Neyland Community School

Science and Technology

AoLE Teaching and Learning Policy

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Links to the UNCRC:

Article 28: (right to education) Every child has the right to an education. Primary education must be free and different forms of secondary education must be available to every child. Discipline in schools must respect children's dignity and their rights. Richer countries must help poorer countries achieve this.

INTENT:

Science and Technology draws on the disciplines of biology, chemistry, computer science, design and technology, and physics to enhance our knowledge and understanding of the world. At Neyland Community School we want to promote 'Ambitious, Capable Learners' through a carefully planned curriculum.

At Neyland Community School, our lessons are planned cross-curricularly always linked to our rich termly themes. For example, Autumn 2022: 'Global Goals – LIFE ON LAND'. When planning across this AoLE, we always keep in mind the 'what matters statements' of:

Being curious and searching for answers is essential to understanding and predicting phenomena.

Design thinking and engineering offer technical and creative ways to meet society's needs and wants.

The world around us is full of living things which depend on each other for survival.

Matter and the way it behaves defines our universe and shapes our lives.

Forces and energy provide a foundation for understanding our universe.

AIM:

At Neyland Community School we aim to provide a balanced, progressive and rich learning experience in Science and Technology to our pupils across the phases. As a school community, we specifically aim:

- To develop learners' enjoyment and interest in science & technology, and an appreciation of its contribution to all aspects of everyday life
- To build on learners' curiosity of the world and the achievements of science & technology
- To use a range of investigations and practical activities, both indoors and outdoors, to give learners a greater understanding of the concepts and knowledge of science & technology
- To provide learners with opportunities to explain their thinking, explore, discuss and use literacy skills to communicate their ideas
- To develop learners' basic practical skills and their ability to design, create, measure, interpret data, make deductions, communicate and draw conclusions based on evidence
- To develop learners' ability to develop and apply digital skills appropriately
- To develop and apply wider skills including critical thinking and problem-solving, planning and organisation, creativity and innovation, careers and work-related experiences
- To explore how Wales has contributed to scientific & technological innovation and development

OBJECTIVES:

The following objectives derived from the above aims will form the basis of our decision making when planning lessons and enquiries linked to our termly whole school themes:

- To use experiences indoors and outdoors
- To develop learners' enjoyment and interest in science & technology using real world examples to demonstrate its contribution to everyday life
- To develop an appreciation of the contribution made by famous scientists and inventors to our knowledge of science & technology, including those from Wales and other cultures
- To develop in learners a general sense of enquiry which encourages them to question and make suggestions
- To encourage learners to predict the likely outcome of their investigations and practical activities
- To provide learners with a range of specific investigations and practical work which gives them a worthwhile experience to develop their understanding and skills of science & technology
- To develop progressively learners' ability to plan, carry out, evaluate and communicate science & technology activities
- To develop the ability to record results in an appropriate manner including the use of diagrams, graphs, tables and charts
- To introduce learners to the language and vocabulary of science & technology
- To give learners regular opportunities to use the scientific & technological terms necessary to communicate ideas
- To develop learners' basic practical skills and their ability to make accurate and appropriate measurements
- within practical activities give learners opportunities to use a range of instruments and equipment safely
- To give learners opportunities to use digital media (video, digital camera, data logger) to record their work and to store results for future retrieval
- To give learners the chance to obtain information from a wide range of sources including first-hand experience, books, internet and experts in their field

ASSESSMENT, TARGET SETTING AND RECORD KEEPING:

Teachers in the Early Years use Tapestry as their assessment tool. This is a tool which is used to take photographic evidence which is then linked to the progression steps. The information can be shared with families using the Tapestry app. The assessments are recorded daily and linked with the new curriculum progression steps.

Teachers in years 1-6 use the Balance Assessment Tool to assess all children. They do this using the learning events section. Weekly objectives are set, linked to the planned work. These objectives are then assessed during and after the unit of work. Teachers also make half termly professional judgements for all AOLE's including Science and Technology.

INCLUSION:

Teaching and learning is adapted to suit the learning and ability of all children, whilst ensuring that all children are suitably challenged. Every pupil is given the opportunity to be included in all aspects of school life and in all areas of the curriculum. We promote positive attitudes and a "marvellous mistake" ethos throughout the school. All children are encouraged to challenge themselves, seek to discover and believe in their own ability.

Teaching styles are adapted in response to learning needs. Pupil groups such as ALN, eFSM and vulnerable families are at the forefront of everything we do at Neyland Community School. We instil a belief in all of our children than “Those who seek discover, those who discover change the world”.

MAT PROVISION:

Through the DARWIN CENTRE, we provide targeted workshops for identified MAT pupils from Year 3 - 6. The Darwin Centre for Biology and Medicine is a Pembrokeshire charity established in 1994, it aims to engage and enthuse young people, families, and communities in Science, Technology, Engineering, and Mathematics (STEM). Through this experience MAT children are able to expand their knowledge, experience and enquiry skills as it relates to local environmental and biological topics.

ROLE OF SUBJECT LEADER:

The Subject Leader is responsible for the development of Health and Wellbeing throughout the school through:

- Monitoring and evaluating Espresso Coding and other S&T initiatives, through the lens of the poorest learner.
- Monitoring pupil progress and analysis of data using Balance and Tapestry, including RADY learners attainment and progress as a priority, leading to constructive diagnostic conversations.
- Monitoring the quality of the Learning Environment and resources
- Auditing and supporting colleagues in their CPD
- Purchasing and organising resources
- Reporting to governors and SLT
- Guidance and support for parents and carers
- Keeping up to date with current information around the S&T AoLE

STAFF DEVELOPMENT:

Staff development is undertaken in the following ways:

- By identifying areas for development during Performance Management reviews.
- In the School Improvement plan (whole school development).
- By making staff aware of relevant courses / training opportunities.
- By observation and feedback during learning walks.
- By whole school INSET.
- By visits to other schools and settings when appropriate.

ROLE OF THE PARENT/CARER:

We encourage parents to support their child’s learning:

- By attending the school parents’ evenings which are held twice a year to discuss individual progress and targets for the future ensuring this is done equitably with understanding and care for RADY families.
- By supporting completion of Science & Technology related homework through the platform of Google Classroom.
- By encouraging engagement in opportunities for further learning through STEM SQUAD after school club and STEM week science challenges.

GOVERNORS:

It is the role of the Science & Technology Governor to:

- Play a key role in the monitoring and evaluating of Science & Technology throughout the school. This will include focussed visits, discussions with the Science & Technology leader, policy and action plan evaluation and review of data and results.
- The Science & Technology Leader will keep governors informed of the implementation, progress and impact of initiatives within the school.

STEM SQUAD:

At Neyland Community School, our inclusive after school club of 'STEM SQUAD' meets weekly to explore various STEM challenges and questions, as well as a variety of technology. This club is open to KS2 children and is carefully planned to suit the needs of all learners.

BELOW is now Science specific Teaching and Learning Policy / Teacher Guidance for 'The Neyland Way' regarding this AOLE.

Please see separately detailed DCF Policy for further information regarding technological teaching and learning.

We aim to explore with our pupils ONE rich science investigation per half-term. This is to accompany other DCF opportunities across the curriculum and other cross-curricular teaching of scientific topics linked to our themes and the progression steps.

PROGRESSION OF INVESTIGATIVE SKILLS				
The below table is aimed to provide guidance to practitioners at Neyland Community School regarding which scientific skills are to be taught to each phase, in line with the Science and Technology Progression Steps. This is to be used when planned a rich scientific investigation.				
Skill Category	**Reception**	**Year 1/2**	**Year 3/4**	**Year 5/6**
Testing	Perform simple comparative tests, teacher guided *e.g. Which materials keep things warmest?*	Perform simple comparative and fair tests *e.g. □ Finding out how seeds grow best* *□ Which materials keep things warmest?* Know whether the test has been successful and can say what has been learned.	Set up simple practical enquiries, comparative and fair tests *e.g. □ Which of two instruments make the highest or lowest sound and does a glass of ice weigh more than a glass of water.* Set up a fair test with more than one variable *e.g. using different materials to cut out sound.* Can explain to others why a test is fair *e.g. discover how fast ice melts in different temps*.	Set up an enquiry-based investigation. e.*g. □ Find out what adults/ children can do now that they couldn't do when they were a baby.* Set up a fair test when needed. *e.g. □ Which surfaces create most friction?* Know what variables are in a given enquiry and can isolate each one when investigating e.*g. □ Finding out how effective parachutes are*

				when made with different materials.
Scientific Questioning	Show curiosity and ask simple questions about how things work.	Ask simple questions and recognise that they can be answered in different ways *e.g. □ Why are flowers different colours?* *□ Why do some animals eat meat and others do not?* *□ Why do some trees lose their leaves in autumn and others do not?* *□ How long are the roots of tall trees?* *□ Why do some animals have underground habitats?*	Ask relevant questions based on own experience and suggest simple methods to answer them *e.g. □ Why are steam and ice the same thing?* *□ Why is the liver important in the digestive system?* *□ What do we mean by pitch when it comes to sound?* *Why does the moon appear as different shapes in the night sky?* *□ Why do shadows change during the day?* *□ Where does a fossil come from?*	Can identify questions that can be investigated scientifically and suggest suitable methods of inquir
Measuring	Use simple equipment to observe closely	Use simple equipment such as thermometers and rain gauges to observe closely changes over time	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Take measurements using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate (maths focus including capacity and mass)
Gathering and Recording	Gather and record data with teacher led assistance to help in answering	Gather and record data to help in answering questions including from	Gather, record, classify and present data in a variety of ways to help in answering	Record data and results of increasing complexity using scientific diagrams and

	questions. Can include bar charts, tally charts, etc.	secondary sources of information using drawings, labelled diagrams, block graphs or tables. (Year 2 focus)	questions drawings, labelled diagrams, keys and child constructed bar charts and tables.	labels, classification keys, tables, scatter graphs, bar and line graphs
Communicating Findings	With encouragement can verbally communicate what has been found out through investigation	Make a simple written explanation about what has been learned from an investigation or what conclusions have been found.	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
Classifying	Group and classify according to simple given criteria.	Identify, group and classify according to a given criteria e.g. mammals and birds e.g. using a Venn Diagram	Group information according to common factors e.g. materials that make good conductors or insulators. e.g. Venn Diagrams with bisecting sets or Carroll Diagrams	Group and classify things and recognise patterns using appropriate ways of presenting e.g. classification keys.
Scientific Research			Use research to find out a range of things e.g. *How reflection can help us see things that are around the corner.* *What are the main differences between sedimentary and igneous rocks?*	Find things out using a wide range of secondary sources of information
Predictions and Conclusions	Can verbally discuss what they notice following a scientific enquiry	Can use my *knowledge* and understanding to predict effects as part of my	Can use my *knowledge* and understanding to predict effects as part of my	Can use my *knowledge* and understanding to predict effects as part of my

		scientific exploration. Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns (Year 2 focus)	scientific exploration. Can recognise patterns from my observations and investigations and can communicate my findings.	scientific exploration. Can recognise patterns from my observations and investigations and can communicate my findings. Can evaluate methods to suggest improvements.

GUIDE FOR TEACHERS: Scientific Enquiry / Investigation Subheadings by PHASE:

Note: Not applicable to Nursery/Reception

Year 1/2	Year 3/4	Year 5/6
All to be either discussed and done as a group/class or individually – still all evidenced in books through either written work or pictures: **Question:** **Prediction:** **Materials/Equipment:** **Method:** **Observations:** **Conclusion:** ***PicCollage*** *– always include PicCollage photo depicting investigation and any use of equipment, cooperative learning, etc that took place as part of investigation.*	Most to be evidenced in written format in pupils' books, some may be done as whole class or given (i.e. method). Some steps may be done as a class and support given for using scientific language in prediction, conclusion, etc. (see below resources): **Question:** **Prediction:** **Materials/Equipment:** **Method:** **Observations:** **Conclusion:** ***PicCollage*** *– always include PicCollage photo depicting investigation and any use of equipment, cooperative learning, etc that took place as part of*	Most to be evidenced in written format in pupils' books, some may be done as whole class or given (i.e. method). Some steps may be done as a class and support given for using scientific language in prediction, conclusion, etc. (see below resources): **Question:** **Prediction:** **Materials/Equipment:** **Method:** **Observations:** **Conclusion:** **Evaluation:** ***PicCollage*** *– always include PicCollage photo depicting investigation and*

	investigation.	*any use of equipment, cooperative learning, etc that took place as part of investigation.*