Science and Technology Policy

Date	Review Date	Co-ordinator	Nominated Governor
October 2021	October 2024	Mrs Joanne Davies Miss N Stoakes Miss R Lewis	Mr M Dixon

United Nations Convention on the Rights of the Child

At Llangewydd Junior School, we put the United Nations Convention on the Rights of the Child (UNCRC) at the heart of our school's planning, policies, practice and ethos. We are a Rights-Respecting School and teach about children's rights - modelling rights and respect in all our relationships: between teachers/adults and our learners.

The UNCRC underpins our school vision and aims. We encourage our children to:

- listen to others and respect their ideas.
- learn about their rights, respect the rights of others and to inform others of children's rights.

Introduction

This Science and Technology policy outlines the purpose and organisation of teaching and learning in Science and Technology at Llangewydd Junior School. It is shaped by our commitment to enabling all our learners to achieve the highest academic and personal standards of which they are capable, gaining knowledge and skills in Science and Technology. In designing and continuously refining our provision in Science and Technology, we are committed to providing our learners with a broad and balanced curriculum that enables them to realise the four purposes and equips them for ongoing learning, work and life. When learners embrace such challenges, they are encouraged to take risks, to innovate and evaluate, and learn to develop solutions. They can become more resilient and purposeful learners across all areas of learning and experience. Our Science and Technology provision currently adheres to the statutory requirements of the National Curriculum as we simultaneously develop high-level curriculum design in preparation for implementation of the Curriculum for Wales 2022.

At Llangewydd Junior School, as lifelong learners, we believe that the teaching and learning of Science and Technology should be a positive and inspiring experience for us all with well-being and enjoyment at its core.

Through our provision, we equip our learners with the skills of creativity, innovation, personal effectiveness, planning and organising and help them to be critical thinkers and problem solvers.

We understand that:

- 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.
- matter and the way it behaves defines our Universe.
- forces in energy provide a foundation of understanding.
- computation is the foundation for our digital world.

Our essential nurturing of children's progress in Science and Technology takes the form of the fullest possible development of a child's capabilities as a listener, enquirer, observer and investigator. We aspire to extend their scientific and computational language and knowledge by creating an inspiring and pupil-led curriculum.

Principles

At Llangewydd Junior School, our Science and Technology provision, framed by our four purposes, is shaped by the following salient principles and aspirations for our learners to develop:

- an increasing breadth and depth of knowledge – Knowledge moves through exploration from a personal understanding of the world to an abstract view that enables learners to conceptualise and justify their understanding.
- a deepening understanding of the ideas we understand that investigative skills can be applied to all other Science and Technology topics. Children will develop iterative approaches to problem-solving from computer science and design technology that can also be beneficial to all sciences across the curriculum.
- an understanding that sophistication and refinement needs to be seen in the way they explore and investigate the problems and the resulting formulation of creative solutions.
- an ability to make connections and transfer their learning into new contexts. Our learners will develop the capacity to apply their learning in Science and Technology to inform their thinking and action beyond the classroom.
- an effectiveness to become more independent and develop an ability to regulate their own thinking.

Science Aims

At Llangewydd Junior School we aim to stimulate a child's curiosity in finding out why things happen the way they do. We teach methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and begin to appreciate the way in which science will affect the future on a personal, national and global level. We ensure that scientific skills are developed and that they can use equipment, conduct experiments, build arguments, explain concepts confidently and continue to ask questions, whilst being curious about their surroundings.

At Llangewydd Junior School, we encourage and engage our children to:

- think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- be confident and competent in the full range of practical skills.
- take the initiative in, for example, planning and carrying out scientific investigations.
- demonstrate excellent scientific knowledge and understanding in written and verbal explanations.
- solve challenging problems and report scientific findings.
- show high levels of originality, imagination or innovation in the application of skills.
- undertake practical work in a variety of contexts.
- be passionate about science and its application in the past, present and future technologies.

Design and Technology Aims

At Llangewydd Junior School we aim to stimulate a child's curiosity to research, create and evaluate. We ensure that Design and Technology skills are developed by using creativity and imagination. Pupils design and make products that solve real and relevant problems within a variety of contexts. They acquire a broad range of subject knowledge and draw on disciplines such as mathematics, science, engineering, computing and art.

Pupils learn how to become resourceful, innovative, enterprising and capable citizens. Through the evaluation of past and present design and technology, they develop a critical understanding of its impact on daily life and the wider world.

At Llangewydd Junior School, we encourage and engage our children to:

- develop the creative, technical and practical expertise needed to perform everyday tasks confidently and to participate successfully in an increasingly technological world.
- build and apply a repertoire of knowledge, understanding and skills in order to design and make high-quality prototypes and products for a wide range of users.
- critique, evaluate and test their ideas and products and the work of others.
- understand and apply the principles of nutrition and learn how to cook.

Computational Aims

ICT and Computing education equip pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology. The pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Computing also ensures that pupils become digitally literate and are able to use, and express themselves and develop their ideas through, information and communication technology, at a level suitable for the future workplace and as active participants in a digital world.

At Llangewydd Junior School, we encourage our children to:

- understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation.
- analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems.
- be responsible, competent, confident and creative users of information and communication technology.

The Rights of the Child

At Llangewydd Junior School, we always aim to adhere to the rights of the United Nations Convention on The Rights of the Child (UNCRC). Digital technologies have reshaped children's lives, resulting in new opportunities to promote their well-being and rights. The following 'Rights of the Child' are promoted through the teaching of Science and Technology:

- Article 17 'Every child has the right to reliable information from a variety of sources'

Pupils at Llangewydd are encouraged to use the technology in their classrooms to investigate the world around them. This is done in a variety of ways including: individual and collaborative research tasks, watching daily/weekly news updates and other directed tasks.

- Article 24 'Governments must provide... education on health and well-being so that children can stay healthy.'

At Llangewydd Junior School, we educate our pupils on the advantages of a healthy diet and healthy lifestyle. This is achieved through science investigations and science lessons on the human body and the benefits that eating healthily and exercising can have on our body. The aforementioned lessons are reinforced through our healthy lunchtime meals and our healthy tuck shop.

- Article 28 ‘Every child has the right to an education.’

Science and Technology forms an integral part of a child’s education at Llangewydd and Science and Technology is planned for and delivered in accordance with the Curriculum.

- Article 29 ‘Education must develop every child’s personality, talents and abilities to the full.’

At Llangewydd, pupils are encouraged to reach their full potential in all curriculum subjects, including science and technology. High quality planning and teaching supports this, allowing pupils’ talents and abilities to flourish.

Curriculum Organisation – Science and Technology

(See Curriculum Policy)

The school's curriculum follows the statutory requirements of the National Curriculum which identifies three core subjects:

- English
- Mathematics
- **Science**

and eight foundation subjects:

- Welsh Second Language
- **Information and Communication Technology (ICT)**
- **Design and Technology (DT)**
- History
- Geography
- Art and Design
- Music
- Physical Education (PE)
- RE

Literacy, Numeracy and Digital Competency are central to the curriculum and are planned, taught, monitored and assessed through all areas of learning. We value the Curriculum Cymreig and our children are given opportunities across the curriculum to develop and apply their knowledge and understanding of the cultural, economic, environmental, historical and linguistic characteristics of Wales.

At Llangewydd Junior School, Science and Technology are taught through cross-curricular, topic-based learning that blends the NC subjects. Our thematic approach is shaped by the four purposes, responsive to Pupil Voice and informed by pedagogical principles. Through 'Pupil Voice' exercises, teachers plan with the children aspects of a topic that they would like to explore and this evolves during the course of a topic. This approach invests the children with ownership of their learning, making it more engaging and purposeful for them. Each half term, topics with a specific AoLE bias are chosen and a balance between the AoLEs is achieved throughout the academic year although Science and Technology is evidenced across all our topics:

Autumn Term	Humanities Topic (History bias)
Spring Term 1	Science and Technology driven topic
Spring Term 2	Health and Well-being driven topic
Summer Term 1	Expressive Arts driven topic
Summer Term 2	Humanities Topic (Geography bias)
Science and Technology is taught throughout all our topics.	

Each topic is launched with a 'Super Start' - immersion activities or experiences to engage the children's interest and enthusiasm for their anticipated learning. Similarly, each topic culminates with a 'Fabulous Finish' event to celebrate or showcase the learning that has taken place with parents, governors and other stakeholders.

- **Science and Technology** is taught throughout **all** our topics.
- Literacy, numeracy and **Digital Competency skills** are taught throughout **all** our topics.

Teaching Approaches

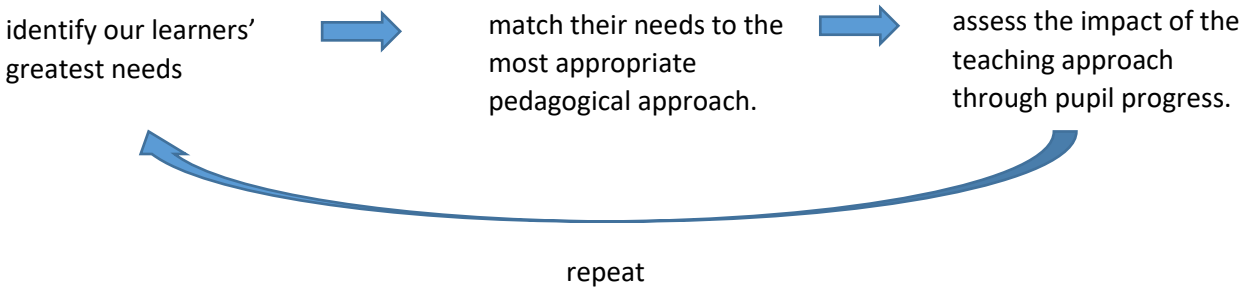
(See Teaching and Learning Policy)

In shaping our Science and Technology curriculum, we do not place an emphasis on any particular teaching approach, understanding that decisions about teaching and learning are very context and purpose specific, and are best taken by our teachers themselves. Teaching and classroom support staff use different teaching styles such as direct instruction, inquiry-based learning and collaborative learning to suit the ability and learning styles of our learners in a wide variety of teaching and learning contexts in Science and Technology.

To enhance our teaching of Science and Technology, we facilitate learning through active and practical experiences. Practical learning experiences of a specific, thematic or multi-disciplinary nature should strengthen learning and conceptual understanding, not simply engage learners in memorable and enjoyable tasks.

The planned sequencing of science and technology learning and teaching should consider the development of the *knowledge* or *skills* learners' need, in advance of engaging them in more practical activities or inquiry. We can ensure that we use science equipment, practical activities, plan, develop and carry out practical experiments and investigations to strengthen our children's Science and Technology knowledge and understanding.

We:



Within our Science and Technology provision, our teaching approaches are informed by pedagogical principles that we view as having integrity depending on the learners and their specific contexts. These include:

- creating authentic contexts for learning.
- encouraging learners to take responsibility for their own learning.
- supporting social and emotional development and positive relationships.
- encouraging collaboration.
- promoting sustained pupil effort to reach high but achievable targets.
- employing a broad repertoire of teaching approaches.
- promoting problem solving, creative and critical thinking.
- building on previous knowledge and experience to engage interest.
- focusing on the four purposes.
- using Assessment for Learning to accelerate progress.
- making connections within and across Areas of Learning and Experience.
- reinforcing cross-curricular responsibilities in literacy, numeracy and digital competence.

It may be appropriate to implement the teaching and learning of Science and Technology as:

- a whole class – whole class teaching and learning is differentiated appropriately.
- in groups
- with individual learners.

Classroom support staff are used effectively throughout the school to provide additional support for groups and individuals, helping to support specific learning difficulties, weaknesses or barriers to learning as well as challenging and extending more able learners.

At our school, a balance and variety of approaches to teaching Science and Technology are used. We recognise the relationship between listener, enquirer, observer and investigator and our teaching promotes interaction between these so that a balanced Science and Technology provision is achieved. Our learners are given opportunities to apply and improve their developing skills in science and technology across the curriculum:

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

Ask questions.
Identify, investigate and suggest suitable methods of enquiry through questions and explorations.
Recognise patterns, suggest conclusions, carry out inquiries through observations and investigations.
Use knowledge and understanding to evaluate methods and suggest improvements in scientific exploration.
Recognise and engage with technological evidence to inform opinions.

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

Produce designs.
Communicate ideas drawing inspiration from historical, cultural and other sources whilst identifying and considering factors.
Explore creatively using a range of tools, prototyping techniques to improve and refine designs to produce specific outcomes.
Consider the affects these designs will have on the environment and society.

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

Recognise patterns from observations and communicate findings using knowledge and understanding to predict effects as part of my scientific exploration.
Recognise that the things I use have an effect on the environment.
Explore relationships between living things, habitats and life cycles.
Describe features of organisms, explaining the role of organs and systems that enable plants and animals to grow.
Describe changes of growth and development, recognising interventions, defences and treatments.

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

Recognise patterns from observations and communicate findings using knowledge and understanding to predict effects as part of my scientific exploration.
Recognise that the things I use have an effect on the environment.
Explore and describe properties of materials and justify their uses.
Recognise that our planet provides natural resources explaining why they have been processed to make them useful.

Forces and energy provide a foundation for understanding our universe.

Recognise patterns from observations and communicate findings using knowledge and understanding to predict effects as part of my scientific exploration.
Use knowledge and understanding to predict effects, investigate different forms of energy and how it can be transferred.

Communicate effects forces have, exploring motion, creating a variety of models, and explaining energy transfer in myself and objects.
Explore effects of lights, sound, electricity and magnetism.

Computation is the foundation of the digital world.

Create and follow algorithms using conditional statements, repeating patterns and loops.
Use computational thinking techniques, explain and debug algorithms and explain how data is stored and processed.
Use a range of tools, materials and equipment to gather and process data.
Build and control physical devices and evaluate effectiveness for user interaction.
Explain the importance of accurate and reliable data and explain how devices can be interconnected locally and globally.

Scientific Inquiry

At Llangewydd Junior School we place an emphasis upon Scientific Inquiry. We ensure that our learners have a wide, in depth knowledge and have opportunities to participate in different forms of inquiry. We understand that Science inquiry can present itself in different forms which include:

Surveys, Patterns and Trends - This type of investigation can be a comparison or survey. In a survey, you record things you observe or measure. This type of investigation is used when there are many variables that you cannot control.

Over Time – For this type of investigation you find things out by watching one thing for a length of time, which can be a few minutes / hours / days / weeks / months / years. Sometimes we just make observations and sometimes we measure what is happening using equipment.

Classifying and Identifying – This type of investigation includes classifying things by sorting them into groups. Sometimes we sort things into different groups because they have different features, like materials or animals.

Fair Testing – In a fair test, you change one factor to find out what happens to something else. You change one factor (independent variable), measure or observe something (dependent variable) and keep all the other factors the same (control variables).

Using and Applying Models – In science, a model is a representation of an idea, an object or even a process or a system that is used to describe and explain phenomena that cannot be experienced directly.

At Llangewydd Junior School we would expect all classes to complete one full Science investigation a term, which focuses on pupil-led enquiry. We would also expect smaller topic-led investigations through the other terms, which would concentrate on one or two of the following aspects - prediction, gathering data, representing data, conclusion. (Appendix 3a and 3b can be used to support and structure a Science investigation.)

Design and Technology

At Llangewydd Junior School we use a variety of teaching and learning styles in Design and Technology. Design and Technology is about designing, making and evaluating. We aim to develop children's knowledge, skills and understanding. Teachers ensure that the children apply their knowledge and understanding when developing ideas, planning and making products and then evaluating them. We aim to ensure good practice and that teachers plan for the following essential criteria.

User – Learners should have a clear idea of who they are designing and making for, considering needs and wants.

Purpose – Learners should know what the products they design and make are for. They are given real life scenarios; products should be formed from a clearly defined task with expected criteria. Therefore, they can be evaluated in a reflective and purposeful way.

Functionality – The products learners design and make should be functional and perform a task that can be evaluated.

Design Decisions – When designing and making products, learners should have opportunities to make informed decisions when choosing materials, components, joining techniques, and considering how they will work and who they are for.

Innovation – Learners are encouraged to be creative and innovative with their thinking; leading to a range of design ideas and products being developed.

Authenticity – Learners' designs should be real and meaningful and not replicas, models or reproductions that limit design decisions.

At Llangewydd Junior School we incorporate the following aspects of Design and Technology through our topic based subjects:

Structures – shell structure (nets), **food** (also linked to Health and Wellbeing AoLE), **textiles –** 2D shape into 3D products, Combining different fabric shapes, **mechanical systems –** levers and linkages, pulleys or gears, cams and **electrical systems – s**imple parallel circuits, complex switches and series circuits.

Teachers at Llangewydd Junior School ensure that our learners are equipped with the knowledge, understanding and skills to engage in Design and Technology tasks successfully and to develop independence. We develop this through the three activities below:

Investigative and Evaluative Activities – allowing children to explore a range of existing products
Focused Practical tasks – Learners are taught specific knowledge, designing or making skills
Design, Make and Evaluate Assignments – Learners design, make and evaluate functional products with users and purposes in mind.

Computer Science

At Llangewydd Junior School we use a variety of teaching and learning styles in Computer Science. We aim to develop children's knowledge, skills and understanding of logic, algorithms, patterns, repetition. Teachers ensure that they embed these key coding concepts and approaches into plugged and unplugged cross-curricular activities. ICT is an extremely powerful tool that enhances teaching and learning both within and outside the classroom. It is imperative that our children are taught how to use and access digital content safely and understand how to respond appropriately to unsafe situations. We aim to ensure good practice across the school in the following areas:

Algorithms - a series of steps or instructions to solve a problem. Coding or programming can be thought of as the instructions that a machine executes.

Computer Systems – could be defined as the basic, complete and functional hardware and software setup with everything needed to implement computing performance. It may have the ability to receive user input, the ability to process data and also the capability to create information for storage and output.

Networks – a computer network is a set of connected computers. The connection between computers can be created via cabling or can be wireless. Connected computers can share resources like access to the Internet, file servers, printers and others. A network allows a single computer to do more than it could without any connection.

Data – Computer data is information processed or stored by a computer. This information may be in the form of text documents, images, audio clips, software programs or other types of data. Computer data may be processed by the computer's CPU and is stored in files and folders on the computer's hard disk. At its most rudimentary level, computer data is a collection of ones and zeros, known as binary data. Because all computer data is in binary format, it can be created, processed, saved, and stored digitally. This allows data to be transferred from one computer to another using a network connection or various media devices. It also does not deteriorate over time or lose quality after being used multiple times.

We at Llangewydd Junior School develop the children's digital skills through using a range of technology and software throughout our curriculum topics.

Some of the technology and software we use is listed below:

- Green screen software
- Stop Start animation
- Garage Band
- Adobe Spark
- Book Creator
- Photo Speak
- Google Classroom (docs,slides and sheets)
- Hwb
- Flipgrid
- Jamboard
- iMovie
- Comic strip
- INo-Bots
- Beebots
- Microbits
- Data logger
- Programming software – Scratch
- Drone
- Motion sensor camera
- Ipads
- Chromebooks
- Promethean boards

Internet Safety

At Llangewydd Junior School, we recognise the importance of internet safety. The internet and online technology provide new opportunities for young people's learning and growth, but it can also expose them to new types of risks. With this in mind, we work to educate all pupils about online safety, both inside and outside of school. We take a

whole school approach, ensuring staff, governors and parents play a role in teaching pupils about online safety. We seek to keep children and young people safe by:

- providing clear and specific directions to staff and volunteers on how to promote e-safety within their teaching. Staff are encouraged to use Hwb playlists with their class to share resources such as web links and quiz questions with their pupils. We also promote annual events such as Internet Safety D ay by planning appropriate and engaging learning experiences that relate to online safety.
- supporting and encouraging pupils to use the internet and mobile phones in a way that keeps them safe and shows respect for others.
- supporting and encouraging parents and carers to do what they can to keep their children safe online. Articles and posters on e-safety are posted on our school Twitter page and our school website.
- developing clear and robust procedures to enable us to respond appropriately to any incidents of inappropriate online behaviour, whether by an adult or a child/young person.
- reviewing and updating the security of our information systems regularly.
- ensuring that usernames, logins, email accounts and passwords are held and used effectively.
- ensuring personal information about the adults and children who are involved in our school is held securely and shared only as appropriate.
- ensuring that images of children, young people and families are used only after their written permission has been obtained, and only for the purpose for which consent has been given.
- providing supervision, support and training for staff and volunteers about online safety.
- examining and risk assessing any social media platforms and new technologies before they are used within the organisation.

Teaching of Science and Technology

Teachers plan to incorporate Science and Technology in other curriculum areas. They build upon the children's prior learning. We give children of all abilities the opportunity to develop their skills, knowledge and understanding and we also build planned progression into the topic plans. This ensures that the children are increasingly challenged as they move through the school.

We provide a range of experiences that encourage exploration, observation, problem solving, critical thinking and discussion. These activities, indoors and outdoors, arouse the children's interest and curiosity. They include:

- whole class teaching.
- individual/group/paired activities.
- setting common tasks that are open-ended and can have a variety of results.
- setting different tasks for range of abilities.
- providing a range of challenges through the provision of different resources.
- using additional adults to support the work of individual children or small groups.

To enhance our Science and Technology teaching and learning at Llangewydd Junior School, we ensure that we have a current and relevant bank of resources, which are centrally stored in the lower hall. These include:

Light and sound	Electricity	D.T
- Variety of materials - Light boxes - Tuning forks - Sound and tone kit - Mirrors - Foil	- Logiblocs - Bulbs - Motors and holders - Wires - Battery holders - Log box	- Glue guns - Spindles - Wooden and plastic wheels - Foil - Dowels

- Shadow investigations kit	- Forces - Force meters - Parachutes - Ramps	- Safety glasses - Pulleys and levers - Cams board - Cogs - Straws - Saw - Levers and linkages board - Balance and equilibrium science kit
Minibeasts/Lifecycles - Butterfly garden - Two-way bug viewers - Bug houses - Magnifying glasses - Microscopes - Bug Catchers - Nets - Specimen tubes - Petri dishes - Binoculars - Aqua scopes - Water Cycle model	**Human body** - Interactive human eye models - Anatomy aprons - Human heart pump - Skeleton - Teeth - Professional human torso sets - Thermometers	

All teachers identify potential risks and hazards while using the equipment mentioned above. Close monitoring and supervision ensures that these are used correctly and that 'Health and Safety' guidelines are adhered to - e.g. supervision when using saws, glue guns, wearing goggles/masks.

Cross Curricular Links

At Llangewydd Junior School we ensure that we embed cross-curricular skills when teaching Science and Technology. The following illustrate how we incorporate cross-curricular skills in the Science and Technology area of learning and experience.

Language, Literacy and Communication

At Llangewydd Junior School, learners' knowledge and use of scientific and technical vocabulary is essential in developing understanding of important ideas and concepts within Science and Technology. Teachers should encourage learners to develop and use a range of specialist vocabulary, to understand the origin of these terms and to use them naturally from an early age.

Teachers are encouraged to use a range of texts to teach Science and Technology. These texts should be frequent and powerful tools for conveying scientific facts, principles, and explanations. Teachers at Llangewydd Junior School will use scienctific texts designed to optimise the likelihood that learning will occur. These should;

- promote metacognitive talk and dialogue in the classroom
- carefully select the vocabulary to teach and focus on the 'most tricky' words
- show the links between words and their composite parts
- use activities to engage pupils with reading scientific text and help them to comprehend it

- support pupils to develop their scientific writing skills

In the context of science inquiry, literacy practices will support learners by enabling them to grapple with ideas, share their thoughts, enrich understanding, and solve problems. Instructional and curricular features that can support learners in developing literacy in the context of science are:

- linking new ideas to prior knowledge and experiences,
- anchoring learning in questions that are meaningful in the lives of students,
- connecting multiple representations,
- providing opportunities for learners to use science ideas
- supporting learners' engagement with the discourses of science

Digital communication and computer languages offer opportunities for links to reinforce learning across these Science and Technology. Learners will apply literacy skills such as instructional and observational languages in this area, as well as accessing and producing texts and accurately using technical and scientific vocabulary.

DCF

At Llangewydd Junior School, teachers will provide learners with opportunities to use of a range of digital technologies and software applications to develop and support their skills in Science and Technology. These will be considered through three aspects of knowledge; procedural, epistemic and content.

Developing knowledge on how to undertake science and technology activity (procedural) will be closely related to knowing about their value and place in society (epistemic) and, together, will be considered as aspects of learning 'about' science and technology. Teachers will ensure that this includes capturing and interrogating data, recognising and evaluating computational processes, designing and expressing learners' thinking using digital devices and systems. Integral skills must be included in all aspects of science and Technology including

- Creativity and Innovation - curiosity and inquisitiveness about the physical and digital world, helping learners' question or challenge established knowledge to deepen their own understanding, and providing a foundation for product development and entrepreneurial actions.
- Critical thinking and problem-solving – gain conceptual understanding, greater independence and self-regulation, and stronger inquiry skills. Problem-solving is a key driver in the design and engineering of innovative solutions.
- Personal effectiveness- skills can be enhanced through reflection on scientific and technological processes and developments.
- Planning and organising - learners will become increasingly independent when developing their ideas, implementing solutions, and monitoring and reflecting on results.

Numeracy across the curriculum

All Llangewydd Junior School, teachers and staff have responsibility for promoting the development of numeracy across the curriculum. With an increased emphasis upon numeracy for all learners, teachers will need to plan, revisit and consolidate numeracy skills through Science and Technology. The following numeracy skills will be emphasised through scientific and technological practice and expertise:

- Estimation and rounding
- Number and number processes
- Fractions, decimal fractions and percentages
- Money
- Time
- Measurement
- Data and analysis

- Ideas of chance and uncertainty

Learners will build up the concepts and skills contained in the experiences and outcomes. They will demonstrate their competence and confidence in applying them in a variety of scientific and numerical ways. For example:

- Can they explain their thinking to show their understanding of number processes and concepts?
- Are they developing securely the full range of skills and attributes set out within the experiences and outcomes? As they apply these to problems, can they draw on skills and concepts learned previously?
- As they tackle problems in unfamiliar contexts, can they confidently identify which skills and concepts are relevant to the problem?
- Can they then apply their skills accurately when working independently and with others, and can they then evaluate their solutions?
- Are they developing their understanding of personal finance?
- Can they evaluate data to make informed decisions?
- Are they developing the capacity to engage with and complete tasks and assignments?

Education for Sustainable Development and Global Citizenship (ESDGC)

At Llangewydd Junior School, ESDGC is incorporated and embedded throughout all Science and Technology learning experiences. It is more than a body of knowledge as it is about values and attitudes, understanding and skills. It is an ethos that must be embedded throughout Llangewydd Junior School - an attitude to be adopted, a value system and a way of life. ESDGC links the environment and the people who live in, and from it. It looks at the world and the ways that all living things relate to each other. It recognises that the world is unjust and unequal, but that it can be shaped and changed by the attitudes, values and behaviour of the people who populate it. ESDGC encourages and supports the development of thinking skills and helps involve and engage young people in their own learning. All teachers should aim to cover ESDGC in science and technology in the following ways:

Science

- comparing the needs of living things and the importance of biodiversity.
- doing science and environmental work outdoors.
- examining inter-relationships in communities - interdependence.
- learning about the Earth in space - significance, size etc.
- discussing the nature of science, moral dilemmas in science.
- exploring scientific and technological developments on local and global scales.
- debating nuclear energy use.
- exploring properties of materials in relation to sustainability e.g. learning about mass/energy conservation, recyclable, renewable materials, energy and resources use in recycling.
- learning and discussing global warming and other impacts on the atmosphere.
- exploring low carbon futures, personally, locally, nationally and globally.
- learning about renewable and non-renewable energy resources.

Design and Technology

- using of recycled and renewable resources in design and make activities.
- considering needs and wants.
- considering different cultures, ethnicity, dietary preferences, religious beliefs, when designing and making food products, greetings cards etc.

- considering sustainable product design e.g. choice of materials and the relative benefits of re-using, recycling and biodegradability.
- considering product packaging and sustainability issues.
- considering classroom, playground & school design.
- discussing the use of Fairtrade products, impact of processing, food miles & locally produced food.
- considering design influences from a variety of countries and societies.
- discussing how technology can be used to improve people's quality of life, locally and globally.

ICT

- exploring the potential of ICT for learning more about, and communicating with, people from other cultures and societies;
- discussing the effect of ICT on language and cultures.
- exploring energy implications and other impacts of ICT.
- using ICT applications to aid in decision-making activities. Handling of data about global issues e.g. population, refugees etc.
- disposal/recycling of hardware

Mini Enterprise

At Llangewydd Junior School, our Year 6 cohort take part in an annual Mini Enterprise topic. Mini enterprise should utilise modern approaches and techniques to empower and meet scientific challenges of the 21st century. It should enhance the methodology that fosters collaboration to enhance scientific skills such as data collection, analysis sharing and useability, so that teachers can make the most of existing Llangewydd Junior School resources.

Mini enterprise should address the following:

- communicating scientific results and outcomes in an impactful and easy to understand approach.
- provide co-ordinated and reliable access to information and research products.
- improve the value and use of, as well as access to, scientific data.
- better visualisation, analysis, and interpretation of patterns.
- provide ways to share methods techniques and knowledge.

Outdoor Learning

At Llangewydd Junior School we are committed to carrying out primary science activities outdoors as much as possible as well as incorporating extensive use of our outdoor classroom. Teachers at Llangewydd Junior School will ensure that use of outdoor activities will develop scientific enquiry skills. The outdoor learning environment will be accessed by all year/ability groups with significant progression in activities related to topic content. Science and technology activities will be planned and delivered by all teaching staff to have a direct impact on the children's positive attitude towards learning and to develop independent learning, investigative skills and questioning skills.

Exploration and experience of the world through inquiry, including investigating environments indoors and outdoors in a safe and systematic way, are crucial for all learners. This can help build learners' understanding of different environmental issues and help them to learn to demonstrate care, responsibility, concern and respect for all living things and the environment in which we live. Our outdoor environment at Llangewydd Junior School supports the teaching and learning of Science and Technology. We can utilise the following areas: forest areas, pond, Eco-classroom, playing fields and playground space. These enable our learners to use the environment to help support their learning and development throughout Science and Technology.

As well as our outdoor environment, we have a well-resourced school kitchen which plays an important role in the teaching of Science and Technology at Llangewydd Junior School. It enables us to teach the children an understanding of the importance of a healthy, balanced diet and enables us to teach the food technology part of the Science and Technology curriculum.

Outside Partnerships

Developing a range of partnerships and engaging with science and technology professionals and experts, including but not limited to designers, scientists, engineers, computer scientists and craftspeople, can broaden experiences to deepen learners' understanding. We seek opportunities to collaborate with a range of experts. We have developed partnerships with the following experts. e.g. the school nurse, SUSTRANS, community police officers, MMA, Nuffield Health, SONY, NASA, Sea Quest, Bryntirion Comprehensive School Science Day, Welsh Water, South Wales Police, the Fire Service, STEER forest schools and Stem ambassadors.

Throughout our teaching of Science and Technology, we consider the use of educational visits as vital to support our teaching of the curriculum. Examples of some educational visits we undertake include: pond dipping, habitats, adaptations activities at Bryngarw Park, and visits to Kenfig Nature Reserve, Techniquest, Swimsafe and a range of museums.

Pupil Voice and how it co-constructs our Science and Technology curriculum

Our curriculum is co-constructed and shaped by Pupil Voice processes. Our Pupil Voice Committees have been created to allow all our learners to have a voice that is heard and acted upon. Children from all our classes are represented in our Pupil Voice Committees and have responsibility for discussing and making decisions about different aspects of school life including our Science and Technology curriculum. Our eight Pupil Voice Committees are:

Pupil Voice Committee

(consisting of the Head/Deputy Head Boy and Girl and a representative from each of the Pupil Voice committees below. These give feedback about the outcomes of the other committees. This committee has overarching responsibilities.)

Teaching and Learning Committee Criw Cymraeg Digital Leaders
Playground Wellbeing Committee Outdoor Sports Committee
Eco Committee Rights Ambassadors

Before every topic, through designated 'Pupil Voice' time, teachers plan with the children aspects of a topic that they would like to explore and this evolves during the course of a topic. This approach invests the children with ownership of their learning, making it more engaging and purposeful for them.

We encourage our children to take responsibility for their own learning in Science and Technology and to assume ownership of the learning process as much as possible through:

- creating opportunities to initiate and influence teaching and learning in Science and Technology e.g. through class planning sessions.
- creating opportunities for learners to make personal choices and to follow their interests in Science and Technology activities.
- our Assessment for Learning (AfL) processes.
- ensuring that status is given to 'thinking time'.
- sharing and negotiating learning objectives (our WALTs) and our 'Q' – what is needed for quality outcomes.
- placing an emphasis on modelling.
- celebrating children's positive attitudes and efforts.

- providing high quality feedback to children regarding their learning.
- encouraging and facilitating self- and peer-support and assessment.
- recognising and celebrating children's achievements.

Planning

Planning is carried out in three phases (long-term, medium-term and short-term). As our preparations for Curriculum for Wales 2022 progress, we are currently in a period of transition where our teaching staff are encouraged to explore new ideas and approaches through a collaborative process in order to inform planning for the future. Our current planning processes are as follows:

- **Medium-Term Planning.**

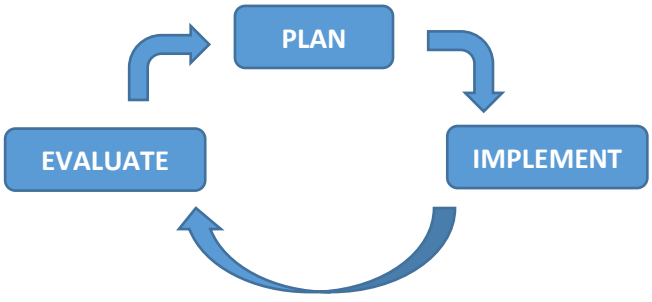
Prior to each half term, year group teams meet with the Assistant Headteacher, collaborating on medium term topic plans that are driven by Pupil Voice. Each half term, medium term planning with a specific AoLE bias is undertaken although an emphasis is placed on blending AoLEs (only when links have integrity) within the context of topics. Our medium-term planning ensures an appropriate balance of learning across the AoLEs is achieved throughout the academic year. (See Appendix 2)

- **Long-Term Planning.**

Once a year's cycle of medium term planning has been completed and mapped in terms of Curriculum for Wales 2022 coverage and progression of skills, AoLE teams will develop long-term plans that map out opportunities for developing learners' skills/covering curriculum content within their respective AoLEs in each year group throughout the school. It is anticipated that these long term plans will provide an overview of coverage and progression in learning as opposed to being detailed Schemes of Work and that they will be adapted regularly to acknowledge a fluidity in medium term topic plans resulting from a responsiveness to Pupil Voice and real life local, national and global events.

- **Short-Term Planning.**

Teachers plan and organise their teaching within the agreed medium- term topic plans on a weekly basis. Weekly, short term plans are completed by individual teachers (or collaboratively in year group teams). These plans are specific to individual classes and are always informed by an evaluation of pupil progress in learning. Teachers determine particular activities and the nature of those activities to support and challenge the specific needs of the pupils in their classes within the context of themes jointly shared by classes. Teaching plans are refined and adapted on a day-to-day basis according to teachers' evaluations of pupils' learning within their classes:



The level of detail in teachers' short term planning varies according to the preferences of individual teachers although all lesson plans include (See Appendix 1):

- The learning objective or **WALT** (We are learning to…)
- An outline of lesson structure – Starter, Main Activity, Plenary.
- Notes about **Differentiation** for different groups of learners and/or individual learners.

- Bullet points about key teaching points – 'how' learners will achieve quality work/outcomes – **Quality Work** (our 'Q').

Assessment and Feedback in Science and Technology

(See Assessment and Feedback Policy)

Formative Assessment - Assessment for Learning

At Llangewydd Junior School, we recognise the status of Assessment for Learning as an integral and omnipresent part of our teaching and learning in Science and Technology. We are committed to providing high-quality feedback that comes from good formative assessment – assessment for the purpose of informing the next steps in teaching and learning by identifying whether our children are progressing as intended. We aim to secure effective formative assessment in Science and Technology at our school through:

- Questioning
- Feedback
- Self-and Peer Assessment
- Formative use of assessments.

(Appendix 5 – Pupil Entitlement – Assessment for Learning)

End of Year Teacher Assessments

As part of our *Target Setting* process, in October, teachers make end-of-year projections for learners' attainment in Science. In July, teachers assess learners' actual attainments in this NC subject using a range of pieces of work and responses. These actual attainment levels are recorded using the SIMS Assessment Marksheet.

End of Key Stage Teacher Assessments

In June, Year 6 teachers assess learners' actual attainments in Science using a range of pieces of work and responses as evidence. They give an overall level for the subject. These actual attainment levels are submitted to WG and are recorded using the SIMS Assessment Marksheet.

School-based standardisation and moderation

Each term summative assessments are undertaken in the context of internal standardisation and moderation meetings (whole staff meetings and year group triads). Throughout the year, our teachers apply the concept of best-fit judgements to learners' work in relation to the National Curriculum level descriptions in Science. This process allows our teachers to confirm a shared understanding of National Curriculum standards, based on an agreed selection of learners' work and supporting teacher commentaries that show links to the level descriptions. Teachers moderate end of key stage assessments and Year 6 teachers apply the outcomes from this internal moderation prior to finalising all learners' end of key stage attainment.

Key Stages 2 and 3 Cluster Moderation

Summative assessments are undertaken in the context of cluster group meetings for Key Stages 2 and 3. These take place in May and include robust arrangements for moderation of examples of Year 6 and Year 9 learner portfolios of work in Science. This process allows cluster teachers, within each subject, to confirm a shared understanding of National Curriculum standards based on an agreed selection of learners' work and supporting teacher commentaries that show links to the level descriptions. Our teacher representatives share the outcomes of the cluster group meetings with other staff. Agreed decisions and outcomes from cluster group meetings are implemented by all relevant staff within our own school prior to end of key stage teacher assessment.

Target Setting

At our school we make full use of all assessment information in setting targets. In October, each teacher sets targets for the learners in their classes, giving end of year National Curriculum level projections for their attainment in Science. Assessment information provides the teachers with the information necessary to ensure that the targets set are challenging yet realistic, taking into account the previous attainment of our learners. In July, these forecasts are reviewed and learners' actual attainment is recorded on our SIMS Assessment Marksheet.

Feedback

(See Assessment and Feedback Policy)

Llangewydd Junior School is committed to providing effective feedback to our learners in Science and Technology. By giving focused and timely feedback to our learners through marking and reviewing work, we activate a constructive, formative dialogue with a view to ensuring that all our learners make as much progress as possible. Our feedback focuses on children's successes and areas for improvement in relation to our learning objectives and 'Q' criteria. It promotes a self-evaluative culture within our school, helping our children to become reflective learners and to close the gap between their current and aspirational performance.

Feedback Strategies

We give feedback to our children in a number of ways during the teaching and learning of Science at Llangewydd. Teachers will choose the most appropriate feedback strategy for specific learning contexts and pieces of work. We aim to give prompt feedback, acknowledging that children make the greatest progress in their learning when they have immediate feedback to their work and have the opportunity to respond in the same lesson or as soon as is reasonably practicable. We do this through:

- **Teachers' well considered, real time interventions.**
- **'Light Touch' marking of work.**
- **In-depth, Quality Feedback and Feed-forward Marking**
- **Self- and Peer- Assessment**

(See Assessment and Feedback Policy)

Our Expectations for Science and Technology.

(See Assessment and Feedback Policy)

- Our 'Marking Code' is followed in all cases (See Appendix 4).
- All learners' work including homework/blended learning and any work assessed by the learners themselves is to be at least 'light' marked by a teacher or support staff. No work should be unmarked.
- There should be regular evidence of in-depth, quality Feedback and Feed-forward marking.
- An appropriate amount of time is allocated for learners to respond to teacher comments and Feed-forward tasks.
- Teachers or classroom support staff will indicate whether work has been completed with support and the nature of that support e.g. '*Small group with teacher support*'.
- Spelling, grammar, punctuation and handwriting will be given attention appropriate to the stage of development of individual learners and strategies used to support their development. They are not marked in every piece of writing because we acknowledge that children cannot focus on too many things at one point in time.

Periodically, as work develops and when work is completed, however, our learners are encouraged to proof-read their writing to consider such aspects before editing it accordingly. When responding to spelling, no more than 5 spelling corrections for a piece of work will be given.

Our Teaching and Learning Environment

At Llangewydd, we perpetually strive to improve our teaching and learning environments, to support Science and Technology believing that a carefully planned environment sets the climate for effective teaching and learning. In recent years, we have created zones both within and adjoining our classrooms to promote independent use of resources and high-quality work by the children. Our classrooms are organised to enhance and facilitate effective teaching and learning.

Our classroom areas include:

- a Literacy area – well-stocked with attractive class library non-fiction books, VCOP resources, specific vocabulary word mats and a range of literacy scaffolds.
- a 'Q Quarter' – where the children are encouraged to check their work for quality e.g. specific language a effective sentence openers to help write predictions, conclusions, evaluate and reflective processes linked to the 'Q' criteria.
- classroom furniture that can be easily moved to facilitate paired work, group work, class work and individual work.
- a variety of papers (lined, plain, A4, A3, line guides,graph paper).
- stationery items e.g. rulers, erasers, sharpeners, pens, pencils, crayones, scissors, glue sticks.
- IT resources – iPads, Lenovo tablets, access to chromebooks, voice recorders, microbits, beebots, data loga, Ino-Bots, motion sensor camera.

Our classroom displays reflect the topics being studied by the children. We believe that our learners are entitled to learn in an inclusive classroom/learning environment where everyone's quality Science and technology work is celebrated in attractive displays. Our classroom displays:

- support and challenge the children in their learning e.g. through use of questions and prompts that encourage them to interact with display content.
- place an emphasis on bilingualism.
- include a VCOP display with prompts and strategies that the children can use in their writing across the curriculum.
- include a 'Working Wall' that reflects current learning.

We have also developed teaching and learning areas beyond the classroom that support our Science and Technology provision including our 'Reading Rainforest' school library, two computer suites, a radio station, an outdoor classroom and a variety of outdoor learning areas. These are used effectively to promote independent learning in Science and Technology.

Differentiation

All learners have equal access to our Science and Technology curriculum. It is differentiated appropriately so that all learners are challenged and supported in their learning in order to achieve maximum educational and personal benefit. Our methods of differentiation include differentiation:

- by task.
- by grouping.

- by resource.
- by support.
- by outcome.
- by questioning.
- by assessment and feedback.
- by teaching style.

Homework / Blended Learning

We 'blend' face to face Science and Technology teaching and learning that takes place at our school with tasks and activities that the children are asked to complete at home – online, offline or a combination of both. Homework tasks and activities are designed to pre-teach, consolidate, reinforce or extend skills and understanding in topic being studied in class. Some of the homework will be ICT-based using the Google Classroom platform where online assignments and any accompanying digital resources are uploaded by teachers. At times, online tasks may be started in school and completed at home or vice versa. Homework consists of:

- one homework task every week. All homework tasks are relevant to and meaningful in the context of the current topic. The nature of these tasks will vary e.g. inquiry-based research, problem-solving, applying literacy, numeracy or other skills taught, investigations, practical tasks such as model-making. We aim to achieve a balance of different types of tasks across the AoLEs throughout the year.

Homework/Blended learning is similar in our CARE base / LRC, however, it is given on an individual basis according to the needs and anxieties of each child.

Additional Learning Needs

If a child has an additional learning need, our school does all it can to meet these individual needs. At present we comply with the requirements set out in the SEN Code of Practice in providing for pupils with additional learning needs as we prepare for the new ALN Code 2021. A range of assessment strategies are utilised to help identify particular difficulties and external agencies can be involved in order to provide more specialist assessments and support.

The school provides a 'child-friendly' Individual Educational Plan (IEP) for each pupil on the Additional Learning Needs register. This sets out the nature of any needs, and outlines how the school and parents should aim to address them. It also sets out SMART targets for improvement so that we can review and monitor the progress of each pupil at regular intervals. This document is shared, discussed and reviewed with parents and outside agencies (when required) biannually. It is a working document and targets can change and be revisited when deemed appropriate.

Our CARE base and LRC children will often have more reviews due to the nature of their need and if they have a statement. We have an outside line directly to the bases and parents can contact staff whenever they need to.

Some of our learners need more support in than that provided by differentiated tasks in the normal classroom context. Individual programmes of work are devised and interventions put in place to meet the needs of these children.

More able children are taught with their own class and their learning extended through differentiated group work, extra challenges and opportunities for independent learning. Where appropriate, special arrangements are made for an exceptionally gifted child e.g. an individualised programme with more challenging learning, attending MAT masterclasses.

Equal Opportunities

All learners regardless of ability, gender, religion, social background, disability and race will have access to our Science and Technology curriculum provision. All activities are planned in such a way as to encourage full and active participation by all learners so that they can develop their skills, knowledge, confidence and enjoyment of learning. Every child is valued and perceived as unique. We aim to ensure that our Science and Technology curriculum responds to the learning needs of the individual pupil, challenging them to the full extent of their capabilities and providing them with opportunities to demonstrate fully what they know, understand and can do. Our children's well-being is always central to everything we do.

Disability

In accordance with the statutory requirements, our school aims to make the curriculum accessible to all pupils as far as is reasonably practicable. The school has an Accessibility Plan that is available to parents on request.

This policy should be read in conjunction with the following policies:

- Curriculum Policy
- Teaching and Learning Policy
- Assessment and Feedback Policy
- ALN Policy
- AoLE policies
- Literacy across the Curriculum Policy
- Numeracy across the Curriculum Policy
- ICT, DCF &e-safety policies
- MAT Policy

Monitoring and Review

Monitoring

Monitoring of the Science and Technology curriculum – planning, coverage and standards of teaching and learning, is conducted by the Headteacher, Deputy Headteacher and Assistant Headteacher. This is done in several ways including:

- book scrutinies
- monitoring planning
- analysing assessment data
- monitoring targets
- lesson observations
- learning walks
- Listening to Learners
- looking at displays
- informal discussions with staff

Review

As we prepare for implementation of Curriculum for Wales 2022, we are aware of the need to monitor our Science and Technology Policy, and to review it regularly so that we can take account of new initiatives and research, Curriculum for Wales guidance, developments in technology and changes to the physical environment of the school. Our Science and Technology Policy will be reviewed bi-annually (or sooner as necessary) by the AoLE Lead, Assistant Headteacher, the Headteacher and the nominated governor. The necessary recommendations for improvement will be made to the Governors.

Signed by the Chair of Governors on behalf of the Governing Body: …… ……

Date approved: ……12/10/2021…… (by full Governing Body)

Signed by Headteacher: …… …….

Appendices

Appendix 1 – Example of Weekly Lesson Planning

Appendix 2 – Example of a Space medium term topic plan

Appendix 3a – Example of investigation sheet - AEL

Appendix 3b – Example of investigation sheet – BEL

Appendix 4 – School Marking and Feedback Code

Appendix 5 – Pupil Entitlement – Assessment for Learning

Appendix 1 – Example of year 6 D&T Weekly Lesson Planning

MORNING BREAK					
11.00 – 12.00 Session 2	LANGUAGE, LITERACY & COMMUNICATION Design and Technology WALT: I understand that a shelter must withstand weight **Starter:** Watch the Youtube clip https://www.youtube.com/watch?v=rHyxP3epU-w&feature=youtu.be. Discuss with the class the dynamics of the Anderson Shelter. 1. Where were they built? 2. How many people could fit inside?	LANGUAGE, LITERACY & COMMUNICATION Design and Technology WALT: I can create a detailed design for an Anderson shelter **Starter:** Recap on yesterdays challenge. What did we learn? Children are encouraged to vocally highlight bad points and to recognise the importance of planning a design before you build it. **Main Activity:** Children are to design an Anderson Shelter in	LANGUAGE, LITERACY & COMMUNICATION Design and Technology WALT: I can work from my plan to create a sturdy 3d model of an Anderson shelter. **Starter:** Tables to be separated into pairs if possible, all children to remain forward facing in line with covid restrictions. Children to set up a work station on their desk looking at their plans for confirmation of quantities of materials needed	LANGUAGE, LITERACY & COMMUNICATION Design and Technology WALT: I can prove my Anderson shelter works. **Starter:** Look at the designs the children have created. Explain to the children that this is the testing phase of the design process. Ask the children to sit in s circle or open space so that each product can be tested in turn by the class	LANGUAGE, LITERACY & COMMUNICATION Design and Technology WALT: I can constructively evaluate my work **Starter:** Teacher to discuss with the class the design process. Discuss with the children that in irder to become successful designers they must be able to evaluate their work. Discuss the
	3. What materials were they made out of? 4. What was the difference between an Anderson shelter and a Morrison shelter?	pairs. Though must be put into how their structure will withstand the weight and be big enough to contain 4 lego figures. A sleeping structure is desirable. Their design must include;	**Main Activity:** Children to construct a 3d model of an Anderson shelter. Children must adhere to health and safety guidance given. Their building must;	teacher or by a peer group. **Main Activity:** Does the Anderson shelter collapse under pressure of the 1kg weight. Can the children	term evaluation? What does it mean? Discuss ways we could evaluate? Market research? Peer assessment? Self evaluation?

	Discuss with the children that both shelters must be strong enough to withstand weight from above. Ask the children why this is? **Main Activity:** Challenge- Taking shelter under the table. Children are to construct a Mossison shelter out of lollipop sticks that must withstand a 1kg weight. The children will work in groups. Each group will have; 1. Glue gun 2. 1 Roll of cellotape 3. 30 lollipop sticks Each group will build their shelter making it as study as possible. Children to be encouraged to think before they do. **Quality Work:** Can the children construct a sturdy shelter without a detailed plan. Can the children build a structure that holds the 1 kg weight. **Differentiation:** Mixed Ability groups	1. A clearly annoted diagram or picture 2. Details of materials that will be used. 3. Quantities of materals that will be used. For example 10 lollipop sticks, 2 sheets of card etc **Quality work:** Is the design legible? Peer assessment of design, can it be read and built by some else? Children to swap designs and give positive constructive feedback on each others designs. **Differentiation:** **AEL** – To create a 3d drawn design clearly annotated with quantative amounts of materials. **O/T** – Picture to be labelled. **BEL**- To be supported by teacher to calculate amounts and label clearly	1. Hold four lego figures. 2. Contain some kind of sleeping/sitting structure 3. Withstand a 1kg weight. 4. Be accurate to WW2 colours. **Quality work:** Children to work together to create their 3d model. They must show team work and good work ethic. **Differentiation by outcome.**	weight. Can the children add anything to their designs to reinforce the structures. Children to strategise how they can make their design stronger. **Differentiation by outcome.**	evaluation? **Main Activity:** Children to complete a self evaluation on their Anderson shelter. Teacher to heavily model sentence structure and use design appropriate language on whiteboard. Talk about design process, materials, capability of product, design floors/weaknesses, significant improvments, limitations of products available or resources. **Differentiation;** **AEL** – To use a guide to write an evaluation under subheadings. **O/T** – to use a template to finsh sentences on their design.

12.30					
12.30	LUNCHTIME				
1.20	REGISTRATION				
1.20 Session 3	LANGUAGE, LITERACY & COMMUNICATION **WALT: I can evaluate my work.** Discuss with the children their Morrison shelter. 1. Did it hold the weight? 2. What could you have done better? 3. Would a constructed plan have helped your work? 4. Discuss the importance of planning and how this enables a better work environment? 5. Disscuss the allocation of roles? **Quality Work**- Effective evaluation **Main Activity**: Children to write an evaluation of thir work. Teacher to model this on the board using the questions above to structure the writing.	LANGUAGE, LITERACY & COMMUNICATION CONTINUE ABOVE All children to have a clear design ready for tomorrows session. Designs to be laminated/ protected in plastic wallets as must be used a s a point of reference during making process.	LANGUAGE, LITERACY & COMMUNICATION CONTINUE ABOVE	LANGUAGE, LITERACY & COMMUNICATION CONTINUE ABOVE	

	Differentiation: **AEL**- To complete independently recognising the importance of planning when designing. **O/T**- Children to se board to write evaluation. **BEL**- Use template provided on the server and stick in book after completing gaps with support.				
2.20 – 2.30	**AFTERNOON BREAK**				
2.30 – 3.30 Session 4	**LANGUAGE, LITERACY & COMMUNICATION** **HUMANITIES** Rose Blanche- Guided Reading. See plan on the server.	**WALT: I can understand how to keep myself safe when using dangerous equipment.** **Starter –** Discuss Health and Saftey in the classroom. What do we do to keep safe. Chairs under tables? Legs under desks? Wires against walls? Bags in boxes? Why do we do this. **Main Activitiy**- Children to create a list of potential hazards when building their designs. How can we keep safe? Children to create a list of rules for D&T staying safe in the classroom. Hazards worksheets templates are available on the server if needed for your class. **Quality work**- Children must be able to identify risk. Children must be able to avoid danger.			

Appendix 2 – Example of Year 5 Space topic medium term planning

ambitious, capable learners, ready to learn throughout their lives

Pupil Voice:

Astronauts, NASA, ISS. The Moon – physical features space rockets, aliens, meteors and asteroids, black holes, the Milky Way, Stars.

Blended Learning:

Comprehension – famous astronauts

Phases of the Moon – log/diary.

Model linked to space e.g. spacecraft

Languages, Literacy and Communication:

- Formal letter to NASA requesting a SKYPE link with real-life astronaut/email/Tweet.
- Debate – moon landing conspiracy theory.
- Research, make notes about an aspect of space e.g the planets, stars, the moon, black holes. Use *Adobe Spark* –create non-fiction book.
- *Read, Write, Perform* – Lost in Space: A transmission of Hope. Write and record a transmission home from an astronaut stranded on Mars. Broadcast on radio station.
- Instructions for Ino-bots / Space-themed game. Commands/activities.
- Welsh poetry recitation –
- Reading of Stabec texts.

Mathematics and Numeracy:

- 3D shape / 2D shape – radius, diameter and circumference of circles – properties of spheres.
- Measure – weight / mass linked to space food/weightlessness.
- Distance of planets from the sun.
- Scale of the solar system.
- Line graphs linked to the changing temperatures on the Moon.
- Data handling – mean, mode, median linked to temperatures of the Solar System's planets.
- Number – place value – 6 digit numbers+
- Time – how long it takes the planets to orbit the sun/ the moon to orbit the Earth.
- Percentages/fractions linked to moon's surface visible from Earth.

Science and Technology:

- Phases of the moon – keep a diary.
- Mission to the Moon –STEM pack
- Tim Peake STEM Challenges
- States of matter.
- Compare and contrast conditions on planets.
- Research/information about the planets e.g. diameter, temperature, features. Database. Book Creator. Life of a star.
- Scale model of solar system.
- Design a Rocket – emphasis on aerodynamics / forces / propulsion.
- *Galaxy Zoo* app - categorize galaxies.
- *Feed Spot* – space blogs of the day.
- NASA – *ISS Live Now* app.
- Ino-bots – use Scratch/programming.

Outdoor Learning:

- Distance simulation of distance between planets.
- SkyView App
- Rocket demonstration.

Curriculum Cymreig:

- Welsh astronaut – John Anthony Llewellyn

Super Start (Engage and Immerse)

Moon landing simulations / Video showing scale of solar system

Topic Map – Year 5 - Space

Literacy | Numeracy | Digital Competency

Critical Th. / Problem S. | Planning and organising

Creativity / innovation | Personal effectiveness

Fabulous Finish (Celebrate)

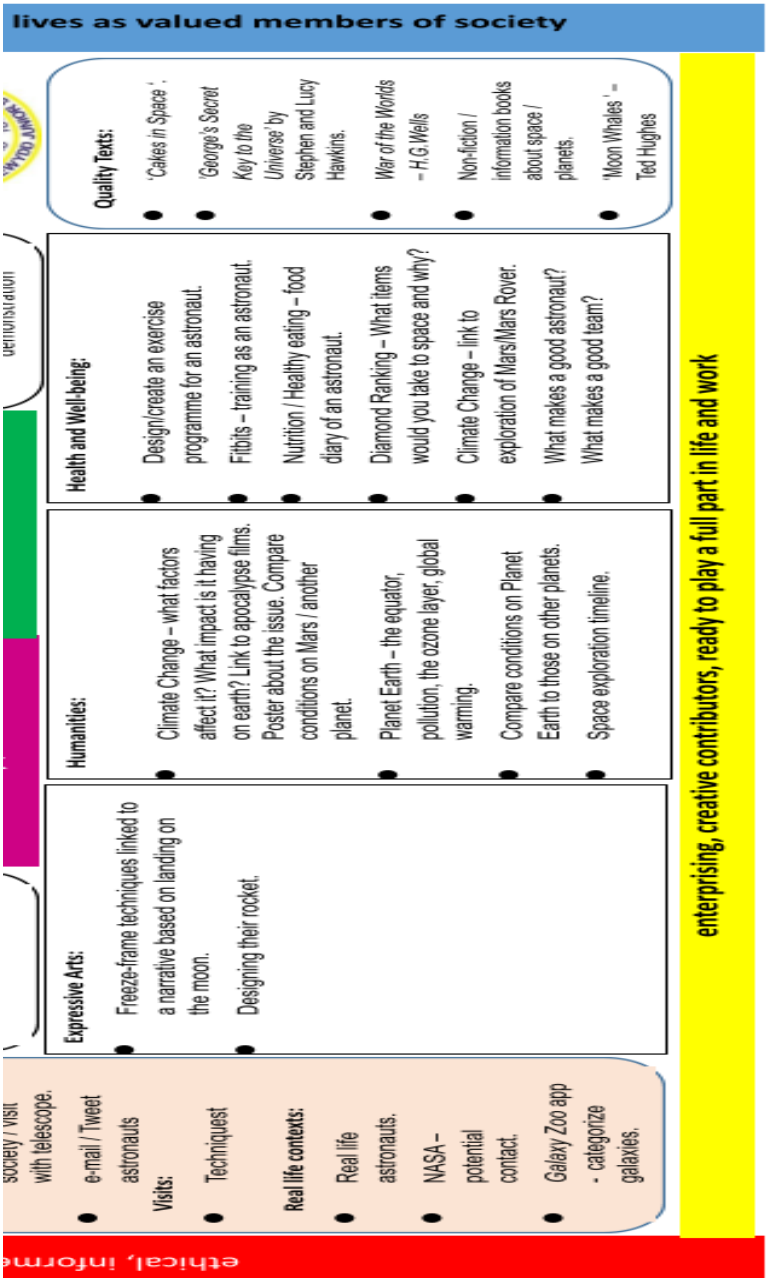
Outdoor (Virtual)

Showcase – practical, interactive activities.

Rocket demo/Moon demonstration

Visitors (virtual):

- Local astronomical society / visit with telescope.


lives as valued members of society
Quality Texts:
'Cakes in Space'.
'George's Secret Key to the Universe' by Stephen and Lucy Hawkins.
War of the Worlds – H.G.Wells
Non-fiction / information books about space / planets.
'Moon Whales' – Ted Hughes
Health and Well-being:
Design/create an exercise programme for an astronaut.
Fitbits – training as an astronaut.
Nutrition / Healthy eating – food diary of an astronaut.
Diamond Ranking – What items would you take to space and why?
Climate Change – link to exploration of Mars/Mars Rover.
What makes a good astronaut?
What makes a good team?
Humanities:
Climate Change – what factors affect it? What impact is it having on earth? Link to apocalypse films. Poster about the issue. Compare conditions on Mars / another planet.
Planet Earth – the equator, pollution, the ozone layer, global warming.
Compare conditions on Planet Earth to those on other planets.
Space exploration timeline.
Expressive Arts:
Freeze-frame techniques linked to a narrative based on landing on the moon.
Designing their rocket.
Real life contexts:
Real life astronauts.
NASA – potential contact.
Galaxy Zoo app - categorize galaxies.
Visits:
Techniquest
e-mail / Tweet astronauts
with telescope.
enterprising, creative contributors, ready to play a full part in life and work

Appendix 3a – Example of investigation sheet AEL

Science Investigation Plan

Question - What do we want to find out?

We want to find out...

Equipment - What equipment will we use?
We will use:

Variables
Independent- What are we changing?
Dependent – What are we measuring?
Control- What are we keeping the same?

We are only going to change:

Fair test - What will we keep the same? Why should we keep things the same?

We will keep...

Method - What did we do?

Firstly we...

Then we...

Measure - How are we going to record our results?
We could record our results by using...
diagrams bar charts drawings tables tally sheets writing lists pictograms

Hypothesis - What do you predict will happen?

I predict that...

Results
What has happened?

Conclusion - Why do we think this has happened?

I think this has happened because...

Appendix 3b – Example of investigation sheet - BEL

Aim of investigation What are you trying to find out?

Prediction What do you predict will happen?

Method How are you going to carry out the experiment?

I will keep the same:

I will only change:

Results What happened during the experiment?

Conclusion What have you found out?

Evaluation Was it a fair test? What went well or badly? What could you investigate next?

Appendix 4 – Our School Marking and Feedback Code

Llangewydd Junior School

Our Marking and Feedback Code

We will use the following codes when we mark your work.

They will help you to understand what you have done well and what the next steps in your learning are.

Code	What it means
	celebrates what you have done well.
	suggests how you can improve – your next steps.
✓ ✓	excellent work linked to our 'Q'
✓	correct or good work linked to our 'Q'
X	incorrect
	underlined error - missing capital letter, full stop, comma or other punctuation
*	new paragraph needed here
?	Check that this makes sense.
∧	missing word
mistake mistaik	Spelling The mis-spelt part of a word is underlined and the correct spelling is written above the word.
	indentation needed
V.F.	Your teacher has talked to you about your work.

Pupil Entitlement – Assessment for Learning

Expectation – I am entitled to…	RAYG Rating			Way Forward
	Aut	Spr	Sum	
Questioning				
be given time to think about questions that I am asked.				
be given time to think about questions that are asked and to discuss my ideas with a partner before a class discussion (Think, Pair, Share).				
be sometimes asked 'closed' questions that require specific answers.				
be asked 'open' questions that require more detailed, carefully thought-out answers.				
be asked a sequence of questions that build on each other and gradually need more careful thought.				
sometimes write down my answers to questions on a mini-whiteboard.				
sometimes be asked to explain my opinions and ideas in more detail.				
be comfortable sharing my ideas and am not afraid of answering some questions 'wrongly'. I understand that it is okay to make mistakes and that we can all learn from our own and others' mistakes.				
Feedback				
discuss with my teacher where I am in my learning, where I want to be and how I am going to get there.				
have our WALT displayed, shared and discussed.				
have our 'Q' displayed, shared and discussed so that I know what I need to do to produce a quality piece of work.				
sometimes look at examples/models to think about 'Q' – what makes it or could make it a 'quality' piece of work.				
be set targets that are SMART – small, manageable and realistic.				
teacher comments about my work – praising what I have done well (linked to our 'Q') and setting me SMART targets as part of my 'Next Steps'.				

Pupil Entitlement – Assessment for Learning (cont'd)

Expectation – I am entitled to…	RAYG Rating			Way Forward
	Aut	Spr	Sum	
respond to SMART targets in my books by signing, responding with a comment or completing a task set by my teacher.				
some teacher comments with 'Two Stars and a Next Step' – praising what I have done well (linked to our 'Q') and setting me a SMART target to help me improve.				
talk to my teacher about what I am doing well and how I can improve e.g. during discussions, group work or whilst talking to me on my own.				
think about whether we have achieved our WALT, how we have achieved our WALT and the next steps in our learning throughout and at the end of our lessons.				
have a discussion with my class teacher in which we agree my targets for improvement in Literacy, Numeracy and Wellbeing.				
have my targets in Literacy, Numeracy and Wellbeing on display in my classroom.				
review my targets with my teacher regularly.				
tell my teacher when I think that I have achieved any of my targets.				
have new targets set in Literacy, Numeracy and Wellbeing when my teacher and I agree that I have achieved my current targets.				
discuss some test results with my teacher so that I understand what I have done well and what the next steps in my learning are.				
Peer and Self-Assessment				
regularly think about my own work/learning in terms of our 'Q' and WALT.				
regularly set my own SMART targets for improvement ('Next Steps') in class during self-assessment activities.				
regularly think about a partner's work/learning in terms of our 'Q' and WALT.				
regularly set SMART targets for improvement ('Next Steps') for a partner in class during peer-assessment activities.				
take part in different self- and peer-assessment activities e.g. traffic light activities, 'Two Stars and a Next Step', Thumbs up Thumbs, Post-It note activities, KWHL grids, self-marking work, peer-marking work, talking partners.				