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| **Becoming a Scientist**  Esh Winning Long Term Map for Science | | | |
| Year Group | Autumn | Spring | Summer |
| N | Ask questions about the world around them. | Talk about simple observations that they have made.  Talk about how they think the things around them might work. | Begin to understand changes over time. Plants and animals will grow and change.  Start to show care and concern for the environment around them. |
| Rec | Understand the similarities and differences between objects and living things. | Talk about the differences and similarities of their own immediate environment.  Observe and comment on changes that are occurring to plants and animals. | Can talk about the properties of some materials and the purposes that they have.  Can simply describe some scientific concepts, i.e. floating and sinking. |
| 1 | Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.  *What garden plants can we find around our school?*  *What makes a tree a tree?*  Identify and describe the basic structure of a variety of common flowering plants, including trees.  *What wild plants can we find around our school?*  *What is the same and different about the flowers around us?*  Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals  *Who is who in the animal world?*  Identify and name a variety of common animals that are carnivores, herbivores and omnivores  *Whose food is this?*  Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)  *How are animals’ bodies different?* | Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense  *Is everyone’s body the same?*  *How do we use our senses to find out about the world around us?*  Observe changes across the four seasons  *How do the changing seasons affect me?*  Observe and describe weather associated with the seasons and how day length varies.  *What can we see and hear? (Part 1)*  *What do different kinds of weather look and feel like?* | Distinguish between an object and the material from which it is made  *What is this material made from? (Part 1)*  Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock  *What is this material made from? (Part 2)*  Describe the simple physical properties of a variety of everyday materials  *What’s it like?*  Compare and group together a variety of everyday materials based on their simple physical properties  *Can the same object be made from different material?* |
| Scientific Enquiry | Asking simple questions and recognising that they can be answered in different ways.  Observing closely, using simple equipment  Performing simple tests.  Identifying and classifying.  Using their observations and ideas to suggest answers to questions.  Gathering and recording data to help in answering question | | |
| 2 | Observe and describe how seeds and bulbs grow into mature plants  *What do gardeners need to know?*  *What happens when a seed germinates?*  Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy  *What do plants need to grow healthy?*  Notice that animals, including humans, have offspring which grow into adults  *How have we changed?*  *How do we change throughout our lives?*  Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)  *What food should we eat?* | Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.  *How can we stay fit?*  *How can we stay clean?*  Explore and compare the differences between things that are living, dead, and things that have never been alive  Identify that most living things live in habitats to which they are suited  *What is in your habitat?*  *Where can I live?*  Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other  *How does the habitat change through the year?*  Identify and name a variety of plants and animals in their habitats, including micro- 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.  *What do different animals eat in their habitats?* | Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for specific uses  *What material is it made from?*  *What is a good choice of material?*  *What material will make the bedroom dark?*  *What can you invent?*  Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.  *How can I change the shape of an object?*  *What property allows a material to be changed?* |
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| 3 | Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat  *What would you need to survive?*  Identify that humans and some other animals have skeletons and muscles for support, protection and movement.  *Why do we have a skeleton?*  *How do muscles help us move?*  *Do our bodies affect how well we can do things?*  Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties  *What different types of rock are there?*  *How are rocks used around our school?*  *How do rocks change over time?*  Describe in simple terms how fossils are formed when things that have lived are trapped within rock  *How is soil made?*  *What is a fossil anyway?*  *How are fossils formed?* | Recognise that they need light in order to see things and that dark is the absence of light.  *What do we need to see?*  *How can we make things easier to see at night?*  Notice that light is reflected from surfaces  *What do mirrors do?*  Recognise that light from the sun can be dangerous and that there are ways to protect their eyes  Recognise that shadows are formed when the light from a light source is blocked by a solid object  *How can I make a shadow?*  Find patterns in the way that the size of shadows changes.  *How can you change the size of a shadow?*  Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers  *What do we know about plants?*  Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant  *What would happen if a plant lost its leaves?*  Investigate the way in which water is transported within plants  *Where does the water go?*  Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.  *Where do new plants come from?*  *How are seeds dispersed?* | Compare how things move on different surfaces  *How can you make it start to move?*  *How well can different objects slide on different materials?*  Notice that some forces need contact between two objects, but magnetic forces can act at a distance  *What can magnets do?*  Observe how magnets attract or repel each other and attract some materials and not others  *How do magnets affect each other?*  Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials  *Which materials are magnetic?*  Describe magnets as having two poles  Predict whether two magnets will attract or repel each other, depending on which poles are facing. |
| Scientific Enquiry | Asking relevant questions and using different types of scientific enquiries to answer them  Setting up simple practical enquiries, comparative and fair tests  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers  Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions  Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables  Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions  Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions | | |
| 4 | Describe the simple functions of the basic parts of the digestive system in humans  *Where does the food go inside your body?*  *How is food broken down?*  Identify the different types of teeth in humans and their simple functions  *What sort of teeth do we have?*  *Why do we have different types of teeth?*  Construct and interpret a variety of food chains, identifying producers, predators and prey.  *What do animals eat?*  Recognise that living things can be grouped in a variety of ways  *How are you?*  Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment  *How lives here?*  *How are vertebrates grouped?*  *How are invertebrates grouped?*  Recognise that environments can change and that this can sometimes pose dangers to living things.  *What impact do humans have locally?*  *Why does cleaning litter matter?*  *What Is the impact of habitat destruction in other parts of the world?* | Compare and group materials together, according to whether they are solids, liquids or gases  *What are my properties?*  *What state am I in?*  *What have we learnt about changes of state?*  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 (°C)  *What are melting and freezing?*  *What is boiling?*  Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature  *What is evaporation?*  *Where did water come from?*  Identify how sounds are made, associating some of them with something vibrating  *How are sounds made?*  Recognise that vibrations from sounds travel through a medium to the ear  *How do sounds travel?*  Find patterns between the pitch of a sound and features of the object that produced it  Find patterns between the volume of a sound and the strength of the vibrations that produced it  *How do sounds change as we move away from the source?*  Recognise that sounds get fainter as the distance from the sound source increases.  *How can we use air to make music?* | Identify common appliances that run on electricity  *What makes it work?*  Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers  *How does a circuit work?*  Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery  Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit  *What do we know about electricity?*  Recognise some common conductors and insulators, and associate metals with being good  *What types of material conduct electricity?* |
| Scientific Enquiry | Asking relevant questions and using different types of scientific enquiries to answer them  Setting up simple practical enquiries, comparative and fair tests  Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers  Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions | | |
| 5 | Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object  *How can we measure forces?*  *Why does an object fall?*  Identify the effects of air resistance, water resistance and friction that act between moving surfaces  *Do all heavy things sink?*  *How far can you stretch?*  Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect  *How can we use levers to help us?*  *Can a wheel with teeth make work easier?*  Describe the movement of the Earth, and other planets, relative to the Sun in the solar system  *What’s in space?*  Describe the movement of the Moon relative to the Earth  *Why does the moon change shape?*  Describe the Sun, Earth and Moon as approximately spherical bodies  Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky.  *What is a year?*  *What is a day?*  *How does the sun help us to measure time?*  *Why do we have seasons?* | Compare and group together everyday materials on the basis of their properties (hardness, solubility, transparency, conductivity electrical, thermal and response to magnets)  *How can we compare and group materials?*  Explain that some materials will dissolve in liquid to form a solution, from a solution  *What happens when we mix liquids and solids?*  Decide how mixtures might be separated, including through filtering, sieving and evaporating  *How can we separate mixtures?*  *How can we get drinkable water from sea water?*  Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic  *Are all changes that happen around us irerty or non-reversible?*  Demonstrate that dissolving, mixing and changes of state are reversible changes  *Are all changes that happen around us irreversible or non-reversible?*  Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including associated with burning and the action of acid on bicarbonate of soda. | Describe the changes as humans develop to old age.  Draw a timeline to indicate stages in the growth and development of humans.  *How does the human life cycle compare with that of other animals?*  Describe changes experienced in puberty.  *How do boys become men?*  *How do girls become women?*  Work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.  *How does the human life cycle compare with that of other animals?*    Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird  *What is a life cycle?*  *What makes a successful life cycle?*  *How are humans helping endangered animals to complete their life cycle?*  Describe the life process of reproduction in some plants and animals.  *How do flowering plants reproduce?*  *Do all plants reproduce by producing seeds?*  *How do amphibians and insects reproduce?*  Recognise that light appears to travel in straight lines  *What is light and what does it do?*  Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye  *Can light change direction with a mirror?*  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  *Can light go round corners?*  Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.  *How can you measure a shadow?* |
| Scientific Enquiry | Planning different types of scientific enquiries to answer questions, including recognising and scvariables where necessary  Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate  Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs  Using test results to make predictions to set up further comparative and fair tests | | |
| 6 | Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood  *What does my circulatory system do?*  *What is the heart and what does it do?*  *What is in blood?*  *What do valves and blood vessels do?*  Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function  *What does being healthy mean?*  *What are the benefits of sport and exercise?*  *How do drugs effect the body over time?*  *How does smoking effect the body?*  Describe the ways in which nutrients and water are transported within animals, including humans  *What happens to the water in our bodies?*  *What does the road around our body look like?* | Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including , plants and animals  *Can you sort this mess?*  Give reasons for classifying plants and animals based on specific characteristics  *How are vertebrates/invertebrates grouped together?*  *How can you grow your own micro-organisms?*  *What happens when scientists disagree?*  Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago  *What evidence is there that living things have changed over time?*  Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents  *Why do things vary?*  *Can you breed dogs for a specific purpose?*  Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.  *How do living things survive?*  *Why do living things become extinct?*  *How does natural selection work?* | Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit  *Will the lights stay on (part 1 and 2)?*  Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches  *How many simple circuits can you make?*  Use recognised symbols when representing a simple circuit in a diagram.  *Do you know your circuit diagrams, and can you construct working circuits for them?* |
| Scientific Enquiry | Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary  Taking measurements, using a range of scientific equipment, with increasing accuracy and precision taking repeat readings when appropriate  Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs  Using test results to make predictions to set up further comparative and fair tests  Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations  Identifying scientific evidence that has been used to support or refute ideas or arguments. | | |