slide 5- discuss the learning which will take place during the topic Slide 6- introduce the objectives for the lesson Slide 7- introduce key vocabulary and display it in the classroom Slide 8- Watch the video to recap on classification of animals from Year 2 and 4 https://youtu.be/mRidGna-V4E Slide 9- Headband activity Children are given a card which they have on their head. They go around the classroom asking yes or no questions to find out what animal they are. Try and get them to ask questions such as do I lay eggs? Do I give birth to live young? Do I live in water? Try and discourage them from asking am I a reptile etc. Once you are happy that they have asked enough questions, tell them they can start to guess what they are- am I an elephant? Slide 10- Frog life cycle (use notes to help explain) 1. Adults lay hundreds of tiny eggs. This usually happens in early spring when the weather is just starting to get warmer. The eggs are usually laid among vegetation because they are defenceless. Frogs lay frogspawn which looks like a round cluster of eggs. Toads however lay toadspawn which looks like long ribbons. The baby amphibians start out as jelly-like dots surrounded by a jelly-like substance where the embryos grow. 2. After 1-3 weeks the tadpoles eat the yolk of the egg and hatches. They have gills, a mouth and a long tail and they can swim. For the first couple of weeks, they won't move around very much as they are still absorbing nutrients from the yolk. However after this time, they will start to move	If some children struggle to ask or answer question you can provide some support. Children moving around the room Children all listening	Teacher TA support where needed. Address misconceptions.	Concept map Post its Headband activity cards cut and laminated with double sided sticky tape on the back. Amphibian life cycles cards- enough for each table. Worksheet with Lo and WS in resources. Can use LO and WS only and chil

Prior learning is shown in the knowledge and skills documents and the class books from previous years. Concept maps are completed at the start of each new unit to ensure that the learning starts where necessary. Staff can go back to any relevant gaps in their class' learning.



Science knowledge organiser example- KS1

Plymouth Science

Knowledge Organiser

Year 1
Plants

VOCABULARY

Plant- a living thing that usually grows from the ground.

Flower- The part of a plant that blossoms.

Leaves- use light, air and water to make food for the plant.

Stem- Carries water and nutrients to different parts of the plant.

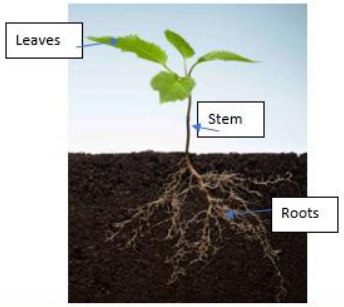
Roots- Holds the plant in the ground and absorbs water and nutrients from the soil.

Seed- production of flowering plant, develops into another plant.

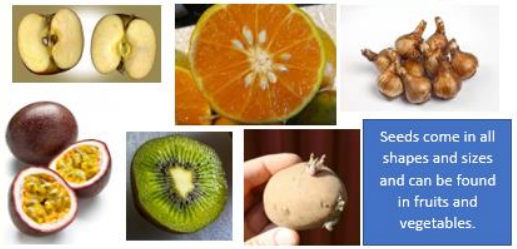
Bulb- round storage system in some plants e.g lily, daffodil.

Bud- compact growth on a plant which develops into a leaf, flower or shoot.

Blossom- a flower or mass of flowers on a tree or bush.



Seeds and bulbs



Seeds come in all shapes and sizes and can be found in fruits and vegetables.

Conditions for growth

Rain/water | Sunlight | Temperature

Air | Time | Nutrients

Knowledge Organisers held in back of the children's book to have easy access to.

Plymouth Science

Year 1
Plants

Parts of a flower

Common Flowers

Evergreen/deciduous trees

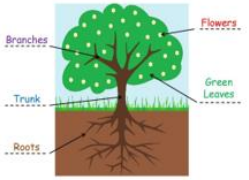
Evergreen

Keeps leaves all year round e.g. pine, cedar, Holly, fir.

Deciduous

Shed their leaves annually e.g. Oak, Maple, Hawthorn, Sycamore, Beech and Elm.

Structure of a tree



Types of leaves

Science knowledge organiser example- LKS2

Plymouth Science

Knowledge Organiser

Year 3
Forces

VOCABULARY

Forces- changes the motion of an object. Pushes and pulls in a particular direction.

Gravity- a force which pulls things towards the centre of the Earth. Discovered by Sir Isaac Newton.

Push- force which causes movement away from something.

Pull- force which causes movement towards something.

Contact force- requires contact to happen.

Non-contact force- doesn't require contact.

Attract- causes something to move towards.

Repel- causes something to move away.

Poles- Magnets have a North and South Pole.

Magnetic field- magnets electric charge

Sir Isaac Newton
1643-1727

An English mathematician, physicist, astronomer and author who is famous for his laws of motion, theory of colour and the discovery of gravity. Gravity is measured in Newtons (N)

John McAdam
1756-1836

John McAdam was a Scottish engineer who modernised the way we build our roads.

Albert Einstein
1879-1955

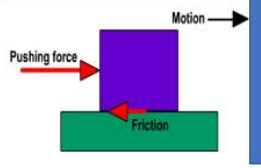
His theories of motion and forces started at five years old when his father gave him his first compass.

Knowledge Organisers held in back of the children's book to have easy access to.

Plymouth Science

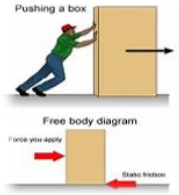
Year 3
Forces

Friction



Friction is a force **between two surfaces** that are sliding, or trying to slide, across each other. For example, when you try to push a book along the floor, friction makes this difficult.

What is a force?



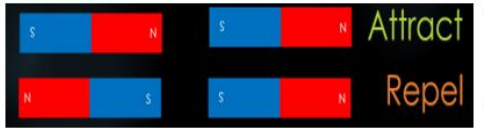
Forces are pushes or pulls.

Push and pull forces can make things start and stop moving, make a moving object change direction and change the shape of an object.

Magnets

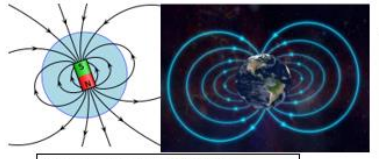
Magnets have North Poles and South Poles.

Magnets can come in all shapes, sizes and strengths.



Opposite poles attract. (Stick together)

The same poles repel. (Move away)



Magnets have magnetic fields.

The Earth is also a giant magnet. This is how compasses work.

Science knowledge organiser example- UKS2

Plymouth Science

Knowledge Organiser

Year 6
Electricity

VOCABULARY

Circuit- A path that an electrical current can flow around.

Symbol- a visual picture that stands for something else.

Cell- A single unit battery that stores chemical energy.

Battery- A collection of cells which stores chemical energy.

Current- The flow of electrons, measured in amps.

amps- How electric current is measured.

Voltage- The force that makes the electric current move through the wires. The greater the voltage the more current will flow.

Resistance- the difficulty that the electric current has when flowing around a circuit.

Electrons- Very small particles that travel around an electrical circuit.

Alessandro Volta.
1745-1827

Italian physicist, chemist and pioneer or electricity and power. He is credited as the inventor of the electric battery and discovered methane.

Components of a circuit

Wire

Cell

Switch

Bulb

Buzzer

Push Switch

Battery

Motor

These symbols can be used to complete an electrical circuit.

Knowledge Organisers held in back of the children's book to have easy access to.

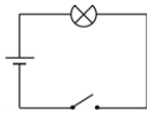
Plymouth Science

Thomas Edison
1847-1931

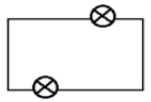
Lived in New Jersey in USA. Known as one of the greatest inventors in history. He invented the lightbulb, the phonograph (record and play sound) and an early video camera.

Electrical Conductors	Electrical Insulators
Copper	Rubber
Iron	Wood
Steel	Plastic
Silver	Paper
Gold	

Series Circuits



The light will not light until the switch is closed to complete the circuit.



This circuit will not work as there is no battery to provide energy.

Electrons flow through the circuit to make the circuit work.

Light is measured in Lux.

Voltage is measured in Volts. Using a volt metre.

The current is measured in amps using an ammeter.

Watt is a unit of power. (Rate of which energy is consumed).

Common Electrical Hazards

1. Overloading a plug extension socket
2. Exposed wires.
3. Damaged wall sockets.
4. Wires left along the carpet for people to trip over.
5. Placing metal into electrical appliances or open sockets.
6. Electrical appliances and wires near water.

NOTE: Water can be an excellent electrical conductor so it can be very dangerous to have electrical devices near water.

What is a battery?

A cell is a single unit that stores energy. A battery is a collection of cells that store energy.

Batteries have voltage which is the amount of force that makes the electrical current move through the wires. The voltage can be found on the battery.

One end of a battery is an anode and the other a cathode. Electrolytes (liquid) are found in a battery which irons flow through.

Renewable Energy

Renewable energy is **useful energy that is collected from renewable resources, which are naturally replenished on a human timescale.**

Solar

Wind

Hydro

Biomass

Whole School Science Events

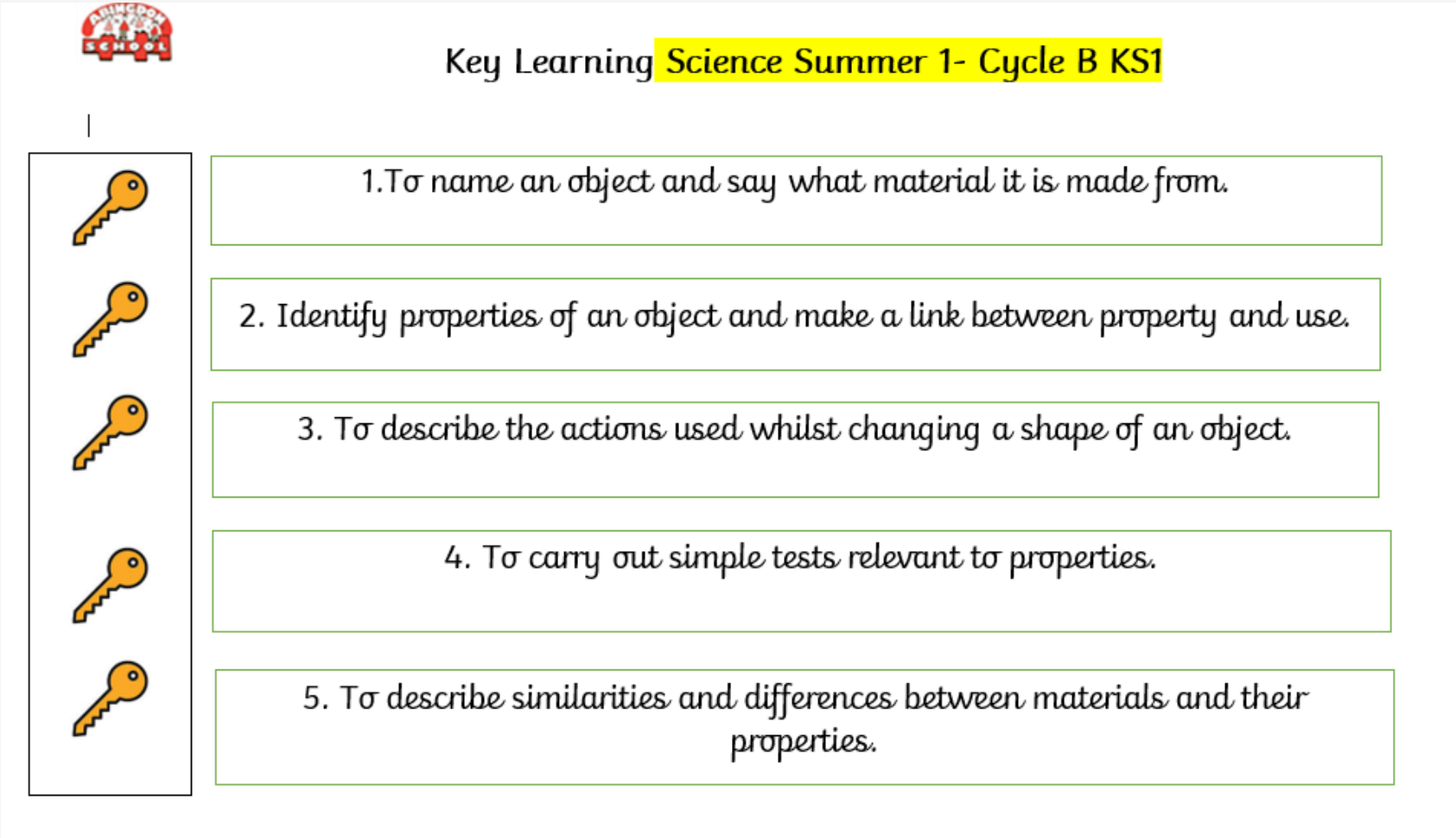
In previous years, we have had after school science clubs for children wishing to extend their science learning further in our Mad Science Club.

We also celebrate British Science Week and teach bespoke lessons that centre around the designated theme each year.

We have good links with Reddish Vale High School. Many classes have visited for science lessons linked to our topics which has been a fantastic opportunity for our children.

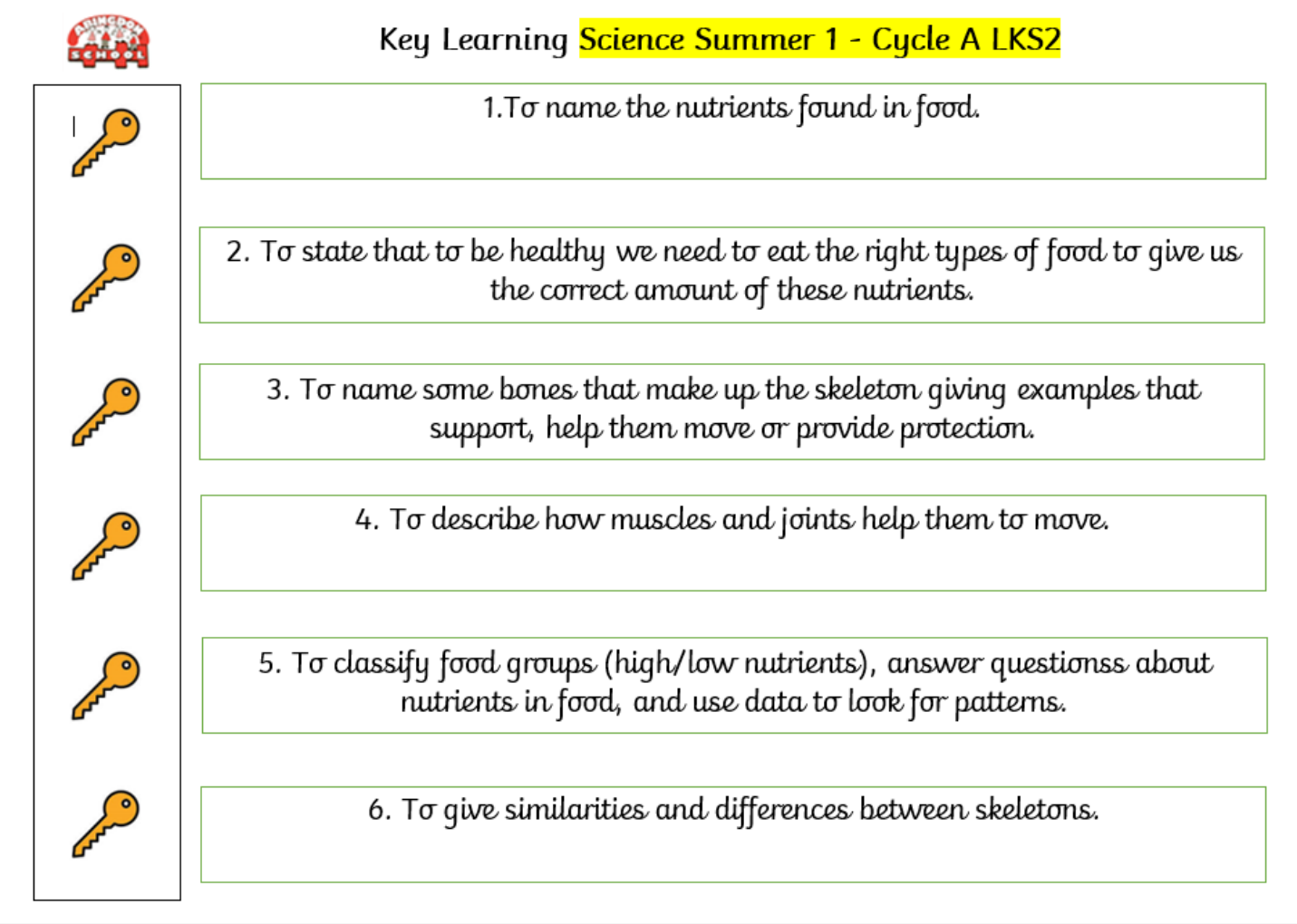
Key Learning poster example

In each subject we have identified the key learning we want the children to know. This is shared with the children with 'key' images.



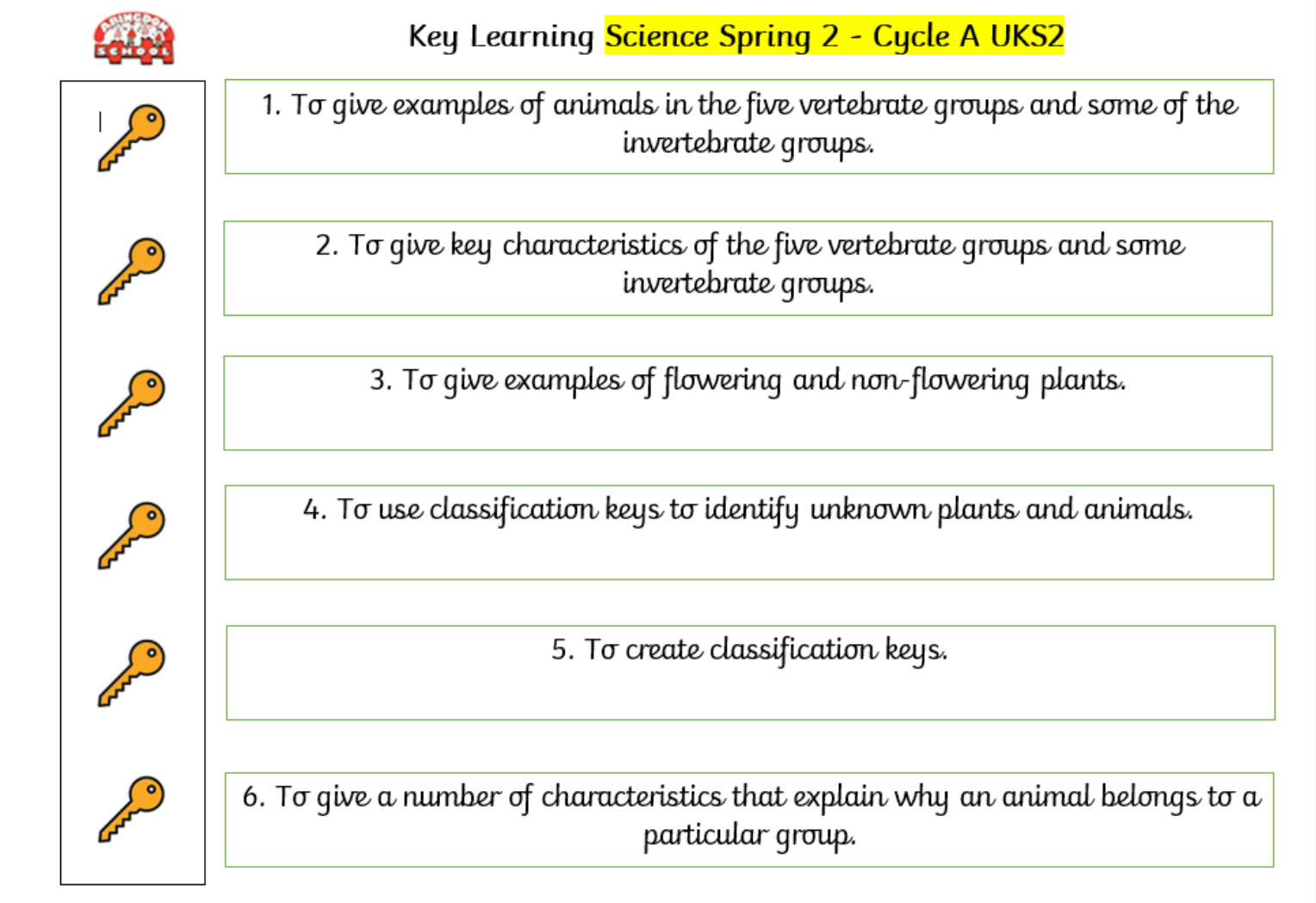
Key Learning poster example

In each subject we have identified the key learning we want the children to know. This is shared with the children with ‘key’ images.



Key Learning poster example

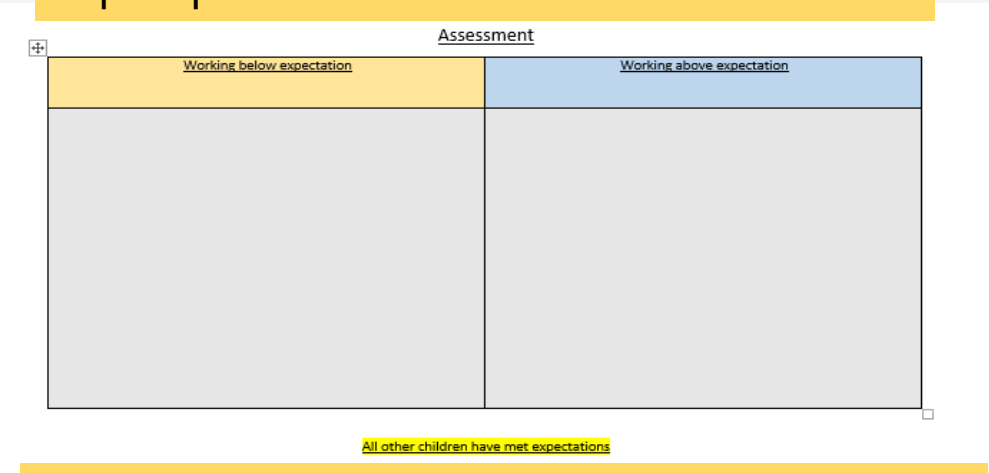
In each subject we have identified the key learning we want the children to know. This is shared with the children with ‘key’ images.



Assessment

We use a number of formative assessment strategies in science:
Live marking/feedback
Concept maps
Quizzes
Verbal questioning
Speaking and listening opportunities

Children add to their concept maps in green pen at the end of a unit to show what they have learned.
In KS2, children also complete an end of topic quiz in their books.



Working Scientifically Assessment.

Working towards ARE	Working AT ARE	Working at or above ARE
Draw conclusions based on straightforward evidence and current subject knowledge to support their findings,	Identify patterns and casual relationships that may be found in the natural environment.	Focuses on scientific reasons for overall pattern rather than a comparison. Adds additional information using own scientific knowledge. Use ideas from secondary sources to support their ideas, choosing appropriate websites.

We also have working scientifically descriptors for each lesson that support the teacher in making judgements as to whether children are working at age related expectations.

Challenge and Adaptations

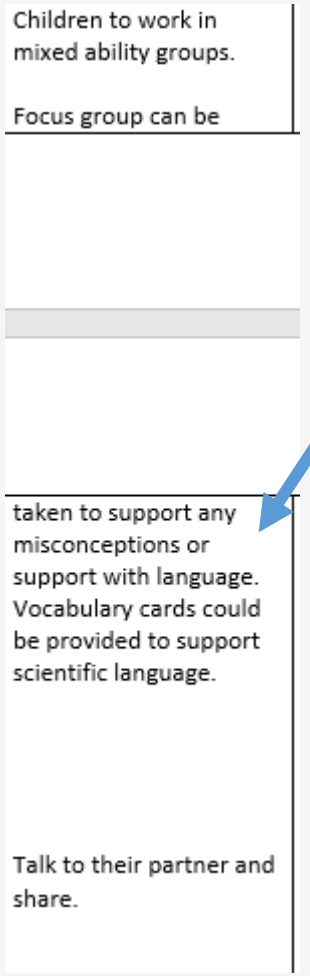
We believe that science should be accessible for all. Adaptations are planned into lessons. They might look like:

Use of additional resources – scaffolding (e.g. Visual representations – Dual coding, assisted technology)

Teacher expertise – e.g.; additional processing time, use of talk partners, scribing, modelling. I do , we do you do

Referring back to previous learning and vocabulary. Pre teaching vocabulary

Use of visits and visitors.



In each medium term plan, ways to support SEN children are identified in the Recording of outcomes (differentiated where appropriate) section. There are multiple options for how children can record or be supported throughout practicals.

High quality teaching benefits pupils with SEND

The 'Five-a-day' principle

The research underpinning the EEF's guidance report 'Special Educational Needs in Mainstream Schools' indicates that supporting high quality teaching improves outcomes for pupils with SEND. Five specific approaches—the 'Five-a-day' indicated below—are particularly well-evidenced as having a positive impact. Teachers should develop a repertoire of these strategies, which they can use daily and flexibly in response to individual needs, using them as the starting point for classroom teaching for all pupils, including those with SEND.

1 Explicit instruction

Teacher-led approaches with a focus on clear explanations, modelling and frequent checks for understanding. This is then followed by guided practice, before independent practice.

2 Cognitive and metacognitive strategies

Managing cognitive load is crucial if new content is to be transferred into students' long-term memory. Provide opportunities for students to plan, monitor and evaluate their own learning.

3 Scaffolding

When students are working on a written task, provide a supportive tool or resource such as a writing frame or a partially completed example. Aim to provide less support of this nature throughout the course of the lesson, week or term.

4 Flexible grouping

Allocate groups temporarily, based on current level of mastery. This could, for example, be a group that comes together to get some additional spelling instruction based on current need, before re-joining the main class.

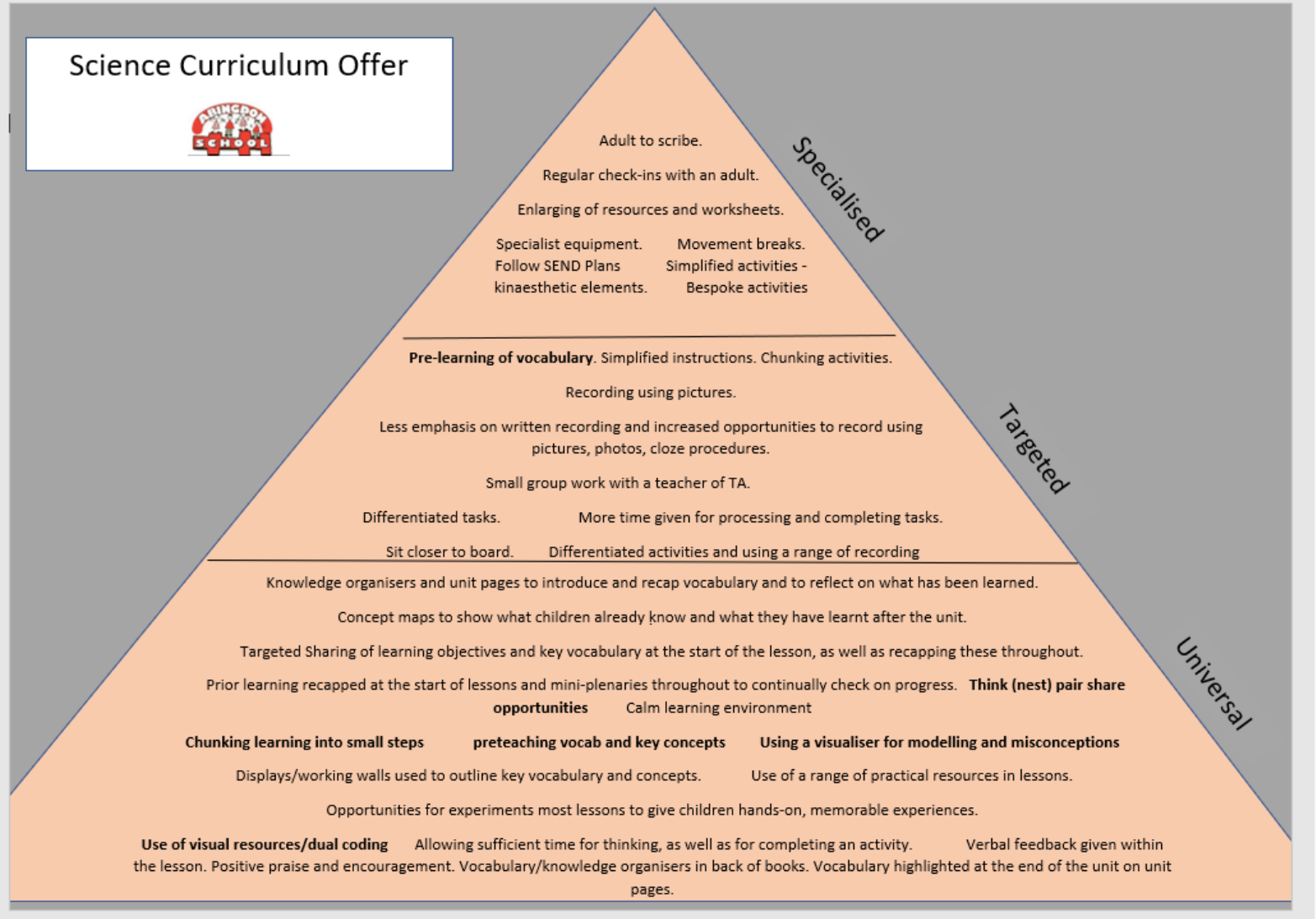
5 Using technology

Technology can be used by a teacher to model worked examples; it can be used by a student to help them to learn, to practice and to record their learning. For instance, you might use a class visualiser to share students' work or to jointly rework an incorrect model.

We use the Five a day principle alongside our own current focuses for adaptations:

1) "Nest/Pair/Share"
2) Pre-teaching of vocabulary and any key concepts
3) Visual resources and dual coding across the whole school
4) Chunking learning
5) Using the visualiser for modelling and misconceptions

Provision Pyramids



What do our children say about our Science curriculum?

I love science lessons, it's fun and you get to see things happening during experiments which proves what we're learning about! Lucas, Year 6

We do cool practical activities like eating different types of chocolate to describe the properties of different rocks! Holly, Year 4

We've been learning about which materials absorb water. We had to drop the water using pipettes and saw which ones soaked up the water. Then we had to squeeze the water out into a cup! Pearl and Edith, Year 1