

Technology Vertical Curriculum

Technology: Introduction

Human technology is as old as humanity. We know that early human species used materials such as stone to produce a wide range of artefacts and tools that extended their possibilities of changing their environment to meet their needs. The saying “humans have what animals are” makes it clear that what animals can do in their various specialisms, people can do using tools and techniques. The earliest tools and artefacts reveal human intelligence and awareness of the properties of materials in their environment. Human culture emerged hand in hand with technology and the hand tools we use today embody a long history of practical wisdom and knowledge of the world and its rhythms.

The basic gesture of technology is the transforming of materials to meet human needs and in the process, transforming human lives and societies. Complex technologies have grown out of simpler, older technologies. We can recognise the evidence of this not only in design and in the machines themselves, but in the language we use, for example terminology in computing that originated in hand-based technologies, such as printing. Therefore, it makes sense to understand the basic principles of navigating, steering a small boat, trimming sails, using wind and currents before one drives a motorized boat or indeed flies in a space shuttle. Making things by hand is the best preparation for designing robots, just as the fine motor skills involved in cutting, slicing, sewing are a good basis for surgery.

The Waldorf technological curriculum begins with handwork and handicrafts and crafting in nature (e.g. building fires, green woodwork etc.). Knowing where materials come from, how they are processed, knowledge of the properties of materials and the uses of tools, first manual and then electric, are preconditions for understanding digital technology as a tool to be used safely and appropriately. Technology is always explored with reference to real human need and the impact of the environment of sourcing and production. Each workshop is a site of craft traditions and learning communities which embody not only the know-how/ know-what, but also the values that accompany craft work and technology. Becoming a craftsman involves the development of ‘an ethic of excellence’ (Ron Berger, 2003). Pupils’ introduction to digital technologies and media builds on this approach, with pupils firstly learning in a practical context – using pcs and cameras, text and image software, search engines and research. The emphasis is on safe and meaningful use, but also understanding the cultural context of technology, including its use of raw materials and energy, its impact on the environment and approaches to sustainability. Later, in the upper school, pupils learn about hardware, programming and coding.

Technology: Purpose of Study

Steiner Waldorf education offers opportunities for pupils to learn how materials are transformed into tools and artefacts to meet human needs. A need is recognised, knowledge of tools and materials are applied to find practical solutions. Starting from a simple practical solution, products can be further developed and modified to meet other, changing or more complex needs, using feedback derived from evaluation of the products created. Technological education begins with the nature and origin of materials, and the nature and cultural origin of tools, and how tools extend human powers and multiply human effort. Knowledge of materials begins with traditional handcraft techniques (sewing, knitting, spinning, whittling) using natural, locally sourced resources. Pupils become familiar

with the safe use of simple and household machines in context, e.g. a corn mill, simple woodworking tools, an apple press etc. They learn to produce useful artefacts and products such as yarn, garments, wooden utensils, apple juice, bread etc. In doing so, they learn the historical and cultural origins of these crafts, the production of materials and the ecological impact of this. As pupils progress through the school they learn to use more complex tools accurately and safely in a workshop environment, embodying the values of being a crafts-person. Through the history curriculum, pupils learn about the history, cultural significance and impact of technology from early cultures to contemporary digital society. In media education children begin by becoming literate in analogue media, followed by learning how to use modern information technology equipment safely, appropriately and responsibly. Digital technology is integrated into the curriculum as an extension of the 'warm' analogue technology of the lower school. Pupils are introduced to the question of human responsibility in the ethical application of technology and the benefits and risks of technology use including Artificial Intelligence.

Technology: Aims

Pupils are

- knowledgeable skilful across a range of analogue technologies
- technologically literate across a range of everyday mechanical and digital applications
- responsible, competent, confident and creative users of information and communication technology
- users and creators of technology, rather than merely consumers of it

Long Term Curriculum Intents

Language and communication

- Accessing information through and about technology in different formats and media
- Understanding and using relevant technological and disciplinary terminology and vocabulary
- Articulate experiences, ideas and solutions in the field of technology

Health and well-being

- Use both analogue and digital tools safely, appropriately and effectively
- Understand how to keep oneself safe in the virtual world
- Understand the impact of technology and its uses on health and wellbeing

Senses

- Observe and understand processes
- Experience, understand and distinguish between real sensory experience and virtual realities

Imagination and play

- Play with tools and materials in exploratory ways: tinker, make rapid prototypes
- Be creative and resourceful in planning and making
- Imagine possible solutions to problems and needs, and improvements to current solutions

Empathy

- Understand the needs of others and the world and how these might be met with technological solutions
- Imagine the effects of technologies on others and the world

- Understand how technologies have evolved and the impact they have had on people's lives and the environment
- Imagine all possible consequences of actions using technology

Aesthetics

- Appreciate the aesthetic qualities of tools and materials including tools from different cultures and periods of history
- Understand and apply aesthetic possibilities of using tools and techniques
- Find solutions to problems which are aesthetically pleasing

Inquiry

- Investigating the needs of specific situations and possible ways of generating useful, effective and ecologically meaningful improvements or solutions
- Understanding the properties, potential, appropriate uses, risks and life cycles of different materials
- Planning, sourcing and making using appropriate technologies
- Constructing models as ways of finding solutions to questions and problems
- Understand the origins and development of key technologies and their effects on society
- Analyse situations and information and be able to understand complexity
- Recognise basic principles at work and use this knowledge to design workable systems within a given field of technology
- Identify key factors in a situation and address these in terms of effective solutions to problems
- Understand and use sequences and processes in complex operations
- Use maths effectively where needed in technological thinking and solutions
- Being able to de-bug: systematically analysing processes to find issues

Democratic participation and society

- Understand the uses and possible misuses of technology in enhancing, supporting and undermining democratic processes
- Recognize the need for democratic control of the uses of technology
- Recognize the need to ensure that all people have equal access to the benefits of technology

Lifelong learning

- Maintain an enquiring attitude and interest in technical matters and changes in technology
- Adapt to new technologies

Future thinking

- Anticipate future needs of people and the environment
- Anticipate the consequences of technologies for all, including nature
- Understand complex relationships between different needs and the effects of technology
- Recognize opportunities for self-development using technology
- Recognize the need for research and technologies that objectively address real human and ecological need rather than profit

Holistic thinking / Spirituality

- Understand technology from a holistic perspective: its processes and systems and its relationship to needs and outcomes
- Understand the purpose of technology in addressing human and ecological needs

- Make decisions about technology within the wider context
- Consider the spiritual meaning of technology and the realities it creates and enables

Judgement

- Make judgements based on knowledge, understanding and insight in relation to technology, its potential and its ethical use
- Use technology in ethical ways
- Reflect on and consider the uses and abuses of technology
- Take up founded positions in relation to technology
- Critically evaluate technological projects

Technology Age-related Learning Opportunities for C1	Relevant Learning Descriptors
<p>Children should have the opportunity:</p> <p>Tool Use</p> <ul style="list-style-type: none"> • To learn safe use of a simple safety blade, e.g. a potato peeler (TE, PS) • To learn how to use and care for tools used in crafting activities (PS, TE) <p>Living Things and Habitats</p> <ul style="list-style-type: none"> • To experience the local natural environment (DE) • To hear stories which draw their attention to aspects of the natural environment (IV, N) • To notice aspects of and changes in the environment (N, IN) • To recall and describe their experiences and observations orally, recording these through shared writing and/or pictures/paintings (DA, RRP) • To explore vocabulary around parts of their own body and their senses (DA, IN) • To understand how to keep themselves safe in the outdoor environments they experience (EE, PS) <p>Energy and Forces</p> <ul style="list-style-type: none"> • To explore what is needed to make a fire (DE, EE) • To understand how to stay safe around a naked flame (TE) • To explore forces in a practical way through lifting, pushing, pulling, and using tools to multiply force (DE) <p>Materials</p>	<p>Beginning Tool Use Children can talk about how to use a simple safety blade, identifying some of the risks and mitigations, and can demonstrate their understanding in practice. They listen carefully to and follow instructions about how to use tools, and take part in ensuring that equipment is well cared for.</p> <p>Beginning Living Things and Habitats Children develop a practical relationship with the living world. They can talk about the plants, animals, weather and other natural phenomena (e.g. sunlight, ice) they have experienced and observed, and their own bodies, demonstrating their knowledge and understanding of growth and change and the breadth of their vocabulary through describing, identifying and naming. Children can talk about how to keep themselves safe in the outdoor environment.</p> <p>Beginning Energy and Forces Children know some of the material in their local environment that can be used to make a fire, for example identifying dry wood of a suitable size for kindling and/or banking the fire. They can talk about the heat that a fire generates, and how to keep themselves safe around a naked flame. Children can demonstrate their practical understanding of forces through the use of their bodies and tools, applying pushes and pulls and talking about the level of force needed.</p> <p>Beginning Materials Children experiment and create with found</p>

<ul style="list-style-type: none"> To explore the nature and potential of found natural materials (EE) <p>History and Culture</p> <ul style="list-style-type: none"> To discover how a simple tool (e.g. a knife) can multiply human effort <p>Media Content</p> <ul style="list-style-type: none"> Create well-designed, attractive, orderly and balanced pages in their lesson books <p>Media Form: Writing</p> <ul style="list-style-type: none"> Develop basic literacy skills Access a rich class library with a wide range of texts <p>Media Form: Sound and Language</p> <ul style="list-style-type: none"> Sing a range of songs frequently, regularly and repeatedly, with a focus on pentatonic songs with a fairly free rhythm Learn to play a simple instrument <p>Media Form: Image</p> <ul style="list-style-type: none"> Explore primary and secondary colours through watercolour paints Explore the creation of images through drawing with crayons and coloured pencils, and through watercolour paint <p>Online Safety</p> <ul style="list-style-type: none"> Talk about things that they have seen or heard that have made them feel sad, uncomfortable, embarrassed or upset, even if those things are online, without fear of judgement or censure. 	<p>materials, e.g. creating land art and simple crafts with sticks, cones, seeds etc. They describe what they have found, and talk about where it originated, and what they can or could do with it.</p> <p>Beginning History and Culture Children can explain where and when they might use a knife, and the advantages of doing so.</p> <p>Beginning Media Awareness Children can create attractive, orderly and balanced pages in their lesson books. They are at a stage of beginning literacy, reading and writing simple sentences, and enjoying looking at books. Children can sing in a group, following the words, rhythm and tune of the song. They can produce drawings and paintings, using their knowledge of colour tones and mixing to create an intended effect. Children know how to say ‘no’/’stop’/’I’ll tell’/’I’ll ask’, and respond when phrases like these are said. They know who they can talk to about anything that has made them feel sad, uncomfortable, embarrassed or upset, even if that thing has happened in an online space.</p>
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Technology Age-related Learning Opportunities for C2	Relevant Learning Descriptors
<p>Children should have the opportunity:</p> <p>Tool Use</p> <ul style="list-style-type: none"> To learn simple knife skills and safety (TE) 	<p>Early Tool Use Children can use a knife to carry out simple tasks safely and effectively, talking about the risks and how to manage them. They listen carefully to and follow instructions about</p>

- To learn how to use and care for tools used in crafting activities (TE)

Living Things and Habitats

- To explore the local natural environment with purpose (EE, DE)
- To observe aspects of and changes in the environment through having their attention drawn to, for example birds, animals, plants, trees, fungi, weather etc (EE, DE, N, O)
- To notice less tangible phenomena, e.g. footprints, scat, shadows etc, and talk about their causes (O, DA, IN, IV, UC)
- To recall and describe their experiences and observations orally, recording these through writing and pictures/paintings (DA, IN, RRP)
- To explore vocabulary around parts of their own body and their senses (DA, IN)

Energy and Forces

- To explore how to build and light a fire safely, and use it for cooking and warmth (DE, TE)
- To explore forces in a practical way through lifting, pushing, pulling, and using tools to multiply force (DE, EE)

Materials

- To explore the creation of useful objects from local found materials (EE, PS)

History and Culture

- To discover how some everyday objects can be made from local natural materials (EE, PS)
- To discover how food can be prepared with primitive technology (PS, TE)

Media Content

- Create well-designed, attractive, orderly and balanced pages in their lesson books

Media Form: Writing

- Develop their literacy skills
- Access a rich class library with a wide

how to use new tools, and take part in ensuring that equipment is well cared for.

Early Living Things and Habitats

Children can identify, name and describe a variety of common plants, animals and birds in the local environment, as well as talking about the causes of some of the things they observe (e.g. footprints, shadows etc). They can talk about and record what they have observed and experienced.

Early Energy and Forces

Children can collect the material needed to build and light a fire, talk about fire safety, and demonstrate it in practice. They understand how the fire can be used to cook food and keep themselves and others warm. Children can demonstrate their practical understanding of forces through the use of their bodies and tools, applying pushes and pulls and talking about the level of force needed.

Early Materials

With support, children can make some useful objects from local natural materials, for example cord from nettles, or a basic shelter from branches and brackens.

Early History and Culture

Children can talk about how, historically, fire would have been used to cook food. They can describe the advantages and disadvantages of basic shelters, and recognise the amount of work needed to create useful buildings, objects and artefacts.

Early Media Awareness

Children can create attractive, orderly and balanced pages in their lesson books. They are at a stage of early literacy, writing short texts and reading their own and others' writing. Children can sing in both larger and smaller groups, following the words, rhythm, structure and tune of the song. They can produce drawings, paintings and illustrations, using their knowledge of colour tones and mixing to create an intended effect. Children know how to say 'no'/'stop'/'I'll tell'/'I'll ask', and respond when phrases like these are

<p>range of texts</p> <p>Media Form: Sound and Language</p> <ul style="list-style-type: none"> • Sing a range of songs frequently, regularly and repeatedly: rhythmic songs in a range of modes, some with a change of tempo; call and response songs (teacher/class and small group/large group) • Develop their skills on a simple instrument <p>Media Form: Image</p> <ul style="list-style-type: none"> • Explore primary and secondary colours through watercolour paints • Explore the creation of images through drawing with crayons and coloured pencils, and through watercolour paint <p>Online Safety</p> <ul style="list-style-type: none"> • Talk about things that they have seen or heard that have made them feel sad, uncomfortable, embarrassed or upset, even if those things are online, without fear of judgement or censure. 	<p>said. They know who they can talk to about anything that has made them feel sad, uncomfortable, embarrassed or upset, even if that thing has happened in an online space.</p>
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Technology Age-related Learning Opportunities for C3	Relevant Learning Descriptors
<p>Children should have the opportunity:</p> <p>Tool Use</p> <ul style="list-style-type: none"> • To learn to use a range of building, farming and other tools safely and for a purpose (TE, PS) <p>Living Things and Habitats</p> <ul style="list-style-type: none"> • To explore the basic needs of human beings (food, shelter, warmth) and how these needs can be met, through stories and practical experience (DE, O, IN, IV) • To explore how some materials in the natural environment can be harvested and used for food or as materials for making and building (DE, N, IN) • To explore the growing of plants and 	<p>Developing Tool Use</p> <p>Children can use a range of tools safely and effectively, talking about the risks and how to manage them. They listen carefully to and follow instructions about how to use new tools, and take part in ensuring that equipment is well cared for.</p> <p>Developing Living Things and Habitats</p> <p>Children can talk about what human beings need in order to live, and how those things can be provided through working together. They can identify and name some materials in the natural environment and describe and/or demonstrate how they can be used as food or to make things. Children can talk about how plants are grown and animals reared for food, and the different processes</p>

<p>rearing of animals specifically for food, and the processes involved (DE, O, IN, DA, PS)</p> <ul style="list-style-type: none"> • To explore examples of human impact on environments, including how humans have adapted the environment and used materials to meet their needs e.g. through building, farming and traditional trades and crafts. (O, DA, IV) • To recall and describe the stories they hear, their experiences and their observations, recording these through writing and pictures/paintings (DA, IN, RRP) <p>Energy and Forces</p> <ul style="list-style-type: none"> • To explore how fire can be used to transform materials, e.g. cooking or heating a dye pot (DE, TE, PS) • To explore forces in a practical way through lifting, pushing, pulling, and using tools to multiply force (DE, EE) <p>Materials</p> <ul style="list-style-type: none"> • To explore building and architecture, and its relationship to available materials, traditional and local skills, and the cultural context <p>History and Culture</p> <ul style="list-style-type: none"> • To discover how houses and shelters were built to meet local need and conditions • To discover how food from the local area can be grown and processed. <p>Media Content</p> <ul style="list-style-type: none"> • Create well-designed, attractive, orderly and balanced pages in their lesson books <p>Media Form: Writing</p> <ul style="list-style-type: none"> • Develop their literacy skills • Access a rich class library with a wide range of texts <p>Media Form: Sound and Language</p> <ul style="list-style-type: none"> • Sing a range of songs frequently, 	<p>involved in managing the environment, husbandry of plants and animals, harvesting crops and producing food. They can describe a range of practical, traditional and local occupations, trades and crafts and their products (e.g. shepherd, fisherman, woodcutter, baker, tanner, weaver, blacksmith, potter). Children can discuss, recall and record their observations and experiences and the stories they have heard.</p> <p>Developing Energy and Forces</p> <p>With support, children can safely use fire for a purpose, e.g. to cook, and describe the processes and results that they observe. They can talk about the precautions they take to ensure their own and others' safety and demonstrate their understanding in practice. Children can talk about working together to multiply force, and how force can be applied through the use of tools, and demonstrate their understanding in practical ways.</p> <p>Developing Materials</p> <p>Children can describe materials, and talk about their potential and how they can be used to construct structures. They can discuss what qualities make a particular material suitable for a chosen purpose. Children understand several processes involved in construction that transform materials, for example brick making, and how to mix mortar, and can demonstrate their understanding in practical ways.</p> <p>Developing History and Culture</p> <p>With support, children can build a structure from the materials local to a particular culture, using traditional skills. They can talk about the impact of the environment on vernacular architecture and local foods.</p> <p>Developing Media Awareness</p> <p>Children can create attractive, orderly and balanced pages in their lesson books. They are at a stage of developing literacy, writing longer texts and reading familiar material with confidence including information books and other text formats. Children can sing in</p>
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<p>regularly and repeatedly: songs in both modes and major key, in a variety of time signatures; introduction of rounds.</p> <ul style="list-style-type: none"> Develop their skills on a simple instrument <p>Media Form: Image</p> <ul style="list-style-type: none"> Explore control of colours with watercolour paints Explore the creation of detailed images through drawing with crayons and coloured pencils, and through watercolour paint <p>Media Carrier</p> <ul style="list-style-type: none"> Making paper <p>Online Safety</p> <ul style="list-style-type: none"> Talk about things that are and are not true Talk about things that they have seen or heard that have made them feel sad, uncomfortable, embarrassed or upset, even if those things are online, without fear of judgement or censure. Talk about bullying and how to report it to a trusted adult. 	<p>both larger and smaller groups, following the words, rhythm, structure and tune of the song. They can produce detailed drawings, paintings and illustrations, using their knowledge of colour tones and mixing to create an intended effect. They understand some of the processes which are part of the manufacture of paper. Children talk about the difference between truth and lies. They can identify the kinds of things that might make people feel sad, worried, uncomfortable or frightened. Children understand what bullying is and how it makes people feel. They can identify a trusted adult who they could talk to about any bullying they have seen or experienced.</p>
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Technology Age-related Learning Opportunities for C4	Relevant Learning Descriptors
<p>Children should have the opportunity:</p> <p>Tool Use</p> <ul style="list-style-type: none"> To learn to use a wider range of tools safely and for a purpose (TE, PS) <p>Living Things and Habitats</p> <ul style="list-style-type: none"> To explore the wider local natural environment with purpose (DE, N) To observe the physical environment, and notice the impact of it on native plants and animals (O, DA) To notice examples of human impact (both positive and negative) on environments (O, DA) 	<p>Progressing Tool Use</p> <p>Children can use a range of tools safely, effectively and appropriately, talking about risks and how to manage them. They listen carefully to and follow instructions about how to use new tools, and take part in ensuring that equipment is well cared for.</p> <p>Progressing Living Things and Their Habitats</p> <p>Children can describe the wider local environment, talking about the how it affects the plants and animals that live in it. They can discuss the positive and negative impacts that human beings have had on the local area. Children can describe a number of different animals from around the world,</p>

- To create vivid mental images of animals, their habitats, and their behaviours (IV, EI, UC)
- To compare and contrast animal and human ways of moving, manipulating, sensing and reproducing, and the kinds of food that they consume. (IV, EI, CH, UC, CC)
- To explore the close relationship of all living creatures to the human being (DA, UC, CC)
- To experience a wide range of technical vocabulary specific to animals, including humans (IN, DA)
- To explore the effects of puberty on both male and female human bodies (DA, IN)

Energy and Forces

- To explore how fire can be harnessed and intensified to effect changes to materials (EE, TE, DE, O, DA, IN)
- To explore forces in a practical way through lifting, pushing, pulling, and using tools to multiply force (DE, EE)
- To explore how animals' adaptations help them to move in effective ways in different media (O, DA, IV, EI, CH, UC)

Materials

- To explore how materials can be processed with heat, e.g. firing clay, cooking bread (N, O, IN)
- To explore how local materials have been processed in traditional industries, e.g. charcoal, pottery (N, DA, IV)
- To explore a craft of the teacher's choosing, depending on available skills and resources

History and Culture

- To explore the connections between local environment and industrial history (N, O, DA, IV)
- To explore the history of the development of writing (DE, TE, PS)

Media Content

using accurate vocabulary, including where they live, their life cycles, what they eat and how they behave. Children demonstrate the detailed mental images that they have created through their writing, pictures, paintings and models. They can compare and contrast animals and humans, comparing the functions of human tool use with animals' anatomy, and talking about other similarities and differences. Children can describe the effects of puberty on the human body, and understand a range of ways to manage menstruation.

Progressing Energy and Forces

With support, children can safely use a fire apparatus such as an oven or kiln. They can talk about the precautions they take to ensure their own and others' safety and demonstrate their understanding in practice. Children can talk about how force can be applied through the use of tools, and demonstrate their understanding in practical ways. They can describe the ways in which different animals move on land, in the air and through water, and how their body shape and size makes this easier or harder.

Progressing Materials

Children can describe the changes that occur in materials which have been subjected to intense heat, using accurate vocabulary. They can talk about raw materials that are available in the local environment, how these were processed, and how the products were used. If available skills and resources allow, children can learn some basic methods and techniques to transform a material through additional craft teaching.

Progressing History and Culture

Children can talk about local historical industries and their connection to the local natural environment and available resources. With support and instruction they can make a functioning pen and usable paper, and talk about the sequence of processes involved.

Progressing Media Awareness

Children can carry out simple, independent research in books, presenting their work on

<ul style="list-style-type: none"> • Use research to inform independent work, and give small presentations <p>Media Form: Writing</p> <ul style="list-style-type: none"> • Further develop their literacy skills • Access a book collections and libraries with a wide range of texts <p>Media Form: Sound and Language</p> <ul style="list-style-type: none"> • Sing a range of songs frequently, regularly and repeatedly: songs in both major/minor key and modes, with a range of time signatures, rounds and work songs, and some simple splitting of parts. • Develop their skills on a simple instrument, playing together as a group and accompanying classmates' singing • Take up a solo instrument of their choice <p>Media Form: Image</p> <ul style="list-style-type: none"> • Explore the creation of detailed and more precise images through drawing and painting <p>Media Carrier</p> <ul style="list-style-type: none"> • Making pens and ink <p>Online Safety</p> <ul style="list-style-type: none"> • Talk about truthfulness and the way people in stories present and disguise themselves • Talk about things that they have seen or heard that have made them feel sad, uncomfortable, embarrassed or upset, even if those things are online, without fear of judgement or censure. • Talk about bullying and how to report it to a trusted adult. • Talk about peer pressure and how to respond to it. 	<p>various topics. They are at a stage of moderately fluent literacy, identifying and selecting the information relevant to a topic, adjusting their writing to suit their intended audience, and writing more extensively. Children can sing in groups as part of a round, or in very simple parts. They can play a simple instrument as part of a group and in accompaniment. They may choose to take up a solo instrument. Children can draw detailed and quite precise images, for example in their botany main lesson, and produce paintings and illustrations using their knowledge of colour and paint. They understand some of the processes which are part of the manufacture of paper. Children talk about how characters in stories can disguise themselves and trick other characters. They can describe the kinds of things that might make people feel sad, worried, uncomfortable or frightened. Children understand what bullying is and how it makes people feel, and identify a trusted adult who they could talk to about any bullying they have seen or experienced. They can suggest some strategies to respond to peer pressure.</p>
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<p>Technology Age-related Learning Opportunities for C5</p>	<p>Relevant Learning Descriptors</p>
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Children should have the opportunity:

Tool Use

- To learn to use a range of tools safely and skilfully (TE, PS)
- To practise whittling and carving skills on green wood (TE)

Living Things and Habitats

- To explore different biomes (DE, N, O, DA, IN)
- To carry out observation-based study of flowering plants in their environment (DE, O, DA, IN, IV, EI, CH, UC)
- To explore the process transformation from seed to flower and fruit (IN, IV, EI)
- To explore a range of trees and plants in the local environment, and where they grow (DE, N, O, DA, IN, UC)
- To explore the relationship between plants and their environment, looking at plants around the world in a range of landscapes and climates (DA, IN, IV, EI, UC, CH)
- To explore some of the relationships between plants and insects (DA, IN, IV)
- To explore some of the ways in which plants have been and still are used (e.g. dyes, medicines etc) (DA, IN, UC)
- To create vivid mental images of groups of animals, their habitats and their behaviours (IV, EI, UC, CC, CH)
- To compare and contrast a number of types of animals within a group, including their specialisms, their feeding habits and how they raise their young. (DA, IN, UC, CH, CC, FC, LC)
- To explore the organisations of social insects (e.g. bees, ants) and the life cycle and metamorphosis of insects (e.g. butterflies) (DA, IN, IV, EI, UC)
- To explore the importance and uses of insects for humans, and the balance of population growth and control. (DA, IN, UC)
- To explore issues of biodiversity and climate change. (DA, EI, UC)

Competent Tool Use

Children can use a range of tools safely, effectively and appropriately, talking about risks and how to manage them. They have refined their practical skills in whittling and carving, creating useful objects. Children listen carefully to and follow instructions about how to use new tools, and take part in ensuring that equipment is well cared for. They take pride in their work.

Competent Living Things and Habitats

Children can talk about a range of relatively local biomes, describing their different soils, crops, habitations and wild spaces. They observe, describe, identify and name a number of individual trees and plants in their local environment, demonstrating their knowledge through detailed drawings which show an appreciation of the beauty of the plant, as well as the structure. Children can identify, name and describe a number of plants growing in different locations and conditions in the local environment. They can talk about the different kinds of plants that grow in different landscapes and climates, describing how they are affected by sun, air, soil, temperature and water supply. Children can explain some of the ways in which plants and insects are important to one another, and some of the ways in which humans have used plants in the past and still use them today.

Children demonstrate the detailed mental images that they have created of groups of animals through their writing, pictures, paintings and models. They can identify the similarities and differences of animals within a group talking about how they have been categorised. Children can describe the complex social behaviour of examples of insect colonies, and the individual specialisations within the organisation. They can talk about how humans rely on insects for pollination and the breaking down of waste, and how their populations can be controlled through insecticides and other, more organic methods. Children can talk

Materials

- To explore how materials can be adapted through skilled tool use (EE, TE, PS, DE)
- To explore a craft of the teacher's choosing, depending on available skills and resources

History and Culture

- To begin to explore the idea of being a craftsperson and the development and application of physical skill. (DE, EI)

Media Content

- Use research to inform independent work, and give small presentations

Media Form: Writing

- Further develop their literacy skills
- Access a book collections and libraries with a wide range of texts

Media Form: Sound and Language

- Sing a range of songs frequently and regularly: songs in both major and minor key and modes, in two parts or more challenging rounds.
- Practice their solo instrument of choice
- Explore music as an academic subject

Media Form: Image

- Explore the creation of detailed and more precise images through drawing and painting

Online Safety

- Talk about truthfulness and the way people in stories present and disguise themselves
- Talk about things that they have seen or heard that have made them feel sad, uncomfortable, embarrassed or upset, even if those things are online, without fear of judgement or censure.
- Talk about bullying and how to report it to a trusted adult.

about the impact of human beings on biodiversity, and some of the ways in which climate change has been accelerated by human activity.

Competent Materials

Children can imagine the potential of a material and how it could/can be transformed through the use of tools. If available skills and resources allow, children can learn some further methods and techniques to transform a material through additional craft teaching.

Competent History and Culture

Children demonstrate their appreciation of the concept of being a craftsperson through taking care with their work, and taking pride in what they produce.

Competent Media Awareness

Children can carry out simple, independent research in books, presenting their work on various topics. They are at a stage of moderately fluent literacy, identifying and selecting the information relevant to a topic, adjusting their writing to suit their intended audience, and writing more extensively. Children can sing in groups as part of a round, or in very simple parts. They can play a simple instrument as part of a group and in accompaniment. They may choose to take up a solo instrument. Children can draw detailed and quite precise images, for example in their botany main lesson, and produce paintings and illustrations using their knowledge of colour and paint. They understand some of the processes which are part of the manufacture of paper. Children talk about how characters in stories can disguise themselves and trick other characters. They can describe the kinds of things that might make people feel sad, worried, uncomfortable or frightened. Children understand what bullying is and how it makes people feel, and identify a trusted adult who they could talk to about any bullying they have seen or experienced. They can suggest some strategies to respond to peer pressure.

<ul style="list-style-type: none"> • Talk about peer pressure and how to respond to it. 	
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Technology Age-related Learning Opportunities for C6	Relevant Learning Descriptors
<p>Children should have the opportunity:</p> <p>Tool Use</p> <ul style="list-style-type: none"> • To develop woodworking tool skills, including axes, froes, draw knives and mauls; chisels, gouges, clamps and holding equipment, different sorts of saws, mallets, rasps, sandpapers etc. • To split firewood (if this can be safely supervised) • To develop green woodworking skills, including using the shaving horse, and other woodland devices (e.g. cleaving breaks) <p>Materials</p> <ul style="list-style-type: none"> • To explore how wood in different forms and from different species can be shaped and transformed • If available skills and resources allow, children can learn some further methods and techniques to transform a material through additional craft teaching. <p>History and Context</p> <ul style="list-style-type: none"> • To encounter the cultural and historical nature of woodworking tools • To experience a craftspersons perspective <p>Media Content</p> <ul style="list-style-type: none"> • Use research, including carefully scaffolded internet searches to inform independent work, and give small presentations <p>Media Form: Writing</p> <ul style="list-style-type: none"> • Explore journalistic work, e.g. by writing a school newspaper or blog <p>Media Form: Sound and Language</p>	<p>Secure Technology</p> <p>Tool Use</p> <p>Pupils can use woodworking tools safely, effectively and appropriately, assessing the risks involved and demonstrating their understanding of how to mitigate these.</p> <p>Materials</p> <p>They can talk about the advantages and disadvantages of the materials they use, and how they were selected.</p> <p>History and Context</p> <p>Pupils have an understanding of the craft workshop as a place of community practices that mediates appreciation and respect. They can talk about the social, cultural and technological history of some of the tools they use.</p> <p>Secure Media Awareness</p> <p>Children can carry out simple, independent research in books and on the internet, presenting their work on various topics. They are at a stage of experienced literacy, taking notes, summarising and providing supporting evidence. Their writing is securely structured and organised, and they can write using different structures and styles. Children can sing in complex rounds, or in two or three parts and may play a solo instrument. They can talk about the projection of images and how shadows are created, demonstrating their knowledge in practice. Children can talk about how the internet can be used to find and store information, and to communicate with others.</p> <p>With support, pupils can find requested information from the internet. They can talk about the benefits and limitations of search technology, and the potential reliability and</p>

- Sing a range of songs: songs in both major and minor key and modes, challenging rounds, drones and 2-3 parts, 7/8 and 9/8 time signatures.
- Practice their solo instrument of choice
- Explore music as an academic subject

Media Form: Image

- Explore the creation of images through projection and shadow, including camera obscura

Media Carrier

- Be introduced to digital media and the internet

Online Safety

- To learn how to find information using digital technologies, examine the differences between fact, opinion and belief and explore influence, persuasion and manipulation in this context
- To explore how online identities can be created, copied, modified, manipulated and altered, and how people might represent themselves online
- To explore trust and relationships online: 'netiquette', appropriate behaviour, social networks, discrimination, harassment, and how to recognise and get help with cyber-bullying
- To explore the impact of sharing personal information online, including the concept of a 'digital reputation' and degrees of anonymity
- To explore the impact of technology on health and wellbeing
- To explore privacy and security, including passwords and permissions, the harvesting of data, scams and phishing
- To explore the use and reuse of content on the internet

trustworthiness of results, including the motivations of the person or organisation giving the information. Pupils can explain ways in which someone might change their identity online, and talk about why someone might pretend to be someone else. They can describe how to show respect for others online, recognise harmful language and harassment, and explain how someone can get help if they are having difficulties online, including with cyber-bullying. Pupils understand that online information about someone can last for a long time and can be seen by others. They can talk about the impact of a digital reputation, and strategies to protect it. Pupils can talk about the potential impact of technology on health and wellbeing, and some strategies to limit negative aspects. They understand age restrictions on some online activities and games, and why it is important to follow them. Pupils can create strong passwords, and explain how to store them and what to do if a password is shared, lost or stolen. They understand that many apps may read and share private information, and know some strategies to identify scams or phishing. Pupils can talk about content that must not be re-used without permission from the owner (e.g. videos, music, images). They make references to and acknowledge the sources of information they have used in their own work.

Technology Age-related Learning Opportunities for C7	Relevant Learning Descriptors
<p>Children should have the opportunity:</p> <p>Tool Use</p> <ul style="list-style-type: none"> To further develop woodworking tool skills To further develop green woodworking skills To learn to use bookbinding tools, e.g. guillotines, knives, awls etc <p>Materials</p> <ul style="list-style-type: none"> To explore how wood in different forms and from different sources can be shaped and transformed To explore a craft of the teacher's choosing, depending on available skills and resources To make glue for book binding from raw materials <p>History and Context</p> <ul style="list-style-type: none"> To encounter the cultural and historical nature of woodworking and other craft tools To experience a craftsperson's perspective <p>Media Content</p> <ul style="list-style-type: none"> Use research, including digital search engines to inform independent work, and give presentations Explore how to refine the results of a digital search <p>Media Form: Writing</p> <ul style="list-style-type: none"> Practice touch typing with all fingers <p>Media Form: Sound and Language</p> <ul style="list-style-type: none"> Sing a range of songs in a range of keys, time signatures and rhythms, in simple polyphony; practice their solo instrument of choice Explore music as an academic subject, including recorded music 	<p>Proficient Tool Use Pupils can use a wide range of woodworking tools safely, effectively and appropriately, assessing the risks involved and demonstrating their understanding of how to mitigate these.</p> <p>Proficient Materials Pupils can select an appropriate raw material, e.g. species of tree, type of seasoned wood, for their project. If available skills and resources allow, children can learn some methods and techniques to transform a material through additional craft teaching.</p> <p>Proficient History and Culture Pupils have an understanding of the craft workshop as a place of community practices that mediates appreciation and respect. They can talk about the social, cultural and technological history of many of the tools they use.</p> <p>Proficient Media Awareness Pupils can carry out independent research using books and other print media, and can use digital search engines, refining their results and making judgements about the probably accuracy of the information they find. They can use a keyboard efficiently and effectively to demonstrate their literacy skills. Pupils sing more complex polyphonic music, and practice any instrument they have chosen to play. They are familiar with a range of audio media, including, for example, radio plays and recorded music. Pupils can use their knowledge of the principles of perspective to represent three dimensional images in a two dimensional plane. They can explain how an analogue camera creates and image, and demonstrate their understanding in practice. Pupils can create a sequence of images that tells a story or creates movement through animation. In an analogue format, they can lay out the pages of a book in an aesthetically pleasing and effective way, demonstrating their</p>

Media Form: Image

- Use the principles of perspective to explore the representation of three dimensional objects in a two dimensional media
- Explore how analogue cameras use lenses and mirrors to create images
- Explore the creation of moving or sequenced images through, for example, stop motion animation with drawings or models.

Media Carrier

- Explore practical book binding, including balancing text, pictures and graphics to lay out pages, typeface, captions and aesthetics, page numbering etc

Online Safety

- To explore the impact of commercial sponsorship on search engine results and how rankings can be influenced.
- To explore the reliability of online content, including the credibility and defensibility of some opinions, deliberately misleading information, and the discrediting of accurate reporting (fake news)
- To explore the ways in which a person's online identity and digital personality can be monitored, managed and protected
- To explore giving, gaining and denying consent online, including around the sharing of images and personal details
- To explore the laws governing acceptable online behaviour, including, for example, sexting, trolling, harassment and stalking
- To explore the importance of self-regulating technology use, the strategies that can be used to identify when someone may need support, and the pressures that technology can place on users.
- To explore privacy and security,

understanding of how to balance text and graphics, use captions, and number pages for printing.

Pupils can select appropriate results from digital searches, talking about the reliability of the information they find, how some information may be deliberately misleading, and how accurate reporting may be discredited. They can talk about their own and others' online identity and digital personality, how these are formed, and how they can be monitored, managed and protected. Pupils can explain some of the rules, conventions and complexities of giving, gaining and denying consent. They can discuss what online behaviour is unacceptable and what is illegal, including the possible consequences of behaviours like sexting, trolling, harassment and stalking. Pupils know the importance of self-regulation in terms of their technology use, and can talk about strategies that they can use. They know some of the things that can put pressure on someone (e.g. the expectation of immediate response on social media apps, invasive notifications etc) and how to identify when someone might be experiencing difficulties in managing their technology use. Pupils know about a range of threats to their digital security, and can explain how they might encounter viruses and other types of malware. They can explain some of the actions they can take to minimise the risks of connectivity, e.g. covering webcams and checking app permissions. Pupils know the importance of backing up data, and how this can be done. They know that commercial online content can be accessed illegally, and can identify the potential consequences of this and how it might impact the creators of online content.

<p>including viruses and malware, the security of devices connected to the internet (e.g. webcams, phones) and how to back up data</p> <ul style="list-style-type: none"> • To explore the illegal access of content (e.g. pirate sites, peer-to-peer sharing) and its potential consequences. 	
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Technology Age-related Learning Opportunities for C8	Relevant Learning Descriptors
<p>Children should have the opportunity:</p> <p>Media Content</p> <ul style="list-style-type: none"> • Use research, including a wide range of digital and print media to inform and present independent work • Explore a range of digital search options, including specialist portals <p>Media Form: Writing</p> <ul style="list-style-type: none"> • Explore formats and styles for formal and informal correspondence, including word processing software, emails and messaging apps <p>Media Form: Sound and Language</p> <ul style="list-style-type: none"> • Take part in a class play, either on stage, behind the scenes, or both <p>Media Form: Image</p> <ul style="list-style-type: none"> • Use the principles of perspective including the golden section to explore the representation of three dimensional objects in a two dimensional media • Explore the creation of short films with digital cameras and editing software <p>Media Carrier</p> <ul style="list-style-type: none"> • Work with cameras and microphones. <p>Online Safety</p> <ul style="list-style-type: none"> • To explore different search engines and portals, and how a person's digital personality will affect the type of information returned to them in a search 	<p>Mature, Independent Tool Use Pupils can use a wide range of woodworking tools safely, effectively and appropriately, assessing the risks involved and demonstrating their understanding of how to mitigate these.</p> <p>Mature, Independent Materials Pupils can select an appropriate raw material, e.g. species of tree, type of seasoned wood, for their project. If available skills and resources allow, children can learn some methods and techniques to transform a material through additional craft teaching.</p> <p>Mature, Independent History and Context Pupils have an understanding of the craft workshop as a place of community practices that mediates appreciation and respect. They can talk about the social, cultural and technological history of many of the tools they use.</p> <p>Mature, Independent Media Awareness Pupils can carry out independent research using a wide range of print and digital media, selecting an appropriate method and mechanism. Pupils can use a word processing app to produce documents in a range of formats and styles, e.g. a CV or a formal business letter. They can adjust their style appropriately for a digital or more informal medium, e.g. emails and messaging apps. Pupils play an active role in the class play, on the stage and/or in a backstage role creating scenery, managing sound/lighting, or working on costumes etc. Pupils can use their knowledge of the principles of perspective</p>

<ul style="list-style-type: none"> • To explore how online content can be designed to influence people's thoughts and beliefs, • To explore the potential reputational benefits and risks in how we represent ourselves online. • To explore the importance of respecting boundaries and being considerate of the impact of the sharing of images and content • To explore how relationships, including romantic ones, can safely begin, develop, be maintained, change and end online • To explore the impact of online anonymity and disinhibition • To explore different routes for reporting online bullying both in school and at home • To further explore the importance of self-regulating technology use, and strategies to help with this • To understand that there is online content and/or groups that promotes unhealthy coping strategies (e.g. suicide, eating disorders, self-harm), and to explore strategies for dealing with this • To further explore privacy and security, including two factor authentication, safe and secure online payments, browser settings and the reporting of cyber problems (e.g. identity theft, ransomware etc) • To explore Creative Commons Licensing. 	<p>and the golden ratio to represent three dimensional images in a two dimensional plane. They write, produce, film and edit short films using digital cameras, microphones and editing software.</p> <p>Pupils can select and use an appropriate search engine or portal for a task. They can talk about the results returned to them, identifying how these might have been affected by a number of factors including, for example, their previous search history, sponsored results etc. Pupils can differentiate between genuine news sites and those which aim to mislead, and talk about how anyone could be targeted with information or disinformation intended to influence their beliefs, actions and choices. They can discuss how they represent themselves online, including how this might impact on people's perceptions of them in the future. Pupils can talk about how they can create and maintain boundaries around the sharing of images and content online, and also how to respect the boundaries of other people. They identify strategies for maintaining healthy and safe online relationships, including romantic ones. Pupils can talk about how online anonymity and disinhibition can affect communication, and how unpleasant comments and cruelty can escalate quickly online. They can explain and assess a variety of routes to report bullying both in school and at home. Pupils can identify online content/groups that promote unhealthy coping strategies, and the risks associated with this. They know how to report content that promotes harmful or unhealthy behaviour, and who to talk to if they or someone else are at risk of being influenced by such sites. Pupils can explain how to make secure online payments, and how to keep their financial and identity information secure. They can apply and use the principles of Creative Commons Licensing.</p>
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