

# PORTFIELD SCHOOL & SATELLITE CENTRES



## POLICY DOCUMENT FOR FOR SCIENCE



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## **REVIEW OF POLICY**

This policy will be reviewed biennially in consultation with staff, parents and governors.

This policy was adopted by:

Headteacher .....

Date .....

Chair of Governors .....

Date .....

## **Portfield School Mission Statement**

Working together      Learning together      Achieving together

At Portfield School we strive to

- Create a happy, safe, supportive and stimulating learning environment
- Value everyone
- Develop everyone's personal, social, emotional health and wellbeing
- Promote relevant academic and vocational skills
- Meet individual needs through an imaginative and flexible approach
- Enable all learners to achieve their full potential

### **UNCRC United Nations Convention on the Rights of the Child**

- Portfield School places the values and principles of the UNCRC at the heart of all policies and practices
- Portfield School is a Rights Respecting School

### **Introduction**

This document is a statement of the philosophy, aims and objectives, teaching and learning strategies of Science in Portfield School. It has been developed through a process of consultation with teaching staff.

### **Philosophy**

For our pupils, Science is an introduction to the world of living things, materials and their properties and physical processes. It is a practical subject which develops the spirit of enquiry by encouraging curiosity and reason.

Throughout the world, scientists have revealed vast amounts of knowledge about our world by using such skills as observation, prediction, investigation and interpretation. Each pupil needs to enjoy the experiences associated with science by increasing and developing their knowledge and by starting to use the skills associated with scientific methods of investigation.

This will include opportunities to apply science in everyday life. Working with others, learning to persevere and ask questions are attributes which encourage work to be carried out in a scientific way.

Throughout the Science Curriculum we are incorporating sustainable development and global citizenship where appropriate.

### **Aims**

Our aims for teaching science are developed from this philosophy and are listed below.

- To provide interest and enjoyment in a stimulating environment.

- To encourage pupils to learn through experience, observation, exploration and discovery.
- To increase pupils' awareness of the world around them.
- To encourage the asking of questions such as why?, what would happen?...etc.
- To stimulate pupils' scientific awareness of themselves and of their environment.
- To develop a feeling of responsibility for the environment.
- To increase pupils' knowledge of scientific facts and principles.
- To follow and develop science as part of an extra-curricular approach.

### **Roles and responsibilities**

All members of the teaching staff have a responsibility for the teaching of Science and they need to ensure that their knowledge is continually updated. The school has a Science coordinator. The role is to:

- take the lead in policy development and production of the schemes of work, ensuring continuity and progression across the school;
- support colleagues in teaching the subject content, development of planning, implementation of the scheme of work and in assessment and record keeping activities;
- monitor teaching and learning to continue to support improvement in pupil progress and report back to the headteacher, staff and governors;
- have responsibility for the purchase and organisation of central resources for Science and relevant ICT resources;
- keep up to date with current initiatives and curriculum development;
- disseminate this information to the staff and keep them informed of possible visits, exhibitions and courses;
- collaborate with colleagues in other schools.

### **Teaching and Learning Strategies and Planning**

It is important that the class teacher identifies the most appropriate teaching strategy to suit the purpose of a particular learning situation.

There are a variety of ways in which the teaching may be effective and teachers are encouraged to use their enthusiasm and professional judgement to identify the most sensible, suitable and appropriate methods of the work being conducted.

The Scheme of Work provides suggestions to help in the selection of suitable activities and the most effective approach. Pupils are encouraged to work as individuals and in groups when appropriate. Pupils are encouraged to use a variety of means of communicating and recording their work.

### **Differentiation**

In order to provide for pupils of different abilities within each class we endeavour to differentiate tasks in suitable ways.

Differentiation is catered for in one of three ways:

1. Differentiation by task.
2. Differentiation by outcome.

3. Differentiation by assistance offered.

### **Literacy and Numeracy Framework**

Teachers should provide opportunities, where appropriate, for pupils to develop and apply the following common requirements through their study/participation in Science.

Pupils will be given the opportunity to develop, practise, apply and refine their skills across the subjects through group and individual tasks.

### **Developing Literacy**

Oracy: Speaking, listening, collaboration & discussion

Reading: Reading strategies & comprehension

Writing: Handwriting, grammar, punctuation, spelling, writing for meaning, structure & organisation

Pupils will be given the opportunity to communicate ideas, information and data in a variety of ways depending on the nature of the task, audience, purpose and the learner's own preferences. Communication can take a wide variety of forms including the use of IT at times. Pupils develop their communication skills across the curriculum through the skills of oracy, reading, writing and wider communication. Wider communication skills include non-verbal communication of all kinds – including gesture, mime, signing and the expression of ideas and emotions through other mediums such as music and art.

In science, opportunities to develop communication apply throughout the Skills and Range sections of the programmes of study for Key Stages 2, 3 and 4.

### **Developing Numeracy**

Represent & communicate

Use number facts & relations

Estimate and check

Length & temperature

Pupils will be given the opportunity to estimate and measure using non-standard then standard measures recording the latter with appropriate S.I. units. They will use tables, charts and graphs where appropriate, to record and present information. With increasing maturity they will be able to draw lines of best fit on line graphs, use some quantitative definitions and perform scientific calculations.

Pupils develop their number skills across the curriculum by using mathematical information, calculating, and interpreting and presenting findings. Mathematical information includes using numbers, measuring and gathering information. Calculating refers to using the number system and a variety of methods. Interpreting and presenting results includes talking and explaining work, comparing data and recording and interpreting data and presenting findings.

### **Developing ICT Skills and Digital Competency**

Pupils develop their ICT and digital competence skills across the curriculum by finding, developing, creating and presenting information and ideas and by using a wide range of equipment and software. They also will develop a growing awareness of how to use digital technology to create, produce and share information and ideas.

They will develop skills to stay safe and identify the risks and benefits of using technology. In Science, pupils use their ICT and digital competence skills to access the internet for information. In fieldwork they use equipment to gather and organise information and select tools to enhance the presentation of their findings.

### **Developing thinking skills.**

Pupils will be given the opportunity to develop their thinking skills through the processes of planning, developing and reflecting, which helps them acquire deeper understanding and enables them to explore and make sense of their world. These processes enable pupils to think creatively and critically, to plan their work, carry out tasks, analyse and evaluate their findings and to reflect on their learning, making links within and outside the setting/school. The processes of developing thinking, namely plan, develop and reflect, should not be seen as a set style of learning and teaching. Each process does not have a specific place in a task. The three processes should be interchangeable. Focused and paired/group work will give the opportunity for the development of learning and thinking strategies, which can be developed and applied to new situations.

### **Learning across the curriculum.**

#### **Curriculum Cymraeg- pupils aged 7-14**

Pupils aged 7-14 will be given opportunities to develop and apply knowledge and understanding of the cultural, economic, environmental, historic and linguistic characteristics of Wales. Pupils should appreciate the different languages, images, objects, sounds and tastes that are integral in Wales today and gain a sense of belonging to Wales, and understand the Welsh heritage, literature and arts as well as the language.

Pupils' Welsh language skills should be progressively developed throughout the Foundation Phase by implementing the Welsh Language Development Area of Learning.

Science contributes to the Curriculum Cymreig by the use of contexts that are relevant to learners' lives in Wales. The rich and varied environment around our pupils gives the basis for fieldwork. Pupils will have the opportunity to study recycling, sustainability and the impact of humans within their locality and further afield.

#### **Wales, Europe and the World – pupils aged 14-19**

Pupils aged 14-19 will have the opportunities for active engagement in understanding the political, social, economic and cultural aspects of Wales as part of the world as a whole.

### **Personal and Social Education**

Personal and Social Education is taught as a core subject in school.

In science pupils will be given opportunities to promote their health and emotional well-being and moral and spiritual development; to become active citizens and promote sustainable development and global citizenship; and to prepare for life-long learning. Children learn about themselves, their relationships with other children and adults both within and beyond the family. They are encouraged to develop their self-esteem, their personal beliefs and moral values. They develop an understanding that others have differing needs. They develop an awareness of their environment and learn about the diversity of people who live and work there.

For pupils aged 14-19 this is part of their learning core entitlement.

### **Careers and the world of work.**

Pupils aged 11-19 will be given opportunities to develop their awareness of careers and the world of work and how their studies contribute to their readiness for a working life.

For pupils aged 14-19 this is part of their learning core entitlement.

Science contributes to careers and the world of work by enabling pupils to study a range of applications of science, medicine and technology in their everyday life and in the wider world.

Throughout all stages ongoing assessment will enable teachers to plan for the next step for individual pupils.

### **Science in the National Curriculum**

Science will be delivered largely through topic work and the Equals Schemes of work.

Science will be studied in its own right as a core curriculum subject in the national curriculum. However it is important that we explore cross-curricular links in order that the curriculum may be delivered to pupils as a coherent whole.

**The Programme of study for Science in the national Curriculum for Wales order for Science 2008 is divided as follows.**

- 1. Interdependence of organisms.**
- 2. The sustainable earth.**
- 3. How things work.**

Scientific enquiry and Investigative Science, is also part of the programme of study.

### **Objectives**

#### **1. Interdependence of organisms.**

- Pupils should know the names, positions, functions and relative sizes of a human's main organs.
- Pupils should know the need for a variety of foods and exercise for human good health.
- Pupils should know the effect on the body of some drugs e.g. alcohol, solvents, tobacco.
- Pupils should know through fieldwork, the plants and animals found in two contrasting local environments, e.g. identification, nutrition, life cycles, place in environment.
- Pupils should know the interdependence of living organisms in those two environments and their representation as a food chain.

- Pupils should know the environmental factors that affect what grows and lives in these two environments, e.g. sunlight, water availability, temperature.
- Pupils should know how humans affect the local environment, e.g. litter, water pollution, noise pollution.

## **2. The sustainable earth.**

- Pupils should know the daily and annual movements of the earth and their affect on day and year length.
- Pupils should know the relative positions of key features of the Sun and planets in the solar system.
- Pupils should compare the features and properties of some natural and man-made materials.
- Pupils should know the properties of materials relating to their use.
- Pupils should know how some materials are formed or produced.
- Pupils should be able to consider what waste is and what happens to local waste that can be recycled and that which cannot be recycled.
- Pupils should be given the opportunities to consider different interpretations and distinguish between ‘facts’, beliefs, and opinions, and to give reasons and to begin to recognise bias.
- Pupils should be given opportunities to form considered opinions and make informed decisions.

## **3. How things work.**

- Pupils should know the uses of electricity and its control in simple circuits.
- Pupils should know the forces of different kinds, e.g. gravity magnetic and friction, including air resistance.
- Pupils should know the ways in which forces can affect movement and how forces can be compared.
- Pupils should know how different sounds are produced and the way sound travels.
- Pupils should know how light travels and how this can be used.

### **Pupils aged 3-7 and the Foundation Phase**

For pupils aged 3-7 science will be taught under the **Foundation Phase** framework, where science is taught alongside history and geography, in the **Area of Learning** entitled **Knowledge and Understanding of the World**.

The programme of study for science in the Foundation Phase Knowledge and Understanding of the World is divided as follows:-

#### **1. Myself and other living things.**

#### **2. Myself and non-living things.**

### **Objectives**

#### **1. Myself and other living things**

Pupils will be given the opportunities to:-



- Learn the names and uses of the main external parts of the human body and plants.
- Observe differences between animals and plants, different animals, and different plants in order to group them.
- Identify the similarities and differences between themselves and other children.
- Learn about the senses that human and other animals have and use them enable them to be aware of the world around them.
- Identify some animals and plants that live in the outdoor environment.
- Identify the effects the different seasons have on some animals and plants.

### **Myself and non-living things.**

Pupils will be given the opportunities to :

- Experiment with different everyday objects and use their senses to sort them into groups according to simple features.
- Experiment with different everyday materials and use their senses to sort them into groups according to simple properties.
- Develop an awareness of, and be able to distinguish between, made and man-made materials.
- Understand how some everyday materials change in shape when stretched, squashed, bent and twisted, and when heated or cooled.
- Understand that light comes from a variety of sources, such as the sun, and that darkness is the absence of light.
- Understand that there are many kinds and sources of sound, that sounds travel away from sources and that they are heard when they enter the ear.

### **Health and Safety**

Good Science is all about being safe.

Risk assessment should be carried out before undertaking any experiment / activity.

This ensures that members of staff are fully conscious of any risk, however small.

The key elements of such assessments is to assess the risk associated with the activity as well as the materials - this will include working with living things as well as materials e.g. visit to local farm / seal sanctuary.

It is possible to assess...

1. The likelihood of an accident occurring.
2. The possible effects of an accident.

By combining these two factors it is possible to assess the realistic degree of risk. The assessment should then include details of the procedures to be followed in performing the activity, how these details will be communicated to the children and how it will be monitored. It should also recognise the procedures to be followed in case of an accident.

### **Staffing**

Science is taught by the class teacher with small group / individual guidance provided by the support staff.

The Science co-ordinator is available to provide support and advice through a timetabled programme.

### **Resources**

Resources are available in two areas.

In upper school:-

In designated cupboards in the science area of Class1.

Files will be kept in the staff room.

See appendix 1

In lower school:-

In the staff room.

See Appendix 2

### **Monitoring and Assessment**

We use Equals baseline assessment for our pupils.

We also monitor their progress through PIVATS - Performance Indicators for Value Added Target Setting.

### **Assessment, Recording and Reporting**

Assessment, recording and reporting in Science is carried out in accordance with the school's Assessment, Recording and Reporting policy. Individual progress and attainment is assessed and targets set.

Assessment in Science is achieved through:-

- Observation – whilst pupils are working
- Discussion – much is learnt about the child's understanding by the way they respond to questions asked about their work
- The written evidence they may produce
- RFL, P levels and NC outcomes and levels (SOLAR) are used to show progress.
- Pupil self assessment and peer assessment is promoted throughout all areas.

### **Equal Opportunities**

All pupils will have access to a broad, balanced and relevant curriculum regardless of their race, culture, background, gender, other protected characteristics or disability. All areas for equal opportunity will be taken into consideration when planning lessons, activities and access to the Science Curriculum. Provision should be made to enable the use of switches, IT, Communication aids etc. and the deployment and support given by staff.

### **Parental Involvement**

Parental involvement in this area is important in that children often gain wide experience in this curriculum area in the home.

Where parents have a particular ability, they should be encouraged to contribute to curriculum development and delivery.

Parental involvement can be achieved through...

- Assessment and reporting procedures

- Development of IEPs
- Multi-disciplinary input
- Home-school diaries
- Open evenings
- Accompanying pupils on visits

### **Implementing, Monitoring and Evaluating the Policy**

All staff will take responsibility to ensure the policy is implemented within their classroom/lessons.

The effectiveness of the policy will be reviewed biennially by the co-ordinator.

- Is current practice still reflected?
- Are the aims being achieved?
- Is there evidence to show breadth and balance in the curriculum?
- Is monitoring and planning effective?
- Is there evidence around school that demonstrates pupil achievement and enjoyment?
- Are resources effectively allocated?
- Is there evidence that teaching and learning is effective?

## **APPENDIX 1**

Upper school,

Electrical board / circuit.

Bulbs

Bulb-holders

Crocodile clips

Motors, battery holders

Prisms

Lenses

Magnifying glasses

Mirror / candles

Candle holders

Wax beads

Colour paddles

Rock samples

'Materials' samples e.g. rubber / tin / copper / wood etc.

Propellers

Motors of different sizes

Wheels of different sizes

Pulley wheels-different sizes

Rubber bands

Balloons, balls-different sizes and densities

Parachute

Stethoscope

Petri dishes

Pipettes

Test tubes

Plastic tubing-different widths

Tuning forks

Plant pots

Seeds

Mini propagator

Seashells

Wood of various textures/sizes

Slate

Bricks

## **APPENDIX 2**

### **Video Resources**

#### **BBC Cat's eyes KS1**

Plants Animals and the environment

Materials and their uses

People and Living things

#### **Electricity Association**

Safety video

#### **Picture Packs**

Changing materials

Small creatures

Plants

## **Bibliography**

National Curriculum Blueprints. Stanley Thomas

Science KS1 teachers resource book  
Science KS2 teachers resource book  
KS1 Photocopyable pupil resources  
KS2 Photocopyable pupil resources  
Science 5-7

Themes for early years-Lynne Burgess  
Pets

Hamish Hamilton-Set of topic books by Joyce pope

The mouse

The owl

The starling

The hedgehog

The fox

Ginn Science Level 1

My bike

Taste

The park in spring

Cranes

At the seaside

The rainy day

Our pets

Leaves

By the wall

The windy day

My day

Listen

The tomato plant

Ginn reading 360 little books level 5

Animal morning

Fun in the snow

Ken's go-cart ride

How dogs can help us.

The man who makes machines

The mayor goes into space

The animal man

The giant who liked to eat cars

The girl with yellow eyes

Mop did it

Helping the police

Hope Harry and Hatty science resource packs KS1

1. Find out about living things
2. Find out about materials

3. Find out about the physical world
4. You are an animal too
5. Plants alive
6. All the same?
7. What is it made of?
8. Changes
9. Switches and circuits
10. Pushes and pulls.