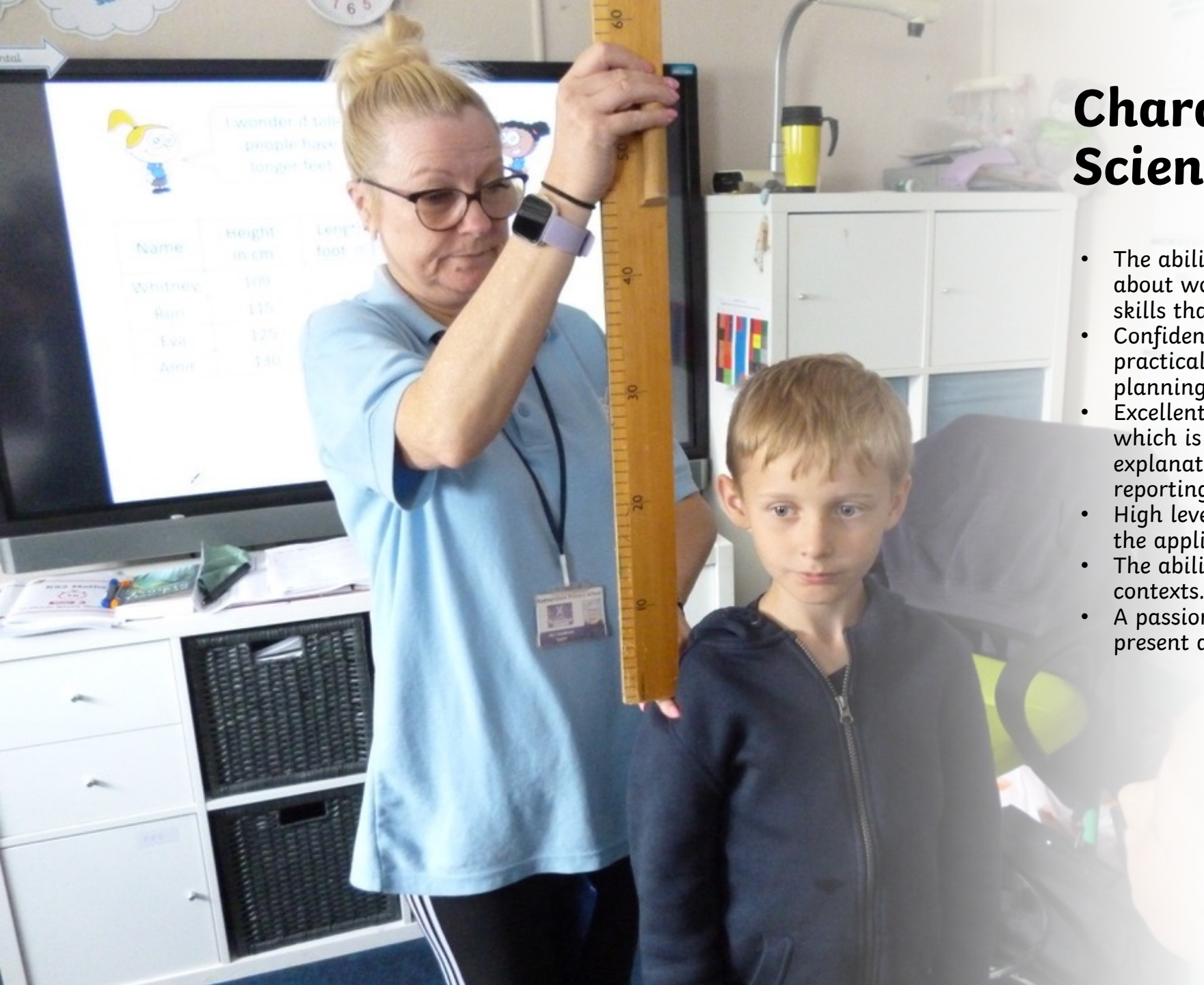

Characteristics of a Scientist

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts.
- A passion for science and its application in past, present and future technologies.

Science Progression of Knowledge and Skills
Rodmersham 2023

	EYFS	Milestone 1	Milestone 2	Milestone 3
Working scientifically	• Show curiosity about objects, events and people • Questions why things happen • Take a risk, engage in new experiences and learn by trial and error • Find ways to solve problems / find new ways to do things / test their ideas • Develop ideas of grouping, sequences, cause and effect • Know about similarities and differences in relation to places, objects, materials and living things • Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world • Closely observes what animals, people and vehicles do Use senses to explore the world around them • Make links and notice patterns in their experience • Choose the resources they need for their chosen activities • Handle equipment and tools effectively • Create simple representations of events, people and objects • Answer how and why questions about their experiences • Make observations of animals and plants and explain why some things occur, and talk about changes • Develop their own narratives and explanations by connecting ideas or events • Builds up vocabulary that reflects the breadth of their experience	Record simple data Use their observations and ideas to suggest answers to questions Talk about what they have found out and how they found it out Observe closely using simple equipment With help, observe changes over time With guidance, they should begin to notice patterns and relationships Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying) With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language Ask people questions and use simple secondary sources to find answers Experience different types of science enquiries, including practical activities Begin to recognise different ways in which they might answer scientific questions Carry out simple tests	Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations Make systematic and careful observations Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them Take accurate measurements using standard units Learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done Should be given a range of scientific experiences including different types of science enquiries to answer questions Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions Set up simple practical enquiries, comparative and fair tests Recognise when a simple fair test is necessary and help to decide how to set it up Talk about criteria for grouping, sorting and classifying; and use simple keys	Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas, Use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results Use their results to make predictions and identify when further observations, comparative and fair tests might be needed Look for different causal relationships in their data and identify evidence that refutes or supports their ideas Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate. Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Identify scientific evidence that has been used to support or refute ideas or arguments Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact Make their own decisions about what observations to make, what measurements to use and how long to make them for Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why Use their science experiences to explore ideas and raise different kinds of questions Talk about how scientific ideas have developed over time

	EYFS	Milestone 1	Milestone 2	Milestone 3
Plants	• To explore growing a plant/flower • To know that a plant needs watering to stay alive	• Plants grow from seeds/bulbs • Plants need light and water to grow and survive • Plants are important • We can eat lots of plants • Some of the most common British plants • Flowers make seeds to make more plants (reproduce) • We need plants to survive (to clean air, to eat) • We can eat different parts of a plant, including the leaves, stems, roots, seeds, and fruit	• Plants are producers, they make their own food. • Their leaves absorb sunlight and carbon dioxide • Plants have roots which provide support and draw water from the soil. • Flowering parts of specific adaptations, which helped to carry out pollination, fertilisation and seed production. • Seed dispersal improves the plants, chances of successful reproduction • Seeds and bulbs require the right conditions to germinate and to grow. • Jane, enough food for the plants, initial growth	
seasons	• To explore signs of some of the seasons • To explore the outdoor area and describe using our senses (what can they hear/see/smell?) • Talk about the changes that each seasons brings in relation to their environment: the clothes they wear, the weather and the plants	• Weather can change • There are lots of different types of weather; rain, Sam, cloud, wind, and snow, et cetera • Days are longer and hotter in the summer • Days are shorter and colder in the winter • There are four seasons: Spring, Summer, Autumn, Winter		

Animals, including humans	• To know the names of basic animals (farm animals, pets) • To know that animals change overtime (babies- adults, caterpillars-butterfly) • Look at different animals and their body parts. Talk about why they have them e.g. beak, wings, leg. Talk about the differences between animals	• There are many different animals with different characteristics. • Animals have senses to help individuals survive. When animals sense things they are able to respond. • Animals need food to survive. • Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy. • Animals move in order to survive. • Different animals move in different ways to help them survive. • Exercise keeps animal's bodies in good condition and increases survival chances. • All animals eventually die. • Animals reproduce new animals when they reach maturity. • Animals grow until maturity and then do not grow any larger.	• Different animals are adapted to eat different foods. • Many animals have skeletons to support their bodies and protect vital organs. • Muscles are connected to bones and move them when they contract. • Movable joints connect bones. • Animals have teeth to help them eat. • Different types of teeth do different jobs. • Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood. • The blood takes nutrients around the body. • Nutrients produced by plants move to primary consumers then to secondary consumers through food chains.	• Different animals mature at different rates and live to different ages. • Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction • Hormones control these changes, which can be physical and/or emotional • The heart pumps blood around the body. • Oxygen is breathed into the lungs where it is absorbed by the blood. • Muscles need oxygen to release energy from food to do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.)
Materials	• To know an item that floats • To know an item that sinks	• There are many different • materials that have different describable and measurable properties. • Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass). • 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)	• Solids, liquids and gases are described by observable properties. • Materials can be divided into solids, liquids and gases. • Causes solids to melt into liquid and liquids evaporate into gases. • Cooling causes gases to condense into liquids and liquids to freeze into solids. • The temperature at which given to substances change state are always the same	• All matter (including gas) has mass. • Sometimes mixed substances react to make a new substance. These changes are usually irreversible. • Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible • Indicators that something new has been made the properties of the material are different. • If it is not possible to get the material back easily, it is likely that it is not anymore, and something new has been made creating an irreversible change.

Forces		• Pushing and pulling can make things move faster or slower. • Pushing and pulling can make things move or stop. • Things can move in different ways. • Larger masses take bigger pushes and pulls to move or stop them. • Pushing and pulling can change the shape of things. • Bigger pushes and pulls have bigger effects	• Magnets exert attractive and repulsive forces on each other. • Magnets exert non-contact forces, which work through some materials. • Magnets exert attractive forces on some materials. • Magnet forces are affected by magnet strength, object mass, distance from object and object material.	• Air resistance and water resistance are forces against motion caused by objects having to move air and water out of their way. • Friction is a force against motion caused by two surfaces rubbing against each other. • Some objects require large forces to make them move; gears, pulley and levers can reduce the force needed to make things move
Living Things and their Habitats		. • Some things are living, some were once living but now dead and some things never lived. • There is variation between living things. • Different animals and plants live in different places. Living things are adapted to survive in different habitats. • Environmental change can affect plants and animals that live there.	• Living things can be divided into groups based upon their characteristics • Environmental change affects different habitats differently • Different organisms are affected differently by environmental change • Different food chains occur in different habitats • Human activity significantly affects the environment	• Different animals mature at different rates and live to different ages. • Some organisms reproduce sexually where offspring inherit information from both parents. • Some organisms reproduce asexually by making a copy of a single parent. • Environmental change can affect how well an organism is suited to its environment. • Different types of organisms have different lifecycles. • Variation exists within a population (and between offspring of some plants) – *NB: this Key Idea is duplicated in Year 6 Evolution and Inheritance.* • Organisms best suited to their environment are more likely to survive long enough to reproduce. • Organisms are best adapted to reproduce are more likely to do so. • Organisms reproduce and offspring have similar characteristic patterns. • Competition exists for resources and mates.

Light and Sound			• There must be light for us to see. Without light it is dark. • We need light to see things even shiny things. • Transparent materials let light travel through them, and opaque materials don't let light through. • Beams of light bounce off some materials (reflection). • Shiny materials reflect light beams better than non-shiny materials. • Light comes from a source • Sound travels from its source in all directions and we hear it when it travels to our ears. • Sound travel can be blocked. • Sound spreads out as it travels. • Changing the shape, size and material of an object will change the sound it produces. • Sound is produced when an object vibrates. • Sound moves through all materials by making them vibrate. • Changing the way an object vibrates changes its sound. • Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds. • Faster vibrations (higher frequencies) produce higher pitched sounds	• Animals see light sources when light travels from the source into their eyes. • Animals see objects when light is reflected off that object and enters their eyes. • Light reflects off all objects (unless they are black). Non shiny surfaces scatter the light, so we do not see the beam. • Light travels in straight lines.
Evolution and Inheritance				• Life cycles have evolved to help organisms survive to adulthood. • Over time the characteristics that are most suited to the environment become increasingly common. *NB: The following could be duplicated in Year 6 Living things and their habitats.* • Organisms best suited to their environment are more likely to survive long enough to reproduce. Organisms are best adapted to reproduce are more likely to do so. • Organisms reproduce and offspring have similar characteristic patterns. • Variation exists within a population (and between offspring of some plants) • Competition exists for resources and mates

Electricity			• A source of electricity (mains of battery) is needed for electrical devices to work. • Electricity sources push electricity round a circuit. • More batteries will push the electricity round the circuit faster. • Devices work harder when more electricity goes through them. • A complete circuit is needed for electricity to flow and devices to work. • Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators	• Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.' • The greater the current flowing through a device the harder it works. • Current is how much electricity is flowing round a circuit. • When current flows through wires heat is released. The greater the current, the more heat is released.
Rocks			• There are different types of rock. • There are different types of soil. • Soils change over time. • Different plants grow in different soils. • Fossils tell us what has happened before. • Fossils provide evidence. • Palaeontologists use Fossils to find out about the past. • Fossils provide evidence that living things have changed over time.	
Earth and Space				• Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance. • Objects with larger masses exert bigger gravitational forces. • Objects like planets, moons and stars spin. • Smaller mass objects like planets orbit large mass objects like stars. • Stars produce vast amounts of heat and light. • All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.