Gomer Infant School

Science - Progression of skills and knowledge

Together we shine

Gomer Infant School

This document outlines the progression of skills for Science from Year R to Year 2. By progress, we mean that children know more, remember more and are able to do more of what was intended in the curriculum, this approach logically sequences the learning for children and allows them to build, recall and apply their knowledge and skills. The knowledge and skills framework offers clear learning progression in a subject, with incremental steps leading to well-defined endpoints.

Our subject leaders talk confidently about implementation, endpoints, opportunities for recall and how we support children to 'know, remember and understand' the knowledge and skills within our curriculum.

Science

Working Scientifically skills progression	Reception Introducing skills of…	Year 1 Developing the skill of…	Year 2 Confidently…
PLAN Ask questions, make predictions, decide on the method and equipment	Listen attentively and respond to what they hear with relevant questions	**Asking simple questions and recognising that they can be answered in different ways**	**Asking simple questions and recognising that they can be answered in different ways**
DO Carry out an enquiry using equipment Measuring (linking to Maths progression)	Show an ability to follow instructions involving several ideas or actions ⍰ be confident to try new activities… ⍰ use a range of small tools… ⍰ safely use and explore a variety of materials, tools and techniques	**Observing closely, using simple equipment** **Performing simple tests** **Identifying and classifying** Measure using non-standard units of measure. (ruler / cubes / thermometer / hands / egg timers)	**Observing closely, using simple equipment** **Performing simple tests** **Identifying and classifying** Measure using standard units where all the numbers are marked on the scale. length (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) Rulers / measuring cylinders / thermometers / scales
RECORD Use drawings, tables or graphs to note observations and measurement (Linking to Statistics progression)	Explore the natural world around them, making observations and drawing pictures of animals and plants	**Gathering and recording data to help in answering questions** Use text, simple labelled diagrams, pictures, photographs, simple prepared tables to record their observations Basic classification – grouping and matching	**Gathering and recording data to help in answering questions** Use text, block diagrams, simple labelled diagrams, pictograms, pictures, photographs, tally charts, simple tables to record their observations

EVALUATE Interpret, communicate and evaluate results	Participate in discussions, offering their own ideas, using recently introduced vocabulary offer explanations for why things might happen… express their ideas and feelings about their experiences know some similarities and differences… drawing on their experience	**Using their observations and ideas to suggest answers to questions**	**Using their observations and ideas to suggest answers to questions**

	Animals
Year R	ELG: The Natural World Children at the expected level of development will: - Explore the natural world around them, making observations and drawing pictures of animals and plants
	Identify and name basic parts of the human body. • Name a range of animals. • Understand that animals need to be treated carefully and with respect. • Develop language to describe different animals. • Recognise that animals move differently and eat different foods. • Recognise that young animals are different to the adult animal. Recognise that different animals live in different places

BIOLOGY
Animals (including humans)

Year 1

Substantive Knowledge from Learning Journeys

Animal Survival

Knowledge Block 1- Feeding for survival

- Animals are groups of **organisms** that need to consume food to survive.
- Food provides **energy** and the building blocks of **growth**.
- There are many different groups of animals including **fish, amphibians, reptiles, birds and mammals**. They have different structures, and they eat different types of foods.
- The structure of a variety of common animals varies **Mammals** have hair/fur and give birth to live young, **fish** can breathe underwater using gills, **birds** have feathers, beaks and wings. Females lay eggs. Most birds can fly, **reptiles** are air breathing and have scaly skin and lays eggs, and **amphibians** have smooth slimy skin and live on land and in water.
- Some eat other animals (**carnivores**), and others only eat vegetables (**herbivores**), and some like to eat both plants and meat (**omnivores**)
- Common animals that are **carnivores** include lions, cats, sharks and snakes
- Common animals that are **herbivores** include cows, horses, sheep, elephants and deer
- Common animals that are **omnivores** include humans, bears, monkeys and seagulls

Knowledge Block 2- Moving for survival

- Animals must move to get their food
- They will move in different ways to get their food
- Animals that eat other animals are called **predators**
- Animals that are eaten by other animals are called **prey**
- Animals feeding relationships can be illustrated in a **food chain**

Knowledge Block 3- Sensing for survival

- The five sense organs are the **eyes** (for seeing), **nose** (for smelling), **ears** (for hearing), **tongue** (for tasting), and **skin** (for touching or feeling).
- Animals have senses to help them survive
- Animals have developed a range of ways to find prey or avoid being eaten

National Curriculum Statutory Requirement

Year 1 Animals, including humans

Pupils should be taught to:

- *identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals*
- *identify and name a variety of common animals that are carnivores, herbivores and omnivores*
- *describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)*
- *identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.*

Year 2 Animals, including humans

Pupils should be taught to:

- *find out about and describe the basic needs of animals, including humans, for survival (water, food and air)*

	Plants
Year R	ELG: The Natural World Children at the expected level of development will: - Explore the natural world around them, making observations and drawing pictures of animals and plants
	Know the difference between a tree and a plant. • Observe growing plants closely and talk about the changes they notice. • Talk about what is the same and different about different plants. • recognise that different plants grow in different places Recognise some plants can be eaten

BIOLOGY
Plants

	Substantive Knowledge from Learning Journeys	National Curriculum Statutory Requirement
Year 1	**Plants** **Knowledge Block 1- Where do plants come from** • A **seed** contains a miniature plant that can develop into a fully grown plant. • A **bulb** has underground vertical shoots which already has modified **leaves** • Seeds and bulbs need water to grow but most do not need light (**germination**) • Seeds and bulbs have food stores inside them to help the plant start to grow. **Knowledge Block 2- Plant survival** • To survive plants, need to get water, light, and avoid being eaten **Knowledge Block 3- How plants get what they need to survive** • A seed produces **roots** to allow water to get into the plant. • A seed produces **shoots** to produce leaves to collect the sunlight. • A basic plant structure can include leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem	***Year 1 Plants*** ***Notes and guidance (non-statutory)*** *Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted.* *They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, **bulb, seed**, trunk, branches, stem).* ***From Year 2*** *Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.*
Year 2	**New Plants** **Knowledge Block 1- What flowers are for** • All **flowering plants** make seeds (**reproduction**) that can grow (**germinate**) into new plants • Plants need water, light and a suitable temperature to grow and stay healthy **Knowledge Block 2- What happens after a plant has produced seeds** • Some plants die after it has produced its seed and sometimes the plant lives for many **generations** producing seeds each year	***Year 2 Plants*** ***Pupils should be taught to:*** • *observe and describe how seeds and bulbs grow into mature plants* • *find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.* ***Notes and guidance (non-statutory)*** *Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for **germination**, growth and survival, as well as to the processes of **reproduction** and growth in plants.*

BIOLOGY
Variation and Evolution

	Substantive Knowledge from Learning Journeys	National Curriculum Statutory Requirement
Year 1	**Habitats** **Knowledge Block 1- Adapted to survive** • There is variation in all living things • Animals and plants live in a variety of different places called habitats • Animals and plants have adapted to survive in different habitats • Wild plants such as ferns, daisies, nettles and dandelions grow randomly. • Garden plants such as roses, tulips, poppies, daffodils are planted intentionally. **Knowledge Block 2- Plants adaptations for survival** • Plants have specific adaptations for survival • To survive they need to get water, light, and avoid being eaten **Year 1- Seasons** **Knowledge Block 1- Surviving the changing seasons** • There are four seasons, **Spring, summer, autumn** and **winter** • Each season is about three months long • In Spring, young animals like lambs and chicks are born, the flowers bloom and the weather starts to become warmer. • In autumn, the leaves fall off the trees and the amount of time we have in the day becomes less. • Winter has the shortest amount of time during the day and the weather is at its coldest. • In summer the trees are full of green leaves and the weather is at its warmest. (THIS SUBSTANTIVE KNOWLEDGE APPEARS IN THE PROGRESSION WITHIN THE PHYSICS- EARTH AND SPACE) • Animals and plants have adapted ways of surviving the changing seasons • These include **hibernating**, storing food, fattening up, **migration**, loss of leaves • Trees can be either **evergreen** or **deciduous**. • **Evergreen** trees keep their green leaves all year round. • **Deciduous** trees lose their leaves every autumn.	***Year 1 Plants*** ***Pupils should be taught to:*** • *identify and describe the basic structure of a variety of common flowering plants, including trees.* ***Year 1 Seasonal Changes*** ***Pupils should be taught to:*** • *observe changes across the four seasons* • *observe and describe weather associated with the seasons and how day length varies* ***Year 1 Plants*** ***Pupils should be taught to:*** • *identify and name a variety of common wild and garden plants, including deciduous and evergreen trees*
Year 2		

	Earth
Year R	ELG: The Natural World Children at the expected level of development will: 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.
	Identify day and night and talk about how they are different Name the 4 seasons Talk about how seasons are different Recognise that habitats change with the season

PHYSICS
Earth & Space

	Substantive Knowledge from Learning Journeys	*National Curriculum Statutory Requirement*
Year 1	**Year 1- Seasons** **Knowledge Block 1- Surviving the changing seasons** • There are four seasons, **Spring, summer, autumn** and **winter** • Each season is about three months long • In Spring, young animals like lambs and chicks are born, the flowers bloom and the weather starts to become warmer. • In autumn, the leaves fall off the trees and the amount of time we have in the day becomes less. • Winter has the shortest amount of time during the day and the weather is at its coldest. • In summer the trees are full of green leaves and the weather is at its warmest. • Animals and plants have adapted ways of surviving the changing seasons • These include **hibernating**, storing food, fattening up, **migration**, loss of leaves • Trees can be either **evergreen** or **deciduous**. • Evergreen trees keep their green leaves all year round. • **Deciduous** trees lose their leaves every autumn. (THIS SUBSTANTIVE KNOWLEDGE APPEARS IN THE PROGRESSION WITHIN THE BIOLOGY- VARIATION AND EVOLUTION)	***Year 1 Seasonal Changes*** ***Pupils should be taught to:*** • *observe changes across the four seasons* • *observe and describe weather associated with the seasons and how day length varies* ***Year 1 Plants*** ***Pupils should be taught to:*** • *identify and name a variety of common wild and garden plants, including deciduous and evergreen trees*
Year 2		

PHYSICS
Forces

	Substantive Knowledge from Learning Journeys	*National Curriculum Statutory Requirement*
Year 1		
Year 2	**Year 2- Pushes and pulls** **Knowledge Block 1** • Objects can move (be in **Motion**) in various ways-roll, slide and bounce **Knowledge Block 2** • The **pushing** or **pulling** of an object can affect its motion. • Pushing or pulling can do three things, **slow down, speed up or change the direction** of an object. **Knowledge Block 3** • The larger the push/pull the bigger the effect on motion	***Year 3 Forces and Magnets*** ***Pupils should be taught to:*** • *compare how things move on different surfaces* • *notice that some forces need contact between two objects* ***HIAS Science team guidance*** The first-time forces are mentioned in the National Curriculum is in year 3 in the topic on magnets. Magnets are a non-contact force which may appear almost magical if children have not first had a firm grounding in the idea that objects can be made to move differently through the physical acts of pushing and pulling. For this reason, we have constructed a topic that we think should be taught in key stage one that teaches the idea of contact forces changing how things move.

	Materials
Year R	ELG: The Natural World Children at the expected level of development will: ; 15 - 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.
	• Name some materials that they are using. • Recognise that different objects are made from different materials. • Explore different materials and how their shapes can be changed. • Develop language to describe different materials. • Talk about how materials are the same and different.

CHEMISTRY Materials		
	Substantive Knowledge from Learning Journeys	*National Curriculum Statutory Requirement*
Year 1	**Describing Materials** **Knowledge Block 1- The big idea about materials** • There are many different materials that have different observable **properties** • Materials that have similar properties are grouped into **metals, rocks, fabrics, wood, plastic and ceramics** (including glass).	***Year 1 Everyday Materials*** ***Pupils should be taught to:*** • *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* • *compare and group together a variety of everyday materials on the basis of their simple physical properties.*
Year 2	**Changing Materials** **Knowledge Block 1- How materials can change** • The properties of a material determine whether they are **suitable** for a **purpose**. • Materials can be **changed** by **physical force** (twisting, bending, squashing and stretching). (The purpose of the activities within this learning journey is for children to understand why we choose certain materials to do certain jobs. Children will plan how to test materials (wood, metal, plastic, glass, brick, paper, rock, cardboard))	***Year 2 Uses of everyday materials*** ***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*

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