Aims:
The most important goal for Science education is to stimulate, nurture and sustain the curiosity, wonder and questioning of pupils.

Rationale: Through learning in the Sciences, pupils develop their interest in, and understanding of, the living, material and physical world. They engage in a wide range of collaborative investigative tasks, which allows them to develop important skills to become creative, inventive and enterprising adults in a world where the skills and knowledge of the sciences are needed across all sectors of the economy.

Audience:
All staff

Quality Indicators:
2.2, 2.3, 2.7

Principles for Curriculum Design

Challenge and enjoyment
- Set learners challenging goals
- Make learners think hard about their learning
- Ensure that learning is active and engaging to motivate all learners

Breadth
- Use a variety of contexts through which to develop and demonstrate learning
- Give all pupils the opportunity to be involved in all aspects of school life

Progression
- Ensure that all learners have the opportunity to achieve appropriate success
- Ensure that all learners have the opportunity to share and celebrate their achievements
- Share expectations and standards with learners
- Review and evaluate learners' progress
- Provide timely, accurate verbal and written feedback on their learning

Depth
- Give learners the opportunity to develop and apply greater intellectual rigour
- Give pupils the opportunity to develop secure understanding

Personalisation and choice
- Take account of their prior learning
- Ensure that all learners have ownership of their learning
- Take account of different learning styles

Coherence
- Help learners see the link between different aspects of learning
- Provide opportunities for learners to transfer and apply learning in different contexts

Relevance
- Ensure learners understand the purpose of the activity
- Make links with learners experiences, learning and interests within and beyond the school

Experiences and Outcomes Overview

While every pupil needs to develop a secure understanding of important scientific concepts, their experience of the sciences in school must develop a lifelong interest in science and its applications.

The key concepts have been clearly identified using five organisers:

- Planet Earth – Biodiversity and Interdependence, Energy Sources and Sustainablity, Processes of the Planet, Space
- Forces, electricity and waves – Forces, Electricity, Vibrations and Waves
- Biological systems – Body Systems and Cells, Inheritance
- Materials – Properties and Uses of Substances, Earth's Materials, Chemical Changes
- Topical science

Learning Experiences

Effective learning and teaching approaches extend experiential learning from the early years into primary school and beyond. As pupils progress in their learning of the Sciences, teachers can take advantage of opportunities for study in the local, natural and built environments, as an opportunity to deepen their knowledge and understanding of the big ideas of the sciences. Teaching and learning approaches should promote thinking as well as provide opportunities to consolidate and apply learning.

In the Sciences, effective learning and teaching depends upon the skilful use of varied approaches, including:

- active learning and planned, purposeful play
- development of problem solving skills and analytical thinking skills
- development of scientific practical investigation and inquiry
- use of relevant contexts, familiar to young people's experiences
- appropriate and effective use of technology, real materials and living things
- building on the principles of Assessment is for Learning
- collaborative learning and independent thinking
- emphasis on children explaining their understanding of concepts, informed discussion and communication.

The experiences and outcomes in Science also provide opportunities for pupils to develop and practise a range of inquiry and investigative skills, scientific analytical thinking skills, and develop attitudes and attributes of a scientifically literate citizen; they also support the development of a range of skills for life and skills for work, including Literacy, Numeracy and skills in Information and Communications Technology (ICT).

Contexts for Learning

Sciences is taught as a component of cross curricular themes and/or interdisciplinary learning, either as a main driver or as vehicle. Science can also be taught as a discrete subject.

Hazlehead has identified and agreed whole world themes across the school to ensure continuity and progression while allowing for flexibility to respond spontaneously to the world around us. This includes Our Scientific World.

Each year group has allocated specific Experiences and Outcomes in Sciences. This is part of our curriculum design.

Engaging with the Wider Community

Every year, the school raises the profile of specific subjects by planning cross curricular learning themed worlds. This allows for strong links with the local and wider community to be established and strengthened. There may be people listed in the school's Parental Skills Database to contact for support with planned activities. This also allows pupils to make real life connections between a curricular area and the wider world.

Local institutions and companies may also be able to support:

- The Marine Lab
- The Macaulay Land Use Research Institute
- Rowett Research Institute
- Waste Aware Aberdeen

Assessment

This will focus on pupils' knowledge and understanding of key scientific concepts in the living, material and physical world, inquiry and investigative skills, scientific analytical and thinking skills, scientific literacy and general attributes. Teachers can gather evidence of progress as part of day-to-day learning, and specific assessment tasks will also be important in assessing progress at key points of learning.

From the early years, pupils will demonstrate progress through their skills in planning and carrying out practical investigations, inquiries and challenges, working individually and collaboratively, and describing and explaining their understanding of scientific ideas and concepts. They will also demonstrate evidence of progress through their abilities and skills in reasoning, presenting and evaluating their findings through debate and discussion, expressing informed opinions and making decisions on social, moral, ethical, economic and environmental issues.

Approaches to assessment should identify the extent to which pupils can apply these skills in their learning and their daily lives and in preparing for the world of work. For example:

- How well do they contribute to investigations and experiments?
- Are they developing the capacity to engage with and complete tasks and assignments?
- To what extent do they recognise the impact the sciences make on their lives, on the lives of others, on the environment and on society?

Progression in knowledge and understanding can be demonstrated, for example, through pupils:

- providing more detailed descriptions and explanations of increasingly complex scientific contexts and concepts
- using a wider range of scientific language, formulae and equations
- presenting, analysing and interpreting more complex evidence to draw conclusions and make sense of scientific ideas.

They will demonstrate their progress through investigations, inquiries and challenges, and through how well they apply scientific skills in increasingly complex learning situations. For example, investigations and inquiries will become more evaluative, deal with an increasing range and complexity of variables, and involve collecting and analysing increasingly complex information.

Through developing these skills, pupils will demonstrate growing confidence and enjoyment of the sciences. Assessment should also link with other areas of the curriculum, within and outside the classroom, to allow children and young people to demonstrate their increasing awareness of the impact of scientific developments on their own health and wellbeing, society and the environment.

Further information can be found by accessing the Benchmarks for Expressive Arts on the Education Scotland website.

Resources

- Matthew Crowther (Sciences Co-ordinator)
- The school has a range of practical equipment and activity based resources in school in the resources room.
- The annual Techfest Science week in September provides unique opportunities to enrich pupils' learning. Visits to TechFest-SetPoint, are possible at other times. The Satrosphere Science Centre has an excellent range of practical activities on a variety of topics. www.satrosphere.net
- Internet resources include: Generation Science (accessed through GLOW), Glasgow Science Centre www.glasgowsciencecentre.org, Global Science www.global-science.net/links.html, BBC Schools www.bbc.co.uk/schools/ks2bitesize/science, Enchanted Learning www.enchantedlearning.com, Sheppard www.sheppardsoftware.com, The Woodlands Trust www.woodlandtrust, Woodlands Junior School www.woodlands-junior.kent.sch.uk