Science Progression Document

Year 2

Topic 1: Chemistry **Materials** **Key Question: What are the properties of materials and how can they be changed?**	**Prior learning**: Year 1 – Children will have looked at different objects and the material from which they are made. They will have identified a variety of everyday materials and described their properties such as wood, plastic, glass, metal, water and rock. Children will also have compared and grouped together a variety of objects made from different materials. **Future learning**: Year 3 – Children will study rocks in more detail looking at the properties of different types of rock. Year 4 – Children will study 'States of Matter' where they will look at a variety of solids, liquids and gases. Year 5 – Children will study 'Properties and Changes of materials' where they will explore deeper into states of matter and reversible and irreversible changes. KS3 – Children will study states of matter and changes in more depth as well as focusing the use of different metals, polymers, ceramics and composites.	**Vocabulary:** Material wood, metal, plastic, glass, rubber, rock, fabric, paper and brick hard, soft, rough, bumpy, smooth, fragile, strong, heavy, light squashing, bending, twisting and stretching	**Cross Curricular links:** **PSHE:** Inspirational people
Children should know…	**Key Questions:**	**Recap:**	**I am thinking like a scientist…**
That materials are chosen for particular uses based on their properties.	Why are materials chosen for certain uses?	What do you recall about materials? Types and properties.	**Identify and compare** which materials are chosen for certain uses. **Compare** the use of different materials. **Classify** or group things according to their uses. **Explain** why a material has been chosen for a particular use and why it wouldn't be suitable.
Why a material might or might not be used for a specific job.	Which material will protect Humpty Dumpty?	What could these materials be used for? Why?	**Perform a test to explore a question.** **Investigate** a material that will be good to wrap around Humpty Dumpty. **Test** the materials to answer questions (Would it protect an egg? Would it be comfortable to wear? Is it heavy?).

That materials can be changed by squashing, bending, twisting and stretching.	How can we change materials?	Which material was best at protecting Humpty Dumpty? Why?	**Find out** how the shapes of solid objects made from some materials can be changed. **Perform** simple tests to find out how materials can be changed. **Observe** how materials can be changed.
That the type of surface affects how things move.	Which surface makes the car travel the furthest/fastest?	Recall how materials can be changed.	**Compare** movement on different surfaces. Set up a **fair test.** **Gather and record data** to help in answering questions. **Draw conclusions** from fair tests and **explain** what has been found out.
The life and work of Charles Macintosh. That Charles Macintosh invented waterproof material.	Who was Charles Macintosh?	Which materials was best for car? Why? Which one was worst? Why?	**Research** the life and work of Charles Macintosh.

Misconceptions:

Children may think of the word 'material' meaning fabric. Children need to know that material refers to the matter from which something is made. Children may also have misconceptions about different materials. They may think that if something is hard then it must be strong or if something is soft then it must be fragile. Glass is hard but very fragile whilst fabric is soft but can be strong.

Key vocabulary to Explain (Pre-Teach):

Material

Types of material such as: wood, metal, plastic, glass, rubber, rock, fabric, paper and brick

Words to describe materials such as: hard, soft, rough, bumpy, smooth, fragile, strong, heavy, light

Stretch and challenge:

- create houses from different materials to identify the best material
- STEM activities such as building the longest bridges or the tallest tower from a selection of given materials
- investigating different spoons (plastic, metal and wooden) to decide which is best (are they better suited for different activities?)
- exploring different metals or different fabrics to show that they are not all the same
- read more stories to conduct investigations to find the best material e.g. Princess and the Pea (which material would make the best mattress?), Goldilocks and the Three Bears (which material would make the strongest chair/comfiest bed/keep the porridge warm?)

1. To recall parts of a plant
2. To recall the main animal groups and features of each group.

Topic 2: Biology **Animals including humans** **Key Question: How do animals, including humans grow and change?**	**Prior learning** Year 1 – Children will have looked at different parts of the human body and the related sense. **Future learning:** Year 3 – Children will study the importance of nutrition in humans and other animals. Year 4 – Children will study the seven life processes again and explore digestion in humans. Year 5 – Children will study life cycles and reproduction. Year 6 – Children will study healthy and unhealthy habits. KS3 – Children will study reproduction in more detail	**Vocabulary** Diet, exercise hygiene illness, disease, medicine, off-spring, seven basic needs movement, respiration sensitivity, growth, reproduction, excretion, nutrition, survive.	**Cross Curricular links:** **PSHE:** Healthy lifestyles and looking after our bodies.
Children should know…	**Key Questions:**	**Recap:**	**I am thinking like a scientist…**
The basic needs of animals, including humans, for survival (water, food and air).	What do humans need?	Recall parts of the body.	**Explain** the difference between needs and wants. **Identify** the basic needs of animals.
That animals, including humans, have offspring which grow into adults. The basic stages in a life cycle of animals (humans, butterflies, frogs).	What are offspring? How do animals change as they change into adults?	What do we need to survive?	**Observe** the changes in animals and their offspring. **Identify** the offspring that comes from different animals. **Sort and label** a diagram to show the life cycle of a butterfly, frog, human. **Explain** how humans change as they grow into adults.
That our bodies change in different ways as we grow.	Do we all grow the same?	What is the lifecycle of a…? What is offspring?	**Gather and record data** to answer the question, 'Do our feet get bigger as we get older?'
Why exercise is important for humans.	Do we need to exercise?	How do we change?	**Observe** the effect of exercise on the human body. **Perform simple tests.** **Gather and record data** to help in answering questions.
Why a balanced diet is important for humans.	What is a healthy diet?	What does exercise do for us?	**Explain** what a balanced diet is and why it is important. **Label** a balanced plate.

Why good hygiene is important.	Why do we need good hygiene?	What do we need for our diet to be 'balanced?'	**Identify** ways of maintaining good hygiene. **Explain** why we need to have good hygiene.
Medicines can come in all different shapes, sizes and colours but they're all used for the same purpose — to make you feel better when you're ill. Medicines can cause harm if they are not used properly. Too much of a medicine can be harmful, and old or outdated medicines may not work or can make people sick. Taking the wrong medicine or medicine prescribed for someone else is dangerous.	How can we feel better when we are ill?	What can we do to have good hygiene?	**Identify** some medicines. **Explain** how medicines can be used. **Explain** how medicines can cause harm.

Misconceptions:

Children might need a thorough explanation of the difference between a "need" and a "want" – needs are things that humans cannot survive without.
Children may have heard the word diet in a negative way when someone is trying to lose weight. Children need to be told that diet just means the food that someone eats.
Children may not understand that medicine must only be taken when you are ill and a trusted adult has given it to you. Certain medicines might taste nice but you cannot digest them if you are not ill.

Key vocabulary to Explain (Pre-Teach):

basic needs – the things humans need to survive
diet – the food we eat
exercise – moving our bodies
hygiene - keeping clean
illness – when we do not feel well/ feel sick/ have a disease
medicine – something we might take to feel better
offspring – the babies of an animal
seven basic needs – movement, respiration, sensitivity, growth, reproduction, excretion and nutrition
survive – to live

1. What is a Carnivore, Herbivore and Omnivore? Can you name any?
2. Can you recall the four seasons? Can you describe changes which occur?

Stretch and challenge:

- plan and cook a healthy meal (soup, salad etc)
- plan and carry out another investigation to see if we all grow the same
- research the diets of other animals
- research the offspring of other animals
- compare the life cycle of different animals
- create a model showing the different stages of a chosen animal's life cycle

Topic 3: Biology **Living things and their habitats.** **Key Question: Can I describe different habitats and what they provide for things which live there?**	**Prior learning:** Year 1 – Children studied different animals and grouped them based on their features and diet **Future Learning:** Year 3 – Children will study the nutrition of animals. Year 4 – Children will study environment threats to habitats and construct and interpret a variety of food chains. KS3 – Children will study interdependence in ecosystems and how organisms can affect their environments.	**Vocabulary** alive dead living Life processes Depend Survive Habitat, microhabitat conditions, adapted food chain, omnivore herbivore, carnivore	**Cross Curricular links:**
Children should know…	**Key Questions:**	**Recap:**	**I am thinking like a scientist…**
The difference between living, dead or never lived.	Is it living, dead or never lived?	Recall animals studied in Year 1 and where they lived.	**Identify and classify** a range of pictures to show if they are living, dead or never alive. **Compare the differences** between things that are living, dead and have never lived.
Different microhabitats in local area and identify living things that might live there (flower beds, under logs/rocks, bushes, in the grass, pond)	What is a microhabitat?	Define living, dead, never been a live. Sort things into these groups.	**Identify and classify** different microhabitats. **Observe** different microhabitats to see the living things that live there. **Use simple equipment** such as magnifying glasses and pooters.
Some large habitats around the world (mountain, polar, jungle, sea, desert, savannah). Differences between habitats around the world. Some living things which might live in different habitats.	How are habitats different around the world?	Organise animals found in different microhabitats. Describe conditions.	**Identify and classify** different habitats around the world. **Compare the differences and similarities** between the different habitats. **Identify** animals that live in different habitats.
How to plan and carry out an investigation to find out which conditions woodlice prefer.	What conditions do woodlice prefer?	Organise animals into different habitats. Describe features of the those habitats.	**Predict** which area the most woodlice will go to. **Investigate** which condition woodlice prefer (Dark and dry, Dark and damp, Bright and dry or Bright and damp)

			Observe closely and use observations to **answer questions.** **Use observations** and ideas to suggest **answers to questions.**
Some animals are better suited to the habitat they live in because they have special features. That most living things live in a habitat to which they are suited. That a specific habitat provides for the basic needs of things living there (camel, polar bear and giraffe).	How are living things adapted to their habitat?	Which conditions do woodlice prefer? Why do you think this?	**Label** animals to show how they have adapted to their habitat. **Explain** how a specific habitat provides for the things which live there.
Some different sources of food for animals. What a simple food chain looks like and how it works.	What is a food chain?	How is a camel/polar bear adapted to its habitat?	**Draw simple diagrams** to show food chains.
The life and work of Charles H Turner. That Charles H. Turner discovered that insects can hear.	Who is Charles H Turner?	Draw a food chain and explain what it shows.	**Research** the life and work of Charles H Turner.

Misconceptions:

Children may not fully understand that some of the food we eat used to be living animals that are now dead.
Children may have misconceptions about where animals live as they may have only seen some of these animals in the zoo so might not realise where their habitat would be in the wild.

Key vocabulary to Explain (Pre-Teach):

alive – something that is living
dead – something that was living but is not anymore
living – something that is alive
habitat – the place in which a living thing lives
microhabitat – a small habitat **conditions** – the state of something
adapted – how something is adjusted
food chain – a series of living things that feed from each other
omnivore – an animal that eats both plants and meat **herbivore** – an animal that just eats plants
carnivore – an animal that just eats meat

1. Name the senses. What parts of the body are associated with them?
2. Recap materials and their properties.

Stretch and challenge:

- Create their own living, dead or never alive quiz.
- Research different plants that live in habitats.
- Create their own habitat picture including animals and plants that live there.
- Go on a local habitat walk in another area.
- Research other animals and their adaptations.
- Find out what other animals eat in different habitats and construct a food chain.
- Research and construct the longest food chain you can.

Topic 4: Biology **Plants** **Key Question: Do I know how plants grow and stay healthy?**	**Prior learning:** EYFS – Children learnt about growing plants during signs of Spring topic. They planted cress/sunflowers and watched them grow. **Year 1 –** Children learnt about different plants and trees and described the basic structure. **Future Learning:** Animals and humans are studied in each year group. **Year 2** – Children will study how plants grow from seeds and bulbs in more detail. They will also look at what plants need to grow and stay healthy. **Year 3** – Children will learn about the functions of the different parts of the plant, find out how flowers play a part in the life cycle of the plant and investigate how water is transported in plants. **Year 5** - Children will look at the life cycle of a plant including the life process of reproduction. **KS3** - Children will study plants in much closer detail, observing the cell structure and how plants create their own food through photosynthesis.	**Vocabulary** plant tree flower roots stem leaf seed bulb germination sprouts shoot seed dispersal temperature nutrition	**Cross Curricular links:** PSHE: Looking after the world we live in- Protecting the bees.
Children should know…	**Key Questions:**	**Recap:**	**I am thinking like a scientist…**
That fruit, vegetables and herbs are a type of plant that we eat.	Which plants can we eat?	Parts of a plant. What do plants need.	Identify and classify different plants into groups to show which ones can be eaten. Label a diagram of a plant to show which parts can be eaten.
That there are similarities and differences between different seeds.	Are all seeds the same?	Alphabet of plants we can eat.	Observe and describe how seeds and bulbs grow into mature plants. Observe closely with magnifying glasses what different seeds look like. Compare similarities and difference between different seeds.
That plants need water, light and a suitable temperature to grow and stay healthy.	What do plants need?	Recall different seeds- match up.	Describe how plants need water, light and a suitable temperature to grow and stay healthy. Explain how to look after a plant.

How to plan a fair investigation to find out where the best place for a seed to grow is.	Where will they grow?	What do plants need to grow?	Set up a comparative test to show that plants need light and water to stay healthy. Observe and record, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb. Gather and record data to help answering questions.
How plants grow and change throughout their life cycle.	How do plants grow and change?	What would happen if a plant did not have: water, light etc..	Observe and describe how seeds and bulbs grow into mature plants. Order and label a diagram showing the life cycle of a plant.
The life and work of George Washington Carver. That George Washington Carver discovered over 300 uses for peanuts.	Who is George Washington Carver?	Life cycle of plant recap.	Reseach the life and work of George Washington Carver.

Misconceptions:

Children may not realise that plants are living things and that they can die. They may think only things with faces and brains are alive.
Children may not know that plants have roots in the ground that help the plant.
Children may think that all seeds look the same, so we need to make sure that we allow them to explore and observe a variety of seeds and bulbs.

Key vocabulary to Explain (Pre-Teach):

plant – a living organism
tree – a woody plant
flower – the seed-bearing part of a plant that is usually surrounded by brightly colouredpetals
roots – the part of the plant that attaches into the ground for support and nutrient collection
stem – the main stalk of a plant
leaf – part of a plant that is typically flat and hangs off the stem
seed – a small part of a plant that can grow another plant
bulb – a fleshy base of a plant that can grow another plant

1. Describe plant lifecycle.
2. Why is this animal a: fish, amphibian, reptile, bird or mammal?

Stretch and challenge:

- plant a variety of different plants and compare what they look like and how they grow
- take part in looking after the school garden/allotment (if you have one)
- invite a gardener in for the children to ask questions
- look at seeds of different fruits
- investigate different fruits and vegetables – do they all taste the same?
- find out if other animals eat different plants