Science Progression at Meanwood C of E Primary School

CURRICULUM SUBJECT:	Science	SUBJECT LEADS:	Jamie Chapman

What are the Y6 end of school end goals?	• To know the difference between physics, biology and chemistry and the part they play in our understanding our world • To be able to apply enquiry skills to a range of scientific concepts • To ask questions about the world around them and find scientific answers. • Be inspired by scientists- both every day and famous-and understand the importance of scientific advances. • Understand the life of humans, plants and animals: their needs, their habitats and how these have changed over time. • To develop a good understanding of the human body and impact of lifestyle on health and body functions. • To have respect and understanding of global or local the environment and the impact of humans on the world.

How is the curriculum at Meanwood C of E Primary School sequenced towards these end points?

EYFS

End of unit end points:

<u>Autumn 1 – I am special, I am Unique!</u>
Name the different members of my family.
Know that we often have similar features to our family members.
Understand what makes my family unique.

<u>Autumn 2- How does Meanwood Park change in autumn?</u>
Know the names of the four seasons.
Know the wildlife in the local area.
Know what a habitat is and that a habitat needs to provide food, shelter and water.
Know some animals hibernate in winter, others migrate and others adapt to survive winter.

<u>Spring 1 – Plastic Pollution in our oceans</u>
Define the sea and ocean and identify animals that live there.
Know some key features of marine animal groups (fish, mammals, reptiles, invertebrates and crustaceans).
Know what causes pollution on our oceans.
Know why it's important to reuse and recycle plastic.
Know how e can help to reduce pollution.

<u>Spring 2 – Keeping ourselves safe and healthy</u>
Name fruits and vegetables and explain the difference between them.
Food and drink give us energy and help us grow.
Eating the right balance of food is important from the food groups.
The importance of exercise and the effects on the body.
Daily habits: washing hands, keeping clean, bathing, clean clothes, getting enough sleep, brushing your teeth twice a day.
Ways to stay safe outdoors.

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Summer 1 – British Farms
Name British farm animals and their offspring, including calf, piglet, lamb, kid, foal, chick, duckling, gosling.
Describe what young farm animals need to grow (clean, food, water, warmth, bed).
Name items we get from a farm (plant and animal produce).
Find out about life cycles (chickens, frogs, butterflies).
Plants/crops need three things to grow: water, soil and sunlight.

Summer 2

Year 1		Year 2
Animals including humans	**Unit end points:** • To know the main body parts of the human body. • To know the names of the five senses and what they do. • To know the different groups/types of animal including birds, fish, amphibians, reptiles, mammals and invertebrates and humans as animals. • To know what an omnivore, herbivore and carnivore are and be able to group animals. • To know how to care for animals Working scientifically: • Make first hand close observations of animals from each of the groups.	**Unit end points** • Animals and humans have offspring that grow into adults. • The basic needs for humans and animals for survival (water, food and air.) • To know the processes of reproduction and growth in animals but NOT to understand how reproduction occurs. • To appreciate the importance of exercise and nutrition for humans. • To identify young and adult animals and humans. • To know the importance of exercise and hygiene. • To know the right amount of different types of food to eat to remain healthy. (fruit, veg, meat, milk etc- not the different food groups). Working scientifically: • Classify food in a range of ways, including using the Eatwell guide. • Investigate washing hands.

	• Take measurements of parts of the body and present results in a table to interpret.	• Describe, using diagrams, the life cycle of some animals, including humans, and their growth to adults e.g. by creating a life cycle book for a younger child. Measure/ observe how animals, including humans, grow
Living things and their habitats		**Unit end points:** • Differences between things that are living, dead and things that have never been alive. • Identify that most things live in habitats. • Describe how different habitats provide for the basic needs of different kinds of animals- including micro habitats. • Identify and name a variety of plants and animals in their habitats. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.
Plants	**Unit end points:** • To know the basic lifecycle of a plant and what a plant needs to grow. • To know how to plant a seed/bulb. • To know how plants, change through the seasons. • To know why plants are suited to their environment.	**Unit end points:** • Describe how seeds and bulbs grow into mature plants. • To know plants need water, light and a suitable temperature to grow and stay healthy. • To know the more detailed lifecycle of a plant: seed-plant-flower-fruit-seed. • To know how outside environments, affect plant growth.

	• Point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems.	• To know the requirements for germination, growth and survival, as well as the processes of reproduction and growth in plants
Forces and magnets		
Light and sound		
Electricity		
Seasons/Earth and space	**Unit end points:** • To know the names of the four seasons. • To know how the four seasons differ from one another. • To know how day length varies. • To know which type of weather is most commonly associated with each season. **Working scientifically:** • Gather and record data about weather conditions in autumn, drawing on observation and using simple equipment (such as a container to measure rainfall). • Use data to create a pictogram and use this to describe changes in day length over the seasons.	
Everyday materials, rocks and soils and states of matter	**Unit end points:** • To know what everyday objects are made from.	**Unit end points:**

	• To know to name a variety of materials including wood, plastic, glass, metal, water and rock. • To know the physical properties of everyday materials. • To know how the shapes of solid materials can be changed by squashing, bending, twisting and stretching. **Working scientifically:** • Compare and group together a variety of everyday materials on the basis of their simple physical properties. • Classify objects made of one material in different ways e.g. a group of objects made of metal. • Chosen an appropriate method for testing an object for a particular property.	• Identify and compare the suitability of materials for everyday use, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • How solid objects can change shape by squashing bending, twisting and stretching. • Identify what material things have been made from and why. • Make links based on knowledge of properties between the material and its purpose: some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors and telegraph poles). Different materials can be used for the same things (spoons can be made from plastic, wood, metal, but not normally from glass) **Working scientifically:** • Classify and sort materials by their properties e.g. manmade, natural • Investigate and observe what happens to different materials during testing and use this to inform explanation of their properties. • Investigate which materials are fit for a purpose e.g. What is the best material for an umbrella? • Explain from their observations how materials change when a force is exerted on them.

		• Record class data in a table and draw simple conclusions from the findings.
Year 3		**Year 4**
Animals including humans	**Unit end points:** • Identify that animals including humans need the right types and amount of nutrition and they cannot make their own food; they get nutrition from what they eat. • To know the different food groups. • To know that protein is good for growth, carbohydrates for energy and fruit and vegetables for vitamins and minerals. • To know the balance of nutrition in a healthy diet. To know that the lack of a nutrient can cause ill health. • Humans and animals have skeletons and muscles for support, protection and movement. • To know basic bones in the body. • To know what the skeleton protects. • To know muscles are for support. Working scientifically:	**Unit end points:** • Know the different organs and describe the simple functions of the basic parts of the digestive system in humans: mouth, oesophagus, stomach, large intestine and small intestine • Know the different types of teeth in humans and their simple functions. • Know how the food passes through the body, and how waste is excreted. • Know that an animal that is eaten by another is the prey, and the animal that is eating another is the predator. • Know that the first consumer in a food chain is the primary consumer, and the second is the secondary consumer and above that is the tertiary. Working scientifically: • Construct and interpret a variety of food chains, identifying producers, predators and prey. • Identify differences, and similarities of different types of teeth according to herbivore, omnivore and carnivore.

	• Use secondary sources to find out the types of food that contain different nutrients. • Classify food in a range of ways • Use food labels to explore the nutritional content of a range of food items. • Compare, contrast and classify skeletons of different animals.	• Label the different parts of the digestive system. • Record the teeth in their mouth
Living things and their habitats		**Unit end points:** • Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Recognise the environments can change and that this can sometimes pose dangers to living things. • Know the life processes: movement, reproduction, sensitivity, nutrition, excretion. respiration, growth. • Know that invertebrates don't have a back bone. • Know that vertebrates have a back bone. • Know that there are two main classifications of plants: flowering and non -flowering.

		• Human impacts: population, development, deforestation, nature reserves, parks, garden ponds etc.
Plants	**Unit end points:** • To know the requirements for plants to live and grow (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant. • To know the function of the stem/trunk, leaf, fruit and flower. • To know the male and female parts of a flower. • To know the role of flowers in the life cycle of flowering plants including pollination, seed formation and dispersal. • To know how water is transported within plants. • To know how plants adapt to different conditions.	
Forces and magnets	**Unit end points:** • To know that friction affects the way that things move on different surfaces. • To know that magnets attract or repel each other and attract some materials and not others.	

	• To know and can describe magnets as having two poles. • To know whether two magnets will attract or repel each other, depending on which poles are facing. • To know that some forces need contact between two objects, but magnetic forces can act at a distance. **Working scientifically:** • Record and report on findings from investigations, involving how things move on different surfaces. • Compare and group materials following magnetic testing, recording findings and use the outcome to answer questions about which materials are magnetic. • Make and investigate predictions on whether two magnets will attract or repel, depending on which poles are facing.	
Light and sound	**Unit end points:** • Recognise that living things need light in order to see things and that dark is the absence of light.	**Unit end points:** • To know that sounds are made by vibrations through a medium to the ear.

	• To know that light is reflected from surfaces. • Recognise that shadows are formed when the light from a light source is blocked by an opaque object. • To know and can explain some of the reasons why the size of shadows changes. • Find patterns in the way that the size of shadows change. • To know how the shadows of transparent, opaque and translucent materials vary. • Recognise that light from sun can be dangerous and that there are ways to protect their eyes. **Working scientifically:** • Observe and identify changes to the size and orientation of shadows, relative to their proximity to the light source. • Observe and identify the difference in shadows of opaque, translucent and transparent objects/materials. • Classify materials according to opaque, transparent and translucent.	• To know sound waves can travel through air, water and solid: the air doesn't move- the wave passes through it. • To know there are relationships between the pitch of a sound and features of the object that produced it. • To know there are patterns between the volume of a sound and the strength of the vibrations that produced it. • To know sound travels slower than light. **Working scientifically:** • Experiment with at least three different instruments to observe and explore volume and pitch. • Make predictions and draw conclusions about the pitch and volume of sounds.

Electricity		**Unit end points:** • Identify common appliances that run on electricity • Construct a simple circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. • Identify whether a lamp will light in a simple series circuit, based on whether a lamp is in a loop circuit with a battery. • Recognise that a switch opens and closes a circuit. • Recognise common conductors and insulators. • Know that insulators are materials where electricity flows with difficulty. • Know that electricity is a form of energy. • Know that current electricity is the flow of charged particles called electrons around a circuit. • Know that static electricity is an imbalance of charged particles on a material – and that it does not operate around a complete circuit. • Know that electricity flows through a continuous path or a circuit. • Know all the relevant components of a circuit. **Working scientifically:** • Construct and investigate a range of circuits.

		• Investigate which materials can be used instead of wires to make a circuit. • Classify materials that conduct electricity and those that don't following investigation and record findings. • Investigate the effect of a switch and combinations of switches in simple circuits. • Apply their knowledge of conductors and insulators to design a switch.
Seasons/Earth and space		
Everyday materials, rocks and soils and states of matter	**Unit end points:** • To know rock is a naturally occurring material. • To know there are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. • To know rocks can be hard or soft. • To know rocks, have different sizes of grain or crystal. • Compare and group kinds of rocks based on their appearance and simple physical properties • To know that rock can be different shapes and sizes (stones, pebbles, boulders) and some absorb water.	**Unit end points:** • Compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius. • Know that things are made up of particles, and that these are organised differently depending on the state of matter. • Know that materials can change state when their temperature changes. • Know that when solids turn to liquid, this is called melting – and when reversed it is called freezing. • Know that when a liquid turn to a gas this is called evaporation, and in reverse this is called condensation.

	• To know, in simple terms, how fossils are formed when things that have lived are trapped within rock. • To know that soils are made from rocks and organic matter. **Working scientifically:** • Can compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. • Devise tests to explore the properties of rocks and use it to classify them.	• Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. **Working scientifically:** • Observe closely and classify a range of solids and liquids. • Classify materials according to whether they are solids, liquids and gases. • Set up investigations to explore changing the rate of evaporation. • From their data, can explain how to speed up or slow down evaporation.
Year 5		**Year 6**
Animals including humans	**Unit end points:** • Know the average human gestation period in days. • Know the human life cycle. • Know the changes humans develop to old age. • Know about foetal development. Working scientifically: • Plot gestation periods on a bar or line graph.	**Unit end points:** • Know and name and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. • Recognise the impact of diet, exercise, drugs and lifestyle on the way the body functions. • Know and describe the way in which nutrients and water are transported within animals, including humans Working scientifically: • Investigate what happens to the human body during exercise and record these findings on a line graph.

		• Infer and predict what happens to the human body when there are changes in lifestyle.
Living things and their habitats	**Unit end points:** • Know and can describe the differences in the life cycles of a mammal (elephant), an amphibian (newt), an insect (butterfly) and a bird (penguin).	**Unit end points:** • Living things can be formally grouped according to characteristics. • Know the work of Carl Linnaeus and how it has helped classify all living things. • Know what a micro-organism is and that they can be both helpful and harmful. Working scientifically: • Use a classification diagram to identify different plants and animals
Plants		
Forces and magnets	**Unit end points:** • To know that gravity is a force and how it works • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. • To know how objects react in the absence of gravity. • To know what air and water resistance and friction are. • Identify the effects of air resistance, water resistance and friction.	

	• Recognise that some mechanisms, including levers, pulleys, and gears, allow a smaller force to have a greater effect. • To know the difference between weight and mass. **Working scientifically:** • Record the pull on different objects using a Newton meter (N). • Report on conclusions relating to an object's mass and its weight in Newtons. • Investigate the effects of water resistance in a range of contexts e.g. dropping shapes through water. • Investigate the effects of air resistance in a range of contexts e.g. parachutes. • Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.	
Light and sound		**Unit end points:** • Light appears to travel in straight lines. • To know and explain that objects are seen because they give out or reflect light into the eye.

		• To know and explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes. • To know and explain, with reference to how light travels, why shadows have the same shape as the objects that cast them. **Working scientifically:** • Investigate the use of mirrors to reflect light and record using straight line diagrams to indicate the direction of light. • Use mirrors, torches and protractors to demonstrate and record how light is reflected in a mirror and how we see ourselves in a mirror. • Measure and record the angle of incidence and angle of reflection using a protractor and detailed diagram.
Electricity		**Unit end points:** • Know that that the brightness of a bulb, or the volume of a buzzer, correlates with the voltage of cells used in the circuit. • Knows and can give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. • Knows and can use the recognised symbols to represent a simple circuit in a diagram. Understand different renewable sources of energy. **Working scientifically:**

		• Draw circuit diagrams of a range of simple series circuits, using recognised symbols. • Make electric circuits and demonstrate, following investigation, how variation in the working of particular components can be changed. • Plan and select resources for a fair scientific enquiry, deciding which variables to control. • Record results from an experiment using tables. • Evaluate and explain their investigation, results and conclusions.
Seasons/Earth and space	**Unit end points:** • To know the order of the planets in the solar system. • To know that planets are spherical objects. • To know the movement of the earth and other planets relative to the sun in the solar system. • To understand the relative movement of the earth and moon. • To explain night and day in relation to the earth spinning on its axis. • To know that the earth takes 365 and ¼ to orbit the sun. **Working scientifically:**	

	• Consider the views of scientists in the past and how evidence was used to deduce the shapes and movements of the Earth, Moon and planets before space travel.	
Everyday materials, rocks and soils and states of matter	**Unit end points** • To know that some materials will dissolve in liquids to make a solution. • To know that dissolving and melting are different processes. • To know that some changes are reversible through filtration, evaporation, sieving and melting and some are irreversible such as burning. • To know that the bonding and particle arrangement is different in each state. **Working scientifically:** • Investigate the properties of different materials in order to recommend materials for particular functions. • Investigate rates of dissolving by carrying out comparative and fair test and records findings	

	• Separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture	
Evolution and inheritance.		**Unit end points:** • Know all living things have offspring of the same kind. • Know offspring are not identical to their parents and vary. • Know plants and animals have characteristics that make them suited (adapted) to their environment. • Know If the environment changes rapidly some variations may not suit the new environment and will die. If it changes slowly, animals and plants with variations that are best suited survive and reproduce. • Know that over a very long period of time these characteristics may be so different that a new species is created. This is evolution. • Know fossils give us evidence of what lived on the Earth millions of years ago scientists such as Darwin and Wallace observed how living things adapt to different environments.

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