Forwards Centre Science Curriculum

Rationale

At the Forwards Centre, we want our children to be inquisitive about the world around them. We want to embrace their sense of wonder about natural phenomena and inspire them to think scientifically about the world around them.
We aim to develop children's ideas and ways of working that enable them to make sense of the world in which they live.
We want our children to develop an understanding of the uses and implications of science, how it has changed and shaped our lives today and for the future.
We guide our children and support them using the **B**olton **I**mpact **T**rusts core values of '**B**elieve', '**I**nspire', '**T**ransform'.
We '**believe**' in our children and their capability in understanding the specific substantive knowledge for each discipline of the Science National Curriculum.
We have high expectations of our children and believe that all children will achieve regardless of their starting point.
We aim to **'inspire'** our children about the scientific world, ensuring that they use those crucial disciplinary skills alongside their substantive knowledge to ensure cohesion, reasoning and a deeper understanding.
We help to **'transform'** our children to become life longer learners, who want to know more about the world in which they live

Contribution and Readiness

We ensure that the science curriculum:

- Helps pupils to acquire a growing understanding of the nature, processes and methods of scientific ideas.
- Helps to develop and extend our children's scientific concept of their world.
- Builds on our children's natural curiosity, developing a scientific approach to problems.
- Encourages open-mindedness, perseverance and develop the skills of investigation
- Develop the use of scientific language, recording and techniques.
- Ensure that misconceptions are addressed, that children are practicing and retrieving information, building upon prior knowledge and helping children to embed their procedural knowledge to long term memory and make crucial links to other areas of the curriculum.
- **Develops Problem-Solving Skills**: Encourages children to tackle scientific questions and problems, preparing them to approach challenges in all areas of life with confidence.
- **Promotes Collaborative Work**: Through discussions, children learn to work with others, share ideas, and contribute to collective goals, preparing them for teamwork in both academic and real-world settings.
- **Encourages Active Participation in Learning**: The hands-on nature of science—through experiments, observations, and investigations—motivates children to engage actively, making them contributors to their own learning process.
- **Instils Initiative and Independence**: Science projects often require children to plan and execute tasks with little guidance, nurturing a sense of readiness and self-reliance.
- **Teaches Planning and Organisation**: By carrying out investigations, children learn to follow steps and organise materials enhancing their readiness for complex tasks in future studies
- **Develops Communication Skills**: Through presenting findings and discussing results, we encourage children to express ideas confidently and clearly, preparing them for effective communication in future careers.
- **Promotes a Sense of Contribution to Society**: By understanding real-world issues like healthy living, the environment and animals in their habitats, children are encouraged to think about how they can contribute positively to society through knowledge and responsible action.

Conduct and Morals

We ensure that pupils develop their own character attributes through the science curriculum by:

- **Promoting Curiosity and Critical Thinking**: Encourages children to ask questions, investigate, and think critically about the world, which fosters honesty and respect for evidence.
- **Encouraging Respect for Life and the Environment**: Lessons about habitats, and conservation help children understand the importance of protecting living things and their environment, fostering a sense of responsibility.
- **Encouraging Problem Solving for the Greater Good**: Science promotes solving real-world problems, from how to be active and healthy to environmental challenges, guiding children to think about how their actions can benefit society as a whole.
- **Respect for Authority and Rules**: Experiments and investigations require adherence to safety rules, teaching children the importance of following guidelines for their well-being and that of others.

Celebrating similarity and difference

We ensure that pupils celebrate similarity and difference through the science curriculum by:

- **Looking at Diversity in Living Things**: Teaches children about the vast variety of living things and their habitat, promoting an understanding of the beauty and importance of diversity in the natural world.
- **Human Biology and Genetics**: Introduces concepts like variation in human traits (e.g., skin colour, height, hair type), helping children understand and appreciate the natural differences among people.
- **Inclusive Collaborative Work**: Science activities often involves work where children with different abilities, backgrounds, and ideas come together, promoting respect for different perspectives and ways of thinking.
- **Encourages Respect for All Life Forms**: Lessons on biodiversity and the value of all living creatures, big or small, teach children to respect differences in life forms, promoting compassion and empathy.

Caring for ourselves

We ensure that pupils learn to care for themselves through the science curriculum by:

- **Empathy through Life Science**: Lessons on growth, reproduction, and life cycles in animals and humans help children understand the shared experiences of life and nurture empathy for both people and animals.
- **Lessons on Health and Hygiene**: By teaching children about the importance of hygiene and nutrition they learn how their actions can protect others, promoting care for family, friends, and the wider community.
- **Encouraging Kindness to Animals**: Learning about the needs, habitats, and behaviour of animals encourages children to treat animals with kindness, reinforcing the value of caring for all living beings.
- **Promoting Safety and Well-being**: By learning about safety procedures during experiments and daily activities, children develop habits that prioritise the well-being of others, ensuring their actions do not harm those around them.
- **Solving Problems for the Benefit of Others**: Science encourages children to think about how they can apply knowledge to solve real-world problems, such as improving health or protecting the environment, which teaches them to care about others' well-being.

Culture and Creativity

We ensure that pupils learn about culture and creativity through the science curriculum by:

- **Hands-On Experiments**: Practical investigations encourage creative thinking as children explore different ways to approach problems, test their approach and find solutions.
- **Encourages Curiosity About the World**: Science lessons inspire children to ask big questions about the universe, the earth, and plants & animals. It encourages them to think creatively about how the world works.
- **Discovery and Exploration**: Children are encouraged to explore and discover new concepts, developing a mind-set of curiosity, which is a key driver of creativity.
- **Application of Science in Everyday Life**: Encourages creative problem-solving in real-world contexts, such as inventing solutions for the use of everyday materials, blending science and practical creativity.

Curriculum Design

The science curriculum has been strategically mapped to ensure accessibility for learners at any entry point, accommodating the dynamic nature of the centre. This approach allows children to engage with the curriculum at their developmental stage, progressing at a pace suited to their individual needs. As children advance through the curriculum, they are exposed to increasingly complex substantive knowledge, while simultaneously developing and applying disciplinary skills to deepen their understanding.

Reading is promoted in all science lessons, subject specific key vocabulary is displayed and explicitly taught to ensure that pupils are able to fully access the science curriculum. Pupils are also taught to understand the disciplinary literacy of science. Pupils are taught to;

- Understand and use specialised vocabulary and scientific terms that may have a precise, technical meaning (e.g., "evaporation," "evolution," or "vibration") that differs from everyday usage.
- Recognise that scientific writing often follows specific organisational patterns, such as the way the results of an experiment are written up.

Green Room: Two-year rolling programme
Cycle A:
Children explore seasonal changes, observing and describing how the world transforms across different times of the year. They also learn to identify and name common animals, including humans, focussing on their structure and features. Additionally, they begin to understand plant biology by identifying, naming and describing simple parts of a flower and recognising common garden plants.

Cycle B:
Building on prior learning, children further their knowledge of plants and animals by exploring their basic needs for survival and growth. They learn about animal offspring and their development, as well as being introduced to simple life cycles, laying the foundation for biological concepts.

Blue and Burgundy Rooms: Two-year rolling programme

Cycle A:
Children deepen their understanding of animal biology by exploring the importance of nutrition and how animals require skeletons and muscles for support and movement. In plant biology, they examine the structure and functions of plant parts and investigate conditions necessary for growth through research and

hands-on enquiry. In addition, children develop foundational knowledge of geology, including rocks, soils and fossils. They learn to compare and group rocks based on physical properties, understand soil formation, and explore the process involved in fossilisation.

Cycle B:
In Cycle B, children expand their scientific understanding of forces, magnets and light. They explore how light travels, how shadows are formed, and how magnets attract or repel objects. They also investigate different materials' properties, such as permeability and conductivity, and apply their disciplinary skills to classify materials based on observed characteristics.

Yellow, Orange, Purple and Turquoise Rooms: Two-year rolling programme.

Cycle A
Children investigate the human life cycle, exploring how animals, including humans, grow and change over time. They study the circulatory system, examining the effect of diet, exercise and substances on health. Additionally, they delve into classification, learning how to group living organisms and use classification keys effectively. The concept of evolution is introduced, with a focus on how living things adapt and change over time. Children also study electricity, constructing and understanding simple circuits and the functions of their components.

Cycle B
Building on prior knowledge, children further understanding of animal classification, exploring observable features and justifying classification decisions. They investigate material properties through experiments on hardness, solubility and electrical conductivity, learning methods to separate and recover materials from solutions. In Earth and Space, children identify planets within our solar system, explore how day and night occur, and develop an understanding of Earth's place in the universe. Forces such as gravity, air resistance and friction are introduced, with practical investigations to contextualise these concepts.

Curriculum Intent

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Green Room Cycle A	Animals including humans	Seasonal Changes And Everyday materials	Seasonal Changes	Animals including humans	Plants	Seasonal Changes
Green Room Cycle B	Uses of everyday materials	Animals including humans	Living things and their habitats		Plants	
Blue and Burgundy Room Cycle A	Plants	Light	Rocks		Animals, including humans	Forces and Magnets
Blue and Burgundy Room Cycle B	Living things and their habitats	States of Matter	Sound	Electricity	Animals, including humans	
Purple Orange Yellow and Turquoise Room Cycle A	Animals including Humans	Electricity	Living things and their habitats	Light	Evolution and Inheritance	
Purple Orange Yellow and Turquoise Room Cycle B	Earth and Space	Properties and changes of matter	Forces		Living things and their habitats	Animals including humans

Assessment and Progress in Science

At the Forwards Centre we believe that regular assessment is crucial to learning, because it provides both staff and pupils with valuable insights into understanding and progress. It helps identify strengths and areas for improvement, guiding teaching strategies and the personalised support given to our pupils. Additionally, assessments help to ensure that learning objectives are met and that pupils are developing the skills and knowledge necessary for future success.

For every topic in science, the medium-term plans set out the new knowledge and skills that pupils should acquire. During the term teachers use a range of formative and summative assessments to systematically check pupils' understanding and to establish what new knowledge and skills they have acquired. Every term teachers are asked to record any formative or summative assessments against the key knowledge objectives on the Insight system for the units of work that they have delivered.

Each child completes a pre-knowledge check, which assesses their prior understanding. This allows teachers to identify specific gaps in their knowledge. If gaps are found, teachers use this information to address those areas. For example, if a child in the Yellow Room struggles with the concept and function of a stem in plants, the teacher can refer to the "Blue and Burgundy" plant topic plan to ensure that the missing knowledge is addressed.

To assess progress, we begin each unit with a pre-knowledge check to evaluate prior knowledge. Throughout the unit, regular low-stakes quizzes, verbal questioning, and practical activities help track ongoing progress against the "I know and I can" statements derived from the national curriculum. This provides a clear picture of what constitutes expected and good progress for each child. Progress on an individual basis due to the diverse needs of our pupils.