Year 3 Science Progression of Knowledge & Skills

BIG Ideas
1. There is a relationship between structure and function. **2. Living and non-living things can be grouped in a variety of ways.** **3. Humans move through different stages of growth and development.** **4. All matter on Earth exists in one of three states: solid, liquid, gas and the state of matter can change.** **5. Living things have characteristics and requirements for life, growth and health.** **6. Changing the movement of an object requires a net force (push or pull) to be acting on it.** **7. Living things depend on each other and on the environment; humans can have both a positive and negative impact.** **8. The diversity of organisms, living and extinct, is the result of evolution.** **9. Energy makes things happen and can be seen by its effects; it can be transferred (but is not used up)** **10. The movement of the Earth affects the seasons and times of day.**
Working Scientifically
These are integrated throughout the Science curriculum and appear in the Progression of Knowledge and Skills for each unit. **Sc2/1.1 asking simple questions and recognising that they can be answered in different ways** **Sc2/1.2 observing closely, using simple equipment** **Sc2/1.3 performing simple tests** **Sc2/1.4 identifying and classifying** **Sc2/1.5 using their observations and ideas to suggest answers to questions** **Sc2/1.6 gathering and recording data to help in answering questions.**
Vocabulary: Question, observe, test, identify, classify, answer, record, data, Venn diagram, chart, equipment, safety, measure
Plants
BIG IDEA 2. Living and non-living things can be grouped in a variety of ways **BIG IDEA 1. There is a relationship between structure and function**
Enquiry Questions: 1. How Are Seeds Dispersed? 2. What Are the Main Functions of The Different Parts of a Flowering Plant? 3. How Do Plants Make Food and How Is Water Transported? 4. Do All Plants Need the Same Things to Stay Alive? 5. Why Does a Plant Need Flowers?
Sc3/2.1a identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
I know the main functions of different parts of a flowering plant, including roots, stems, leaves, flowers. I know that roots keep plants steady in the soil and root hairs absorb water and nutrients. I can make systematic and careful observations and, where appropriate, use a range of equipment (e.g. microscope). I can set up simple practical enquiries, comparative and fair tests to find out how quickly the roots of a seed grow. I can use a ruler to take measurements.
Sc3/2.1b 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
I know that plants are alive, and they need air, light, water, nutrients from the soil and room to grow to stay alive and grow. I know that plants need different amounts of these things to stay healthy.

I can set up a simple practical enquiry to explore the different requirements of plants to live and grow.
I can set up a comparative test to see how plants in different situations grow.
I can make systematic and careful observations of the plants each week for changes in condition.
I can measure different changes e.g. height and number of leaves over time.
I can report on their findings and draw simple conclusions.

Sc3/2.1c investigate the way in which water is transported within plants

I know that plants need water to make their own food.
I know the function of a plant stem, leaves and roots in absorbing and transporting water.

I can set up simple practical inquiries to show water transport through a stem, marking the changes on a jar.
I can calculate the growth rate.
I can report on findings from the enquiry and answer questions about it.

Sc3/2.1d explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

I know that seeds can be dispersed in a variety of ways.
I know that seeds are dispersed so that plants do not compete and become overcrowded.
I know that the cycle from seed to plant to flower to seed is called a lifecycle.
I know that pollination is when pollen is moved from plant to plant.
I know the part that flowers play in pollination.

I can make systematic and careful observations of seeds to look for properties that will help us to understand how they are dispersed.
I can sort seeds into groups according to the dispersal method.
I can set up simple practical inquiries to show water transport through a stem, marking the changes on a jar.
I can calculate the growth rate.
I can report on findings from the enquiry and answer questions about it.
I can make systematic and careful observations of flowers, recording colours in a table.
I can gather, record and present data in a graph that shows the frequency of different colours in the plants.
I can use results to draw simple conclusions and make predictions e.g. which colours are most common and why might that be?

Vocabulary:
seed, parent plant, dispersal, germination, roots, root hair, stem, leaves, flowers, function, nutrients, transport, absorb, root, root hairs, stem, tubes, trunk/branches, leaves, nutrient, drought, climate, flower, pollen, nectar, pollination, reproduce

Animals Including Humans

BIG IDEA 3. Humans move through different stages of growth and development
BIG IDEA 5. Living things have characteristics and requirements for life, growth and health

Enquiry Questions:

1. What Food Do Humans Need?
2. How Can We Keep Our Pets Healthy?
3. Why Do Humans Need a Skeleton?
4. How Do Muscles Work?
5. Do People Who Do More Physical Activity Have Stronger Muscles?

Sc3/2.2a 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

I know that humans need the following food types: fruit and vegetables, carbohydrates, protein, dairy and fat.
I know that humans should eat a balanced diet.
I know that animals also need a healthy and balanced diet.
I know that different pets have different needs, including diet, and owning one carries important responsibilities.

I can organise food into food groups to demonstrate a balanced and healthy diet
I can use known websites or other secondary sources to research the diets of pets.

Sc3/2.2b identify that humans and some other animals have skeletons and muscles for support, protection and movement.

I know that skeletons protect organs in the body, support us and enable movement.
I know that not all animals have a bony skeleton.

I know that muscles help the skeleton move - they work together in pairs.
I know that muscles contract and relax.
I know that physical activity leads to greater fitness and stronger muscles.

I can observe the movement of animals with and without skeletons to identify similarities and differences.
I can sort animals into groups of those with and those without skeletons.
I can create a model of muscles to develop scientific understanding of how muscles contract and relax.
I can set up a simple, comparative practical enquiry which is a
fair test.
I can make predictions.
I can collect and analyse data.

Vocabulary:
nutrition, carbohydrates, fat, protein, calcium, dairy, energy, growth, carnivore, herbivore, omnivore, domesticated, pet, environment, diet, behaviour, company, health and welfare, skeleton, skull, ribcage, spine, joints, organs, protection, support, movement, muscle, triceps, bicep, relax, contract, joints, investigation, pattern, comparative, prediction, data, analysis, scatter graph

Rocks

BIG IDEA 2. Living and non-living things can be grouped in a variety of ways
BIG IDEA 8. The diversity of organisms, living and extinct, is the result of evolution

Enquiry Questions:

1. What is Rock and How Can it be Grouped?
2. How Were Rocks Formed?
3. Why Are Different Rocks Suited for Different Purposes?
4. How Are Fossils Made?
5. What Is Soil and How Is It Made?

Sc3/3.1a compare and group together different kinds of rocks on the basis of their appearance and simple physical properties

I know that rocks can be grouped based on their appearance and simple physical properties (how they feel).
I know that rocks form in different ways (metamorphic, sedimentary and igneous)
I know that different groups of rock have their own unique appearance and set of physical properties.
I know that rocks have different properties, and these relate to how they are formed.
I know that some rocks are permeable, and some rocks are impermeable.
I know that some rocks are more durable than other rocks.
I know that the things we use rocks for, relate to their differing properties.

I can make careful observations of rocks using a hand lens or magnifying glass.
I can classify rocks according to whether they have grains, crystals or layers
I can use video to learn how rocks were formed. Record findings using simple scientific language, drawings and labelled diagrams.
With support, I can carry out a comparative test to find out which rocks are permeable (absorb water) and which rocks are impermeable (do not absorb water).
I can use a stopwatch or second hand on a clock to time the length the rocks are in the water.
I can make careful observations.
I can record findings using scientific language.

Sc3/3.1b describe in simple terms how fossils are formed when things that have lived are trapped within rock

I know how fossils are formed (i.e. when things that have lived are trapped within rock).

I can record findings using simple scientific language, drawings and labelled diagrams.
I know there is a body of scientists who share work as Mary Anning did.
I can create a model of a fossil to help understand the process of fossilisation

Sc3/3.1c recognise that soils are made from rocks and organic matter.

I know that soils are made from rocks and organic matter.

I can make careful observations using hand lenses or magnifying glasses.
I can set up a simple, comparative test.
I can use a simple yes/no classification key to identify the soil samples.

Vocabulary:

Rock, cliff, mountain, coarse grain, fine grain, crystal, layer, names of different rocks, metamorphic, sedimentary, igneous, grains, molten, magma, lava, crystals, pressure, permeable, impermeable, durable, sedimentary rock, fossil, palaeontologist, decay, sediment, fossilisation, sedimentary rock, earthworm, leaves, soil, organic matter

Light

BIG IDEA 1. There is a relationship between structure and function
BIG IDEA 9. Energy makes things happen and can be seen by its effects; it can be transferred (but is not used up)
BIG IDEA 10. The movement of the Earth affects the seasons and times of day

Enquiry Questions:

1. Can We See Without Light?
2. How Does Light Behave When It Is Reflected?
3. Can We Change How Shadows Are Formed?
4. How Can We Protect Our Eyes From The Sun?
5. Do Shadows Stay the Same All Day?

Sc3/4.1a recognise that they need light in order to see things and that dark is the absence of light

I know that we need light to see. If there is no light, we cannot see.
I know some objects are visible because they are light sources, and some are visible because they reflect light.
I know light travels in straight lines, hits objects and bounces off into our eyes and that is how we see things.

I can set up a simple comparative test to see which materials can be seen in low light.
I can make systematic and careful observations to identify which objects can be seen in different lighting conditions.
I can record findings in a table.
I can report on findings and draw a conclusion about which materials are more visible in low light.

Sc3/4.1b notice that light is reflected from surfaces

I know that we can see in a mirror because light is reflecting off the surface and into our eyes.
I know that changing the angle of the mirror changes the direction in which light is reflected.

I can make careful observations when using mirrors, to learn how light behaves when it is reflected .
I can write a written explanation of the learning about light and reflection.

Sc3/4.1c recognise that light from the sun can be dangerous and that there are ways to protect their eyes

I know that we should not look directly at the sun as this can cause damage to our eyes.
I know we can protect our eyes with hats and sunglasses and by not looking directly at the sun or bright lights.

I can report findings about keeping eyes safe in the sun.

Sc3/4.1d recognise that shadows are formed when the light from a light source is blocked by a solid object

I know that shadows are formed when objects block light.
I know that opaque objects create darker shadows and transparent objects create lighter shadows.
I know the closer the light source is to the object, the bigger the shadow will be or the higher the light source is, the smaller the shadow will be.

I can take systematic and accurate measurements of length in cm, to measure how shadows change in size.
I can use observation (how does the height of light change shadows), tables of data (how does distance affect shadow size) and comparison (which objects create darker shadows) to answer questions.
I can use a simple diagram to show how shadows are formed.
I can use results to draw simple conclusions about why distance and height changes the size of shadows.
I can use straightforward scientific evidence to answer questions or to support my findings.

Sc3/4.1e find patterns in the way that the size of shadows change.

I know that the length of shadows changes during a day as the Earth rotates and the sunlight hits the object from a different position.
I know shadows are shortest when the sun is high in the sky and longest when the sun is lower in the sky.

I can collectively set up a simple comparative and fair test to see how shadows change over the course of the day.
I can make careful observations of how the position and size of shadows changes and take accurate measurements using standard units of the length.
I can use an appropriate graph/chart to show how shadows change across a day.
I can identify and explain differences, similarities or changes related to simple scientific ideas and processes (how and why shadows change)

Vocabulary:
light, reflect, light source, visible, visibility, dark, shiny, bright, dull, matt, mirror, reflection, reflect, angle, opaque, translucent, transparent, shadows, angle, position, direction, filters, UV rays, protection, retina, pupil, damage, sunrise, sunset, rotation, compass direction

Forces and Magnets

BIG IDEA 2. Living and non-living things can be grouped in a variety of ways
BIG IDEA 6. Changing the movement of an object requires a net force (push or pull) to be acting on it

Enquiry Questions:
1. What Is a Contact Force?
2. How Do Different Surfaces Affect the Movement of Objects?
3. What Is a Magnet and How Do They Work?
4. What Materials Are Attracted to A Magnet?
5. Do All Magnets Have the Same Strength?

Sc3/4.2a compare how things move on different surfaces

I know that contact forces are pushes and pulls that require contact between two objects.
I know that friction is a contact force that affects the movement of objects.
I know that friction acts in the direction opposite to that of the object moving on the surface.
I know that smoother surfaces produce less friction.

I can use observation to identify forces being used and to identify the effect these forces have on objects.
I understand why tests should be fair and control all but one variable (the surface the car travels on).
I can independently set up an investigation that follows the agreed method.
I can use measuring tape to measure the distance the cars travel.
I can record results in a table and use this data to draw conclusions about which surface slowed down the moving object the most.

Sc3/4.2b notice that some forces need contact between 2 objects, but magnetic forces can act at a distance

I know that the force of magnetism can act at a distance.

I can make systematic observations, testing the strength of magnetism from different distances.

Sc3/4.2c observe how magnets attract or repel each other and attract some materials and not others

I know that magnets have a magnetic field within which they attract magnetic objects.

I can predict whether two magnets will attract or repel each other, depending on which poles are facing.

Sc3/4.2d 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

I know that metals containing iron, steel and nickel will be attracted to magnets.

I can sort into groups objects that are attracted to magnets and those that are not.
I can carry out a simple investigation and record results (bringing a range of materials near a magnet to test magnetism)

Sc3/4.2e describe magnets as having 2 poles

I know that magnets come in different forms.
I know that magnets have two poles. The poles may attract or repel depending on which poles are facing each other.
I know that different magnets have different strengths of magnetic field.

Sc3/4.2f predict whether 2 magnets will attract or repel each other, depending on which poles are facing.

I know that magnets have two poles. The poles may attract or repel depending on which poles are facing each other.
I know that different magnets have different strengths of magnetic field.

I can carry out a simple investigation, record results in a table and use these to present data in a bar chart. I can measure the strength of a magnet by working out how many sheets of paper need to be in the way before a paperclip is no longer attracted. I can discuss the factors that might influence magnet strength, such as the size, shape, and material of the magnet.
Vocabulary: force, contact force, push, pull, friction, resistance, surface, movement (method, fair test, variable, conclusion), gravity, magnet, magnetism, magnetic field, attract, repel, magnetic objects, north pole, south pole, metal, iron, steel, nickel, horseshoe magnet, bar magnet, ring magnet, strength of magnetic field

Year 3 Assessment End Points	
Plants	
Knowledge	**Skills**
I know that seeds can be dispersed in a variety of ways.	I can make systematic and careful observations of seeds to sort and classify them by their properties.
I know the main functions of different parts of a flowering plant, including roots, stems, leaves, flowers.	I can make systematic and careful observations to support their explanations of the basic structure of flowering plants.
I know that plants need water to make their own food.	I can use my observations to explain the function of a plant stem, leaves and roots in absorbing and transporting water.
I know that plants need air, light, water, nutrients from the soil and room to grow to stay alive and grow.	I can set up a simple practical enquiry to explore the different requirements of plants to live and grow.
I know that pollination is when pollen is moved from plant to plant, and can describe the part that flowers play in the pollination process.	I can use my observations and data to draw simple conclusions and make sensible predictions.
Animals, Including Humans	
Knowledge	**Skills**
I know the names of and describe the different food groups that humans need to eat for a balanced diet.	I can sort foods into accurate groups according to their type/nutritional value.
I know that animals, such as pets, also have special dietary needs to keep them healthy.	I can use a range of sources to find and present answers to questions.
I can describe the three main functions of the human skeleton, including naming the relevant parts that fulfill this.	I can identify and sort those animals with and without skeletons.
I know that muscles allow the joints of a skeleton to move.	I can use models to support their scientific explanations of how muscles contract and relax.
My investigations support me to understand how physical activity leads to greater fitness and stronger muscles.	I can conduct a simple pattern-seeking investigation to answer a scientific enquiry question.
Rocks	
Knowledge	**Skills**
I can explain where rocks can be found and link this to the basic structure of planet Earth.	I can sort and group different rocks based on their appearance and simple physical properties.
I know three types of rock formation and can describe their basic properties.	I can use my learning from modelled demonstrations to aid their thinking and explanations about natural processes (i.e. the rock cycle).

I know that different rocks have different properties, and this makes them suitable for different uses and purposes.	I can carry out a reliable comparative test to classify different rocks by their properties.
I know the process of fossilisation to explain how fossils are formed.	I can connect fossilisation to the formation of sedimentary rocks.
Can pupils explain how soil is made, including reference to taught vocabulary from the session (particles, organic matter, earthworms, microorganisms)?	I can use simple equipment to make careful observations to reliably classify different types of soil.
Light	
Knowledge	**Skills**
I know that light is needed for us to see the world around us.	I can identify the difference between a light source and an object that is reflecting light.
I know the difference between a light source and an object that is reflecting light.	I can accurately categorise objects in those that reflect light well and those that do not.
I know about light sources and can link this to explain how shadows are formed.	I can use my observations from different investigations to describe how the position and direction of a light source alters the size of a shadow.
I know the risks of looking into direct sunlight; and can extend this to explain some of the risks of UV rays.	I can identify through a simple enquiry which lenses would be most successful in protecting eyes from bright sunlight.
I know how the position of the sun causes shadows to change size throughout the day.	I can make careful observations and record results accurately to prove scientific ideas and processes.
Forces and Magnets	
Knowledge	**Skills**
I know that pushes and pulls are both examples of a contact force.	I can use observation to identify what kind of contact force is being used to move an object.
I know that friction is a contact force that affects the movement of objects by acting in the opposite direction of the moving object.	I can carry out a fair investigation using an agreed method and record their results to draw sensible conclusions.
I know that magnetism is a non-contact force and that magnets have two poles that may attract or repel.	I can observe a modelled experiment and use their emerging knowledge of magnets to make predictions.
I know that metals containing iron, steel and nickel will be attracted to a magnet.	I can follow a method to carry out a simple investigation and record their results.
I know that magnets can come in different forms and have different strengths.	I can write my own method and use this to carry out a simple investigation, including presenting results.