Technology and Design

Key Stage 3 Non Statutory Guidance for Technology and Design

Contents

Section **01**
Purpose of this Guidance

This guidance is part of the support and implementation package for the Revised Northern Ireland Curriculum (hereafter referred to as Northern Ireland Curriculum) already with your school that includes:

• The Statutory Curriculum at Key Stage 3: Supplementary Guidance; and
• The Curriculum Support and Implementation Box.

Both these resources and additional learning and teaching materials are also available at www.nicurriculum.org.uk.

Technology and Design is part of the minimum requirement for every pupil at Key Stage 3. This guidance seeks to build on good practice and to provide heads of department with information and practical approaches to help them plan and roll-out the requirements for Technology and Design in a manageable way. The guidance explains and provides interpretation of the statutory requirements for Technology and Design.

There are departmental questions and activities after each section which can help you and the members of your department to reflect on and evaluate your current practice and identify actions for departmental planning.

The questions and activities follow *The 4A's Model for Planning* as documented in the booklet, *Planning for the Revised Curriculum at Key Stage 3*, in your school's Curriculum Support and Implementation Box. Working through this guidance and its accompanying activities means that your department will be well on course for rolling out the Northern Ireland Curriculum.

Section 02
Technology and Design in the Northern Ireland Curriculum

The Northern Ireland Curriculum aims to empower pupils to achieve their potential and to make informed and responsible choices and decisions throughout their lives. It is about helping all pupils prepare for life and work:

• as individuals;
• as contributors to society;
• as contributors to the economy and environment.

Technology and Design has a significant role to play in this.

Many pupils at this age have a keen interest in trying to understand major issues that they encounter within their own culture, and through the media. Coming to a more informed understanding of the personal, social and environmental issues which will have an impact on them during their lives, pupils need to explore:

• their sense of identity and belonging;
• their curiosity about the world around them;
• their value system and how we interact with our world and with each other.

The study and practices of Technology and Design help us in making sense of the world, both in terms of the practical issues of design and their close relationship with the values of society and in the consideration of how the products of culture enrich experience.

Meeting Curriculum Objectives

Technology and Design **develops pupils as individuals** by:
• promoting creativity and problem solving skills in response to design challenges in the individual's life;
• helping individuals appreciate their own and other's achievements through research, investigation and evaluation of products;
• promoting safe working practice.

Technology and Design **develops pupils as contributors to society** by:
• investigating the design and manufacture of products which aid particular groups within our society;
• evaluating cultural trends to identify needs and opportunities;
• exploring how technology contributes to communication within society;
• investigating the various impacts which changes in technology have on ethical issues in our lives.

Technology and Design **develops pupils as contributors to the economy and environment** by:
• enabling pupils to develop skills relating specifically to design, manufacture and testing within an engineering environment;
• developing skills valued by employers such as: analysis of problems, research from various sources, analysis of information, problem solving, practical skills including use of new technology, communication and ICT skills;
• analysing a wide variety of products from local and global companies;
• investigating environmental issues in the world today and seeking design solutions which are most suited to taking account of those issues.

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Questions for Departments

In order to contribute to the curriculum objectives during Key Stage 3 Technology and Design, what do we want our pupils to:

• know (knowledge and understanding);

• be able to do (skills);

• be like (attitudes and dispositions)?

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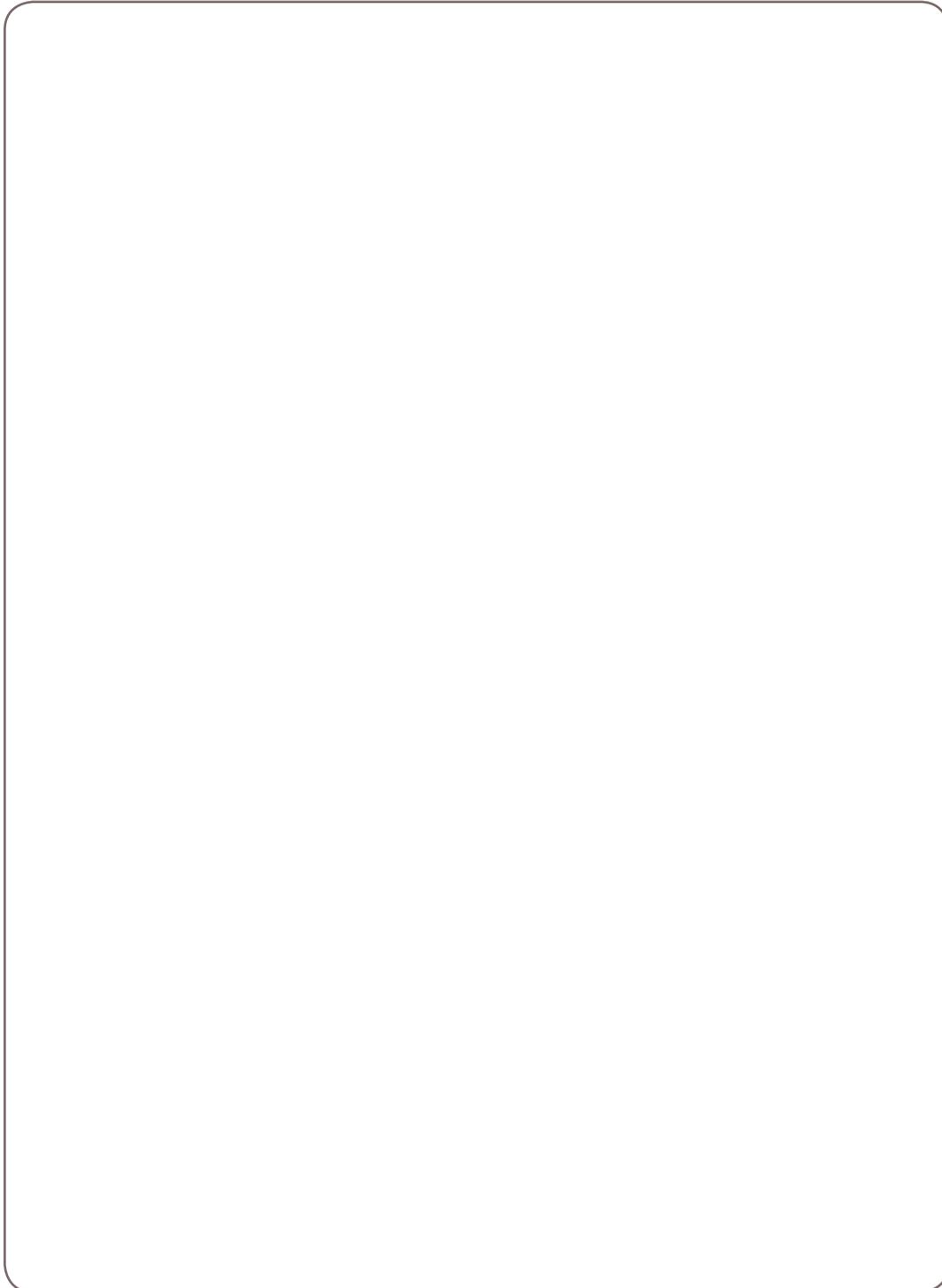
Section 03
Links to Key Stage 2 and Key Stage 4

3.1   Key Stage 2

Science and Technology is a contributory element to The World Around Us at Key Stages 1 and 2, along with Geography and History.

The World Around Us is organised under the following four interrelated strands:

• Interdependence;
• Place;
• Movement and Energy;
• Change Over Time.

The statutory requirements for The World Around Us at **Key Stage 2** are set out below.

Through the contributory elements of Science and Technology, History and Geography, teachers should enable pupils to develop knowledge, understanding and skills in:

Interdependence

Pupils should be enabled to explore:

• How they and others interact in the world;
• How living things rely on each other within the natural world;
• Interdependence of people and the environment and how this has been accelerated over time by advances in transport and communications;
• The effect of people on the natural and built environment over time.

Place

Pupils should be enabled to explore:

• How place influences the nature of life;
• Ways in which people, plants and animals depend on the features and materials in places and how they adapt to their environment;
• Features of, and variations in places, including physical, human, climatic, vegetation and animal life;
• Our place in the universe;
• Change over time in places;
• Positive and negative effects of natural and human events upon place over time.

Movement and Energy

Pupils should be enabled to explore:

• The causes and effect of energy, forces and movement;
• Causes that effect the movement of people and animals;
• How movement can be accelerated by human and natural events such as wars, earthquakes, famine or floods;
• Positive and negative consequences of movement and its impact on people, places and interdependence.

Change over Time

Pupils should be enabled to explore:

- How change is a feature of the human and natural world and may have consequences for our lives and the world around us;
- Ways in which change occurs over both short and long periods of time in the physical and natural world;
- The effects of positive and negative changes globally and how we contribute to some of these changes.

In fulfilling the statutory requirements, teachers should provide a balance of experiences across Science and Technology, Geography and History to connect these where possible.

In addition, teaching in The World Around Us should provide opportunities for children as they move through Key Stages 1 and 2 to progress:

- **from** making first hand observations and collecting primary data **to** examining and collecting real data and samples from the world around them;
- **from** identifying similarities and differences **to** investigating similarities and differences, patterns and change;
- **from** using everyday language **to** increasingly precise use of subject specific vocabulary, notation and symbols;
- **from** using tools, components and materials to design and make **to** combining designing and making skills and techniques with knowledge and understanding in order to present solutions.

3.2   Key Stage 4

The flexible framework at Key Stage 3 allows:

- teachers to establish foundations for Key Stage 4 study by providing opportunities for pupils to demonstrate deeper understanding;
- pupils to become more independent learners who will be adept and experienced in managing their own learning.

Key Stage 3 experiences should provide a robust basis for learning at Key Stage 4. The knowledge, understanding and skills outlined in the statutory requirements for Key Stage 3 Technology and Design provide a framework that enables teachers to tailor the breadth and depth of coverage to meet the needs and interests of pupils.

At Key Stage 4 those pupils who choose to continue with further study in Technology and Design can select from a range of qualifications, details of which are available on the CCEA website. GCSE specifications in all subjects are currently being reviewed.

For those pupils who choose not to continue with further study of Technology and Design beyond Key Stage 3, their experiences during the key stage should have provided them with such knowledge, understanding and skills associated with Technology and Design as will help them engage meaningfully with **real** and **relevant** issues in their world.

Questions for Departments

• What do we know about our pupils' previous experiences of Technology and Design?

• How can we find out more?

• Is our Key Stage 3 provision preparing pupils for GCSE in the way we would like?

• For pupils who don't continue with GCSE Technology and Design, does our Key Stage 3 provision ensure worthwhile experiences which will support their wider learning?

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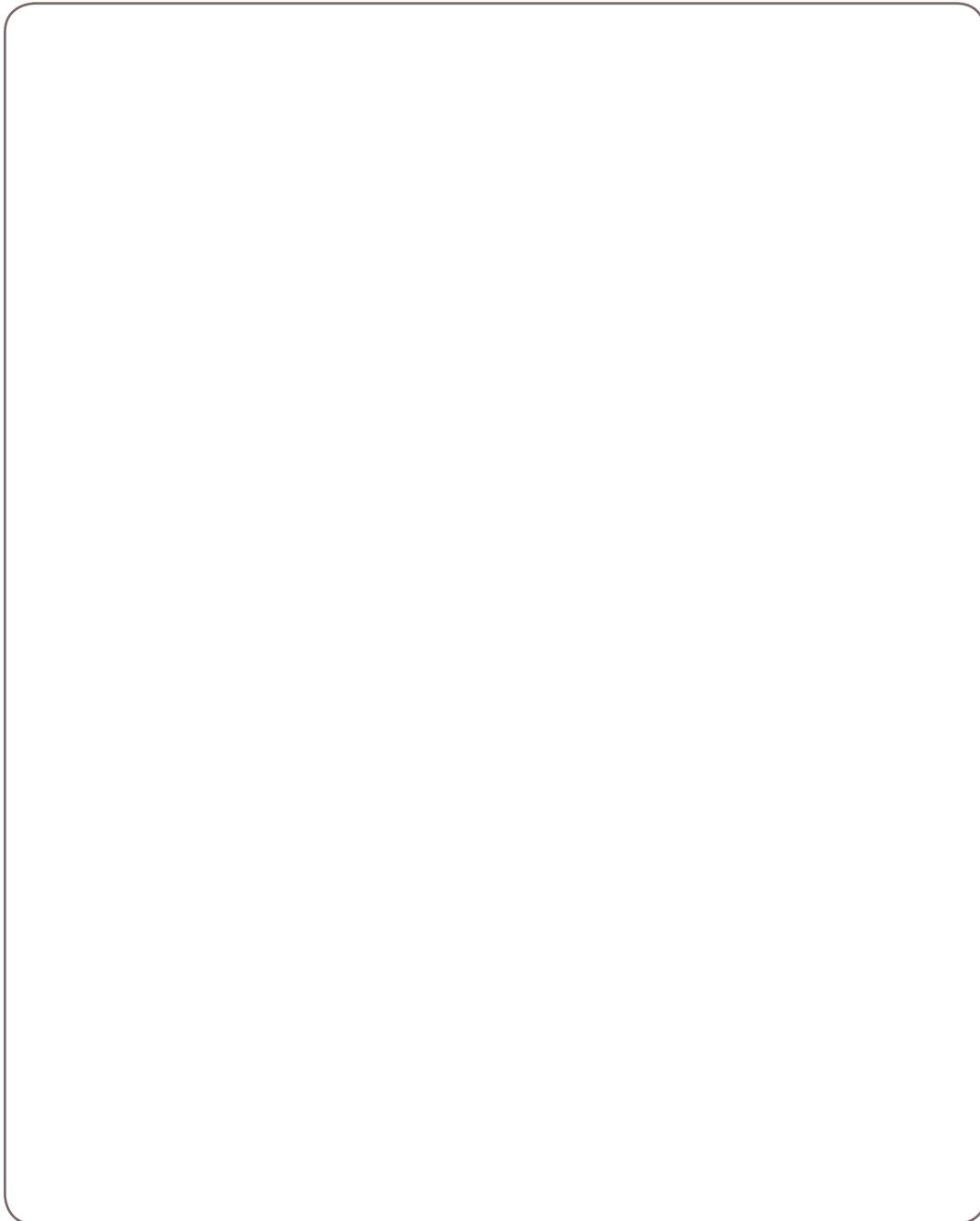
Section 04
Understanding the Statutory Requirements for Technology and Design

This section includes explanation of:

- The Layout of the Statutory Requirements;
- Knowledge, Understanding and Skills;
- Curriculum Objectives and Key Elements;
- The Learning Outcomes;
- Thinking Skills and Personal Capabilities.

4.1 The Layout of the Statutory Requirements

Developing pupils' Knowledge, Understanding and Skills	(Objective 1) Developing pupils as Individuals	(Objective 2) Developing pupils as Contributors to Society
Through engagement with a range of stimuli including peers, poetry, prose, drama, non-fiction, media and multimedia which enhance creativity and stimulate curiosity and imagination, pupils should have opportunities to become critical, creative and effective communicators by:

• expressing meaning, feelings and viewpoints;

• talking, to include debate, role-play, interviews, presentations and group discussions;

• listening actively and reporting

• reading and viewing for key ide engagement and empathy;

• writing and presenting in differ for different audiences and pur

• participating in a range of dram

• interpreting visual stimuli inclu moving image;

• developing an understanding o forms, genres and methods of and an understanding of how m created;

• developing their knowledge of how language works and their accuracy in using the conventions of language, including spelling, punctuation and grammar; | Pupils should have opportunities to:

Engage, through language, with their peers and with fictional and real-life characters and situations, to explore their own emotions and develop creative potential, for example, discuss what they would have done or how they would have felt when faced with a situation in a novel; produce a digital portfolio highlighting their personal qualities etc. [Key Element: Personal Understanding]

and television etc.
Create a campaign to promote a health and safety issue such as dealing with misuse of substances. Improvise a scene demonstrating peer support or peer pressure about a health related issue. [Key Element: Personal Health]

Explore issues related to Moral Character : Demonstrate a willingness to challenge stereotypical, biased or distorted viewpoints with appropriately sensitive, informed and balanced responses, for example, discuss moral choices of real-life and fictional characters; take responsibility for choices and actions. [Key Element: Moral Character]

Explore the use of language and imagery in conveying and evoking a variety of powerful feelings, for example, comment on a film, novel, performance or poem which has stimulated a personal insight. [Key Element: Spiritual Awareness] | Pupils should have opportunities to:

Use literature, drama, poetry or the moving image to explore others' needs and rights, for example, consider the needs of a fictional character; participate in a role play involving conflicting rights etc. [Key Element: Citizenship]

Explore how different cultures and beliefs are reflected in a range of communication methods

Explore issues related to Ethical Awareness : Investigate and evaluate communication techniques used to explore a relevant ethical issue, for example, track coverage of the same issue in a range of media; design and produce own current affairs programme/news sheet for young audience etc. [Key Element: Ethical Awareness] |

Exemplar

See back cover for an A3 version of
the Statutory Requirements for Technology and Design
with additional guidance and examples

Objectives
The **curriculum objectives** provide the real and relevant contexts in which Technology and Design knowledge, understanding and skills are developed. The objectives should be developed throughout the key stage.

The Knowledge, Understanding and Skills to be developed in Technology and Design during Key Stage 3.

The objectives are made up of **Key Elements.** These provide opportunities for subjects to connect with Learning for Life and Work and with other subjects.

| Learning Outcomes

The learning outcomes require the demonstration of skills and application of knowledge and understanding of English and Media Education.

Pupils should be able to: | • research and manage inf
• show deeper under
appropriate;
• demonstrate c
• work effectiv
• demonstrat
• communicat
• attention to a | here appropriate;
and making informed decisions, using Mathematics and ICT where appropriate;

ng and improving own performance;

imagel showing clear awareness of audience and purpose and |

Learning Outcomes
These state the skills and capabilities that pupils should be able to demonstrate throughout the key stage in the context of Technology and Design.

NB: Teachers may develop activities that combine many of the statutory requi... ...aspects highlighted in BOLD (including each of the Key Elements) are met.

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4.2 Knowledge, Understanding and Skills

The first column in the statutory requirements for Technology and Design is headed 'Developing pupils' Knowledge, Understanding and Skills.'

- Everything in this column is a statutory requirement for the key stage as a whole; not for individual years within the key stage.
- It is intended that schools interpret and develop these requirements as appropriate to their own context.
- The nature of Technology and Design means that the bullet points in the knowledge, understanding and skills column are likely to be covered a number of times within the key stage.

Developing pupils' Knowledge, Understanding and Skills	Supporting notes
Design – identifying problems; investigating, generating, developing, modelling and evaluating design proposals; giving consideration to form, function and safety;	During the key stage pupils will have the opportunity to develop ideas within many areas of design. Problems will be clearly understood and relevant areas of research will be carried out before design ideas are developed. A clear, detailed specification of requirements should enable pupils to produce appropriate ideas and evaluate them as their product develops. Modelling of part of, or of the complete prototype may be useful to lead pupils to a final design proposal. Throughout the design process pupils should consider safety as a priority.
Communication – use of free-hand sketching and formal drawing techniques and ICT tools (including 3D modelling);	In the course of the design activity pupils should develop a range of communication skills, including written and oral communication. An emphasis is placed on communication through sketching and annotation, together with 3D solid modelling of designs and parts of a design. Consideration should be given to: colour, form, shape and texture. Formal drawing approaches such as orthographic drawing are practised and completed to recognised standards, using accepted symbols. The communication method chosen at each stage of the design process will be appropriate and suitable for the intended audience.

Developing pupils' Knowledge, Understanding and Skills	Supporting notes
Manufacturing – selecting and using materials fit for purpose; safe use of a range of tools and processes appropriate to materials, demonstrating accuracy and quality of outcome;	The selection of the appropriate materials is carried out through evaluation of design ideas, and with consideration of relevant points within the design specification. Manufacturing techniques and processes are also considered, so as to decide which materials and processes are most suitable. Skills with hand and machine tools are developed with accuracy and quality in mind. Safety is an important consideration at all stages.
Control – incorporate control systems, such as mechanical, electronic or computer-based, in products and understand how these can be employed to achieve desired effects.	An understanding of various types of control systems will be taught and developed throughout the key stage. Suitability of proposed designs for the purpose specified, is discussed and the appropriate control system is incorporated into a suitable casing or other design solution.

Questions for Departments

• What is the current balance between knowledge, understanding and skills in our departmental provision?

• What are the implications for future learning and teaching at Key Stage 3?

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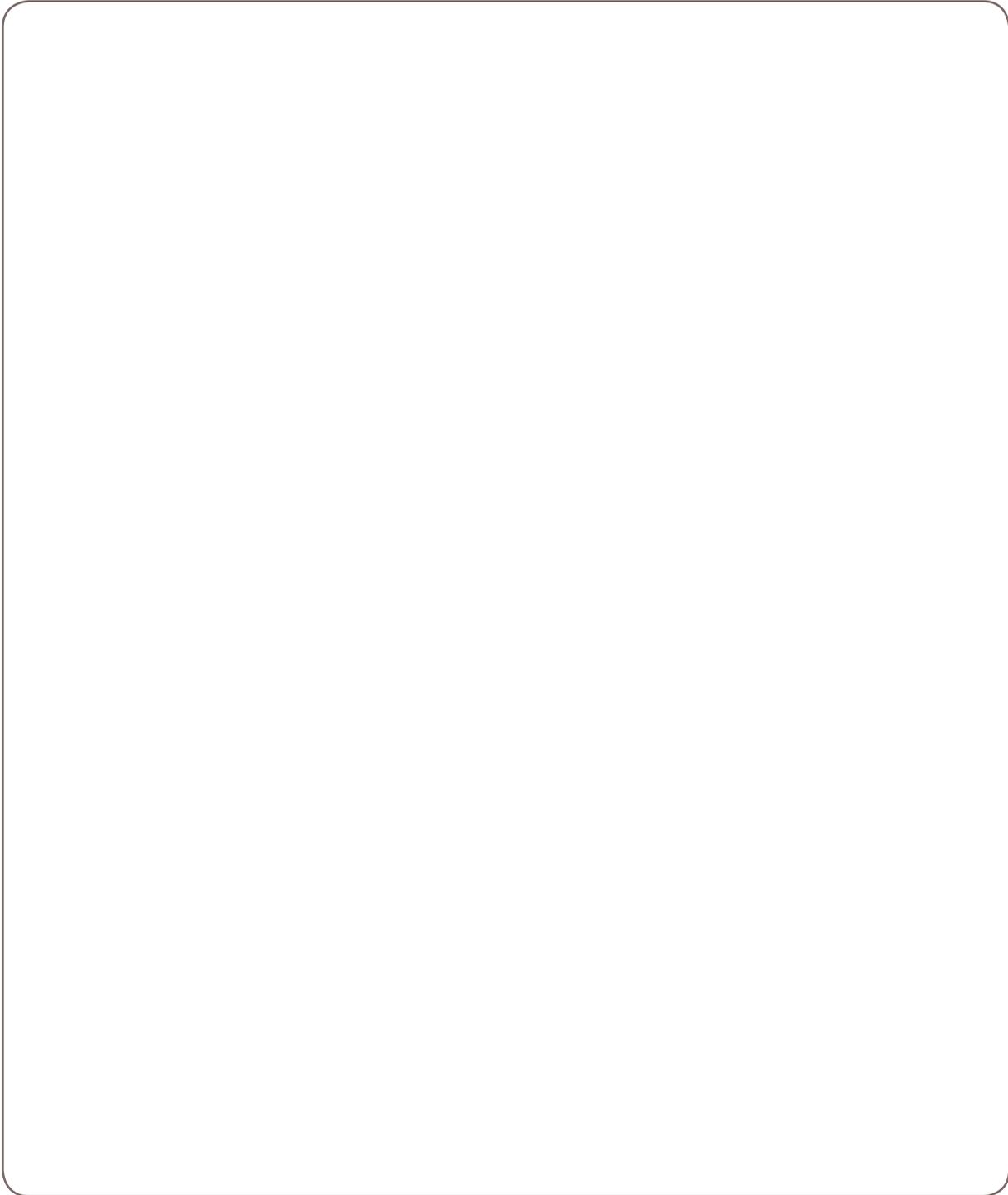
4.3   Curriculum Objectives and Key Elements

The curriculum objectives are broken down into key elements. The key elements are a vehicle for ensuring that Technology and Design directly connects to the curriculum objectives. The key elements can also provide a means of connecting learning in English to other subjects and to Learning for Life and Work. Using Learning for Life and Work to make connections is explored further in 5.3 Connecting the Learning.

The table below shows how each curriculum objective is linked to specific key elements.

The Northern Ireland Curriculum should provide relevant learning opportunities to help each pupil develop as:		
Objective 1 An individual	**Objective 2** A contributor to society	**Objective 3** A contributor to the economy and the environment
Key Elements Personal Understanding Mutual Understanding Personal Health Moral Character Spiritual Awareness	**Key Elements** Citizenship Cultural Understanding Media Awareness Ethical Awareness	**Key Elements** Employability Economic Awareness Education for Sustainable Development

For example, developing the pupil as an individual (Curriculum Objective 1) will require a focus on the key elements of Personal Understanding, Mutual Understanding, Personal Health, Moral Character and Spiritual Awareness.

Every subject must contribute to all key elements across the key stage. Some subjects will have more naturally occurring opportunities to promote certain key elements.

The key elements that Technology and Design contributes to more fully are:

• Personal Understanding;
• Personal Health;
• Citizenship;
• Media Awareness;
• Employability;
• Education for Sustainable Development.

For example, it is difficult to imagine an activity within Technology and Design which would not involve aspects of Personal Understanding and Citizenship. Consideration of our own lifestyle, and the world we live in, is of paramount importance to the development of useful and appropriate products.

Careful consideration of the contextual links which can be drawn out by using classroom activities which closely model real world practice, will lead to profitable connections with the key elements of Cultural Understanding, Media Awareness and Ethical Awareness, and the various aspects of Learning for Life and Work.

The key elements offer opportunities to make meaningful links with other subjects and promote coherence across the whole curriculum and facilitate more collaborative planning and teaching.

The table overleaf gives questions which may help to explore what is meant by each key element in Technology and Design. See also the examples of contexts within which activities could be planned to develop key elements in Appendix 1.

# Developing the Key Elements through Technology and Design

Personal Understanding	Citizenship	Employability	Personal Health	Media Awareness	Education for Sustainable Development
What groups do I belong to? What do I know about myself? What do I want to achieve? How can I realise my best?	What is right and wrong about the world? How can the actions of technologists/engineers and designers influence the world for good or bad? What considerations about the needs of other people need to be borne in mind? What is fair and reasonable? What can I do to help?	How can studying Technology and Design add to my repertoire of skills? What do technologists/ engineers and designers do? What sort of careers use Technology and Design skills? Are there other careers which also use these skills? What are the routes people follow to get jobs in this area?	How do my actions influence my health and safety? What do I need to know in order to stay safe and healthy? What should I do to put that knowledge into effect? How can I make sure I am using materials, tools and equipment safely?	How do the media influence perceptions? How can we better access the media? How can we better understand the messages the media put out? What questions need to be asked regarding media messages? How can I be a critically informed user of the media?	How can good design contribute to preserving precious resources or exploiting new ones? In what ways are our actions linked to local and global developments? What does environmental responsibility look like in practice? What threats are likely to confront future generations?

Mutual Understanding	Cultural Understanding	Economic Awareness	Moral Character	Ethical Awareness	Spiritual Awareness
How do I relate to the groups of which I am a part? How do I relate to other groups? How do I feel about that? In what ways are people different? Am I tolerant of those differences?	What do I know about my own and other cultures? How can I find out more? How does knowing about other cultures enrich experience? What does it mean to live in a diverse cultural environment?	How do design and manufacturing industries contribute to the economy? Are there opportunities for someone with my skills and interests? How are trends likely to develop in the future? How can my education help me adapt to future changes?	What do I really feel about...? What influences me to think that way? Should I question or accept those influences? What should I do about it?	What are the big questions facing society in the 21st century? What needs to be done? What are the consequences of scientific and technological advances?	Where do I find beauty? What inspires me? What gives me a sense of wonder? How can I be fulfilled? How can I be resilient in times of adversity?

Questions for Departments

- What key elements do we
  - address well;
  - need to focus more on;
  - not address at all?

- Are there any key elements that we could develop with another department to promote connected learning?

- How could we use the curriculum objectives or key elements to drive planning in our department?

- What are the implications for our resources?

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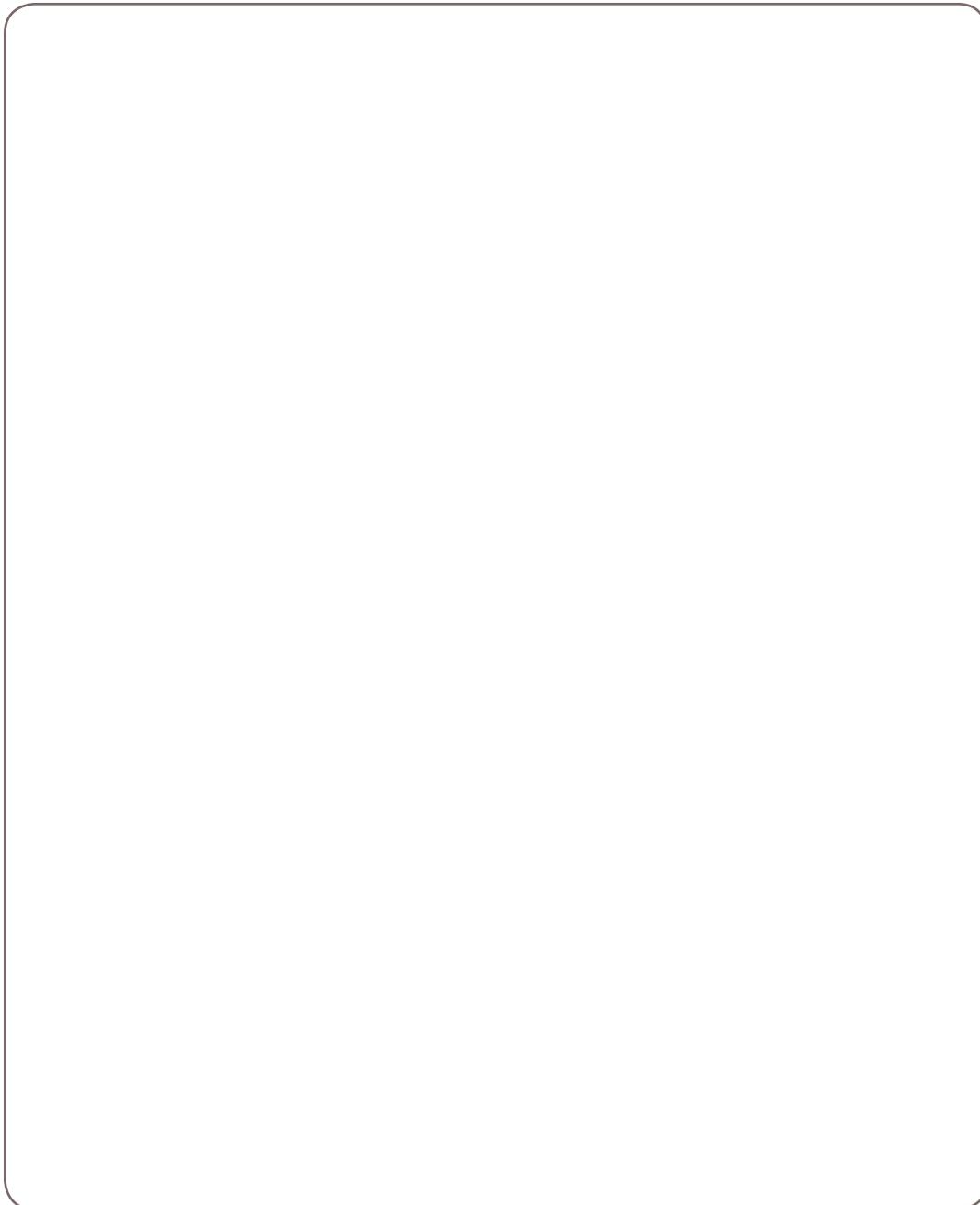
4.4 Learning Outcomes

Learning outcomes incorporate the skills and capabilities pupils should be able to demonstrate throughout Key Stage 3 in each subject strand. These are similar across each subject strand and promote the infusion of the **cross-curricular skills** (Communication, Using Mathematics and Using ICT) (please refer to Appendix 1 for further guidance on the cross-curricular skills). The learning outcomes also promote the infusion of **Thinking Skills and Personal Capabilities** (also refer to Appendix 2 for further guidance on Thinking Skills and Personal Capabilities).

As with all subjects, it is statutory for teachers to provide opportunities for pupils to **acquire** and **develop** the cross-curricular skills and the Thinking Skills and Personal Capabilities in Technology and Design. Pupils should also be given opportunities to demonstrate their skills and application of knowledge and understanding of Technology and Design to meet the learning outcomes.

Evidence for Learning Outcomes

Evidence of the application of skills, knowledge and understanding for a learning outcome can be demonstrated at any point in the learning process. Learning outcomes can be based on process or product. They may be evidenced by teacher, pupil, or peer assessment of a range of pupils' work and performance, including work generated using ICT. The nature of feedback on learning outcomes can be qualitative, quantitative, verbal or written to suit the purpose of the assessment.

Using and Recording Evidence

The number of occasions when learning outcomes are internally recorded, the system for internal recording and the use made of internal records is at the discretion of departments in line with whole school policy. Learning outcomes can be demonstrated through formal or informal assessment, formative and /or summative assessment.

Evidence of Learning Outcomes can be:

• recorded informally, that is, primarily for feedback to pupils and for teacher reference;
• recorded formally, that is, in line with departmental and internal whole school assessment policy requirements;
• used to inform reporting, for example, in relation to Pupil Profile requirements.

Skills and the Learning Outcomes

The relationship between the learning outcomes and the cross-curricular skills and Thinking Skills and Personal Capabilities is set out in the table below.

Learning Outcomes	Cross-Curricular Skills/Thinking Skills and Personal Capabilities
Demonstrate practical skills in the safe use of a range of tools, machines and equipment	Self-Management Thinking, Problem-Solving, Decision-Making Managing Information Communication Using ICT Using Mathematics
Research and manage information effectively, including Using Mathematics and Using ICT where appropriate	Managing Information, Decision-Making Communication Using Mathematics Using ICT
Show deeper understanding by thinking critically and flexibly, solving problems and making informed decisions, demonstrating Using Mathematics and Using ICT where appropriate	Thinking, Problem-Solving, Decision-Making Communication Using Mathematics Using ICT
Demonstrate creativity and initiative when developing ideas and following them through	Being Creative Thinking, Problem-Solving, Decision-Making Communication Using Mathematics Using ICT
Work effectively with others	Working with Others Communication
Demonstrate self-management by working systematically, persisting with tasks, evaluating and improving own performance	Self-Management Thinking, Problem-Solving, Decision-Making Communication
Communicate effectively in oral, visual, written and ICT formats, showing clear awareness of audience and purpose	Working with Others Self-Management Communication Using ICT Using Mathematics

Questions for Departments

- How can we plan for learning outcomes?
- How can our existing departmental assessment policy be amended to make reference to the learning outcomes?
- Which learning outcomes will be the most challenging for our department?

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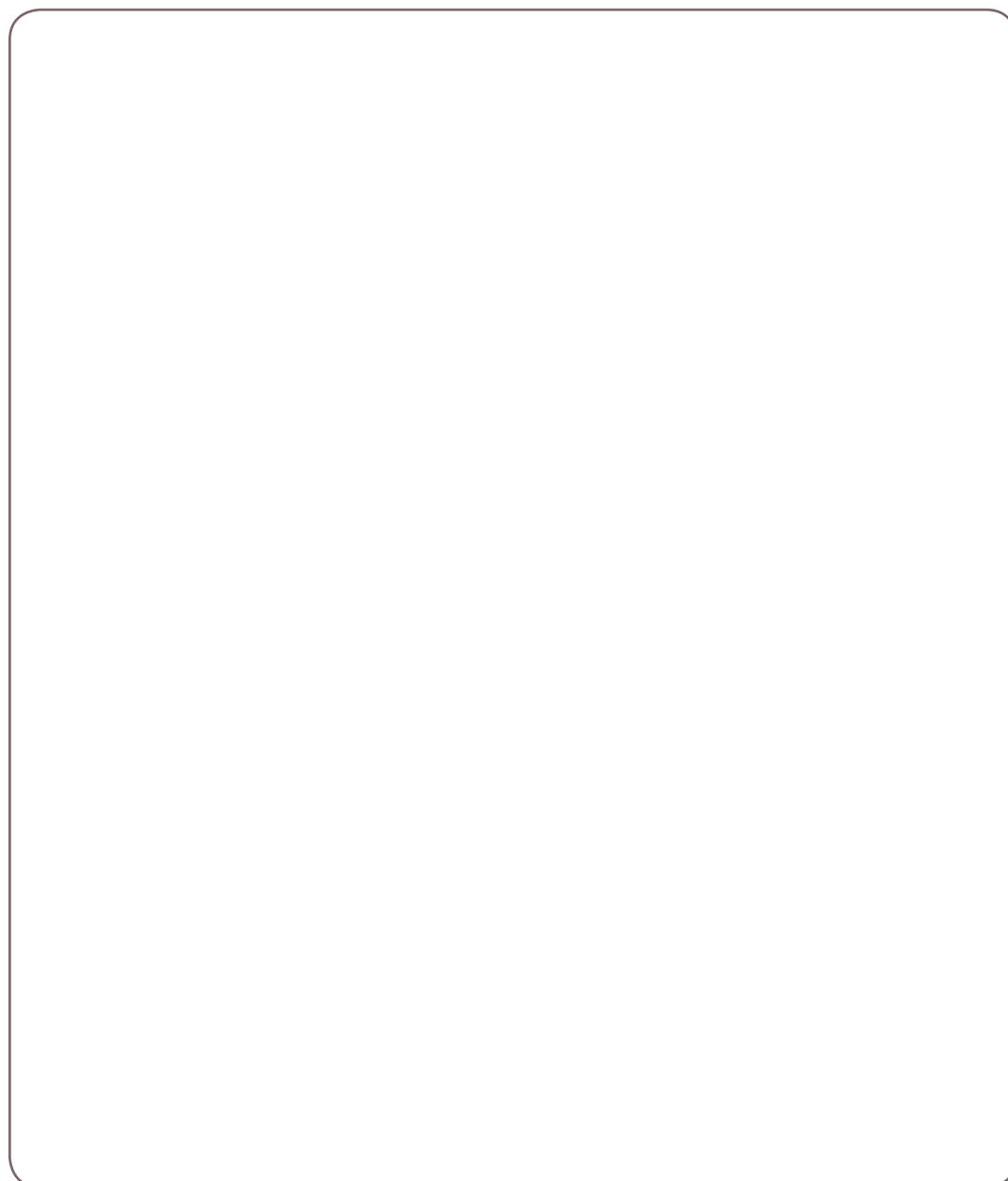
4.5   Thinking Skills and Personal Capabilities

The Thinking Skills & Personal Capabilities Framework consists of five overlapping strands:

• Managing Information;
• Thinking, Problem-Solving and Decision-Making;
• Being Creative;
• Self-Management;
• Working with Others.

Each strand is broken down into further detail (see material available in the Curriculum Support and Implementation Box and at www.nicurriculum.org.uk). The breakdown of the strands can facilitate lesson planning and provide criteria against which pupils' performances can be assessed and reported; for example, linking cause and effect (a design activity), examining evidence (looking at contextual examples), planning a task, etc.

Many of these are not new, and are already being developed across a range of subjects. This single framework aims to make their development more structured and explicit to encourage application across a range of contexts and provide a common language that pupils and teachers can use to talk about their thinking and learning.

There are a number of teaching strategies that will promote the development of Thinking Skills and Personal Capabilities generally, for example: setting open ended tasks, effective questioning, using thinking frames and diagrams, talking about thinking and learning, providing meaningful opportunities for collaborative learning etc.

Many of these activities also support the principles of 'Assessment for Learning'. The big shift, however, is to focus on opportunities in Technology and Design where a specific thinking skill or personal capability can be used to deepen understanding of a particular design concept or context.

The context used in turn provides opportunities for the development and practice of the thinking skill/personal capability.

This promotes lessons where there is the parallel development of subject knowledge and understanding as well as the development of a particular mode of thinking. This approach is known as infusion; adding one thing to another to give it a new significance.

Planning for infusion involves, for example:

a)   looking across a series of units of work in a particular year group and identifying where the most appropriate contexts are to introduce and develop specific skills, such as: evaluating most appropriate information, justifying opinions, reaching agreement within a group etc.

b)   identifying the specific skills and capabilities best developed through Technology and Design and setting up contexts to introduce and practice them, such as comparing and evaluating products, examining options and weighing up pros and cons (design and development), taking turns, sharing and cooperating (group work) etc.

This explicit approach to developing Thinking Skills and Personal Capabilities provides opportunities to observe, record, feedback and report on pupils' strengths and areas for future focus in terms of their development in Thinking Skills and Personal Capabilities. It also enables pupils to transfer particular thinking skills or personal capabilities to other contexts.

Progression in Thinking Skills and Personal Capabilities is only made through practice and application through a range of contexts and at increasing levels of challenge and demand.

Continuing Professional Development materials have been developed to promote the infusion of Thinking Skills & Personal Capabilities across the curriculum.
These materials are available at www.nicurriculum.org.uk.

Questions for Departments

• How can Technology and Design meaningfully develop each strand of the Thinking Skills and Personal Capabilities framework?

• Where are the key opportunities in Technology and Design for infusion?

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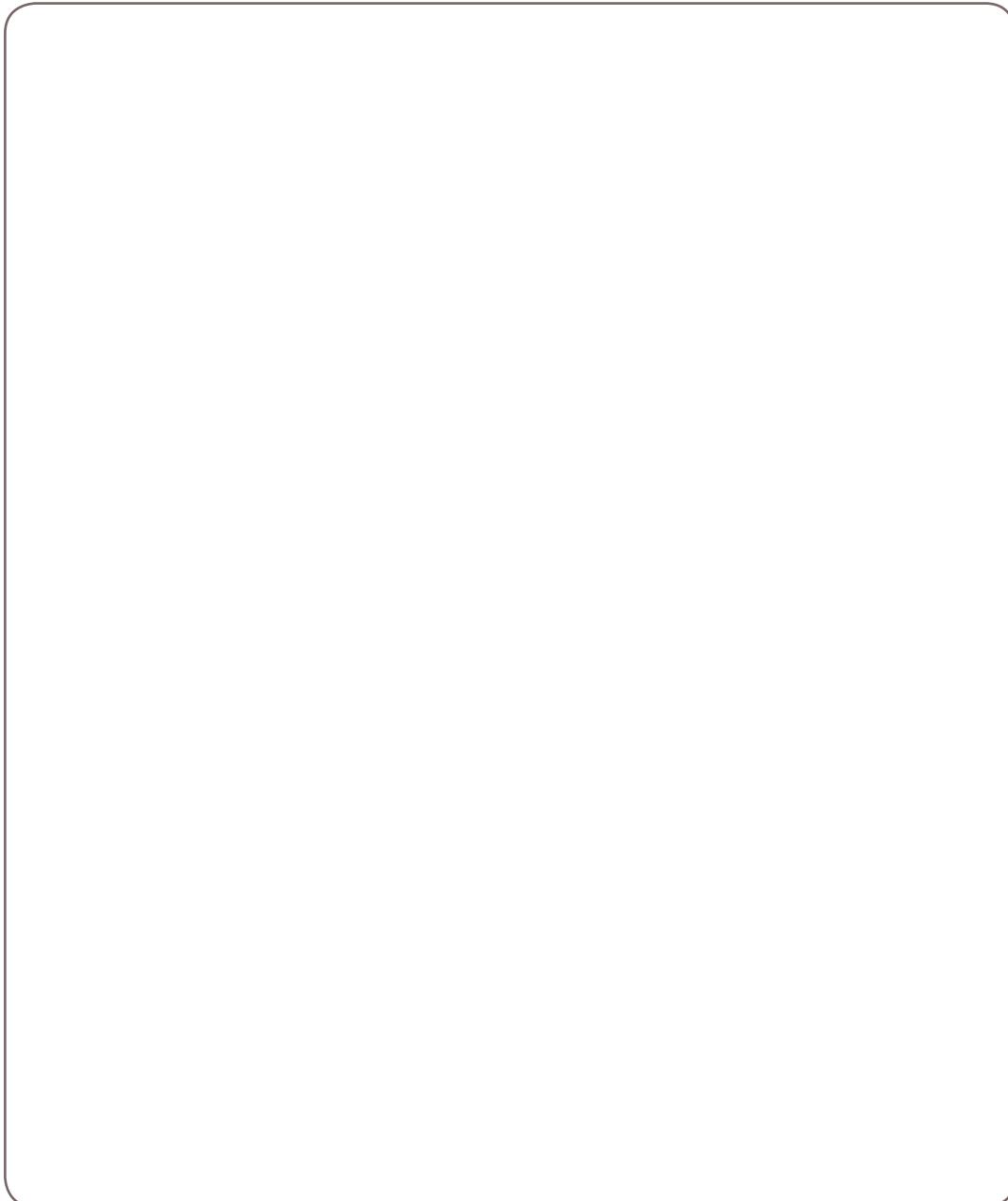
Section 05
Approaches to Learning and Teaching

5.1   Key Messages

Flexibility

Teachers now have the opportunity to use the statutory requirements to devise schemes and units of work in Technology and Design that follow the needs and interests of pupils. This does not mean throwing out schemes of work that have been carefully developed over the years. It provides opportunities for teachers to build on those units that best engage and develop their pupils and replace or revitalise those units that did not engage the pupils so much.

Relevance

Teachers have opportunities to look for themes and issues that are real and relevant to the lives of pupils today. Technology and Design skills and the concepts in the first column of the Technology and Design strand can be developed through many current Technology and Design issues, both local and in the media, in which pupils express an interest.

Integrated

The statutory requirements for Technology and Design are written to help teachers avoid teaching discrete topics and to form units of work that integrate the knowledge, understanding and skills, so as to move away from technical competence considered in isolation, to contextualised working activities which will help pupils gain a better understanding of how the world around us works.

Values Based

The key elements provide opportunities for pupils to reflect on the moral, ethical, spiritual, social and cultural dimensions of Technology and Design, which relate to real people and real places, and to consider their own views and opinions about them.

Future Focused

Pupils are challenged to think about the type of world they would like to share in years to come and how best to achieve it. They can explore how the skills developed through Technology and Design might help them and others in the future.

Process not Product

Progress in learning is made by using the processes that lead to facility in a subject's knowledge and skills. In Technology and Design pupils work to build confidence with using materials, tools and processes, and understanding the contexts in which they are used. Because this emphasis on skills is already familiar it should pose no major difficulties to teachers of Technology and Design.

5.2   Assessment for Learning

'Assessment for Learning' focuses on the learning process rather than the end product and attempts, not to prove learning, but to improve it. It is formative assessment. It is a way to take stock of learning during the process and it can inform teachers on how learning is progressing.

In 'Assessment for Learning':

• there is a high emphasis on *transferable learning*;
• assessment becomes a much more *transparent process* because it is based on critical information that is shared with the learners; and
• learners are able to *take responsibility* for their own learning, and for aspects of assessment.

'Assessment for Learning' is not something extra or 'bolted on.' It integrates with existing classroom practice. Assessment for Learning involves the following key actions:

Sharing learning intentions	A learning intention is a description of what teachers want pupils to know, understand or be able to do by the end of an activity. It tells pupils what the focus for learning is going to be. It helps both teachers and pupils to focus on the learning rather than the activity, for example: Identify what pupils will be learning (We are learning to.....) Explain the reason for learning (We are learning this because.......)
Sharing and negotiating success criteria	Success criteria are statements that help pupils recognise if they have been successful in their learning. Pupils may be involved in deciding these. They summarise the processes or characteristics needed for success, and they always link directly to the learning intention. They essentially spell out the steps or ingredients required to achieve the learning intention, offering specific guidance on how to be successful.
Giving feedback to pupils	Quality feedback is essential for effective learning and teaching. Feedback can motivate pupils by building self-esteem and reinforcing the positive. To be truly formative the feedback must inform the next steps in the learning process. For example, when offering written feedback: 1.Find two occasions where they have achieved success (symbols can be used); 2.Identify an aspect of their work that they can immediately improve; 3.Provide them with a prompt or strategy on how to improve; 4.Give them time to make this improvement.
Effective questioning	Effective questioning is about asking questions in a way that elicits maximum feedback from pupils, which can then be used to evaluate, plan and extend learning, for example: • Ask better questions: ask 'open' questions or reframe questions where there is no single correct answer and pupils are rewarded for exploring options and sharing possible solutions; • Ask questions better: provide pupils with time to think; by increasing the wait time to 3 or 5 seconds between posing the question and asking for the answer, teachers can make a significant difference to the question's effectiveness.
Self and peer assessment	Pupil reflection promotes independent learning, communication and support in the classroom. Teachers can develop pupil reflection in the classroom through the use of peer and self-assessment and self-evaluation.

Continuing Professional Development materials have been provided for schools to promote Assessment for Learning.

Questions for Departments

- What are the benefits of Assessment for Learning practice in our classrooms?
- Which of the Assessment for Learning key actions are part of our existing classroom practice?
- Which do we need to give more attention to?
- How do we do this?

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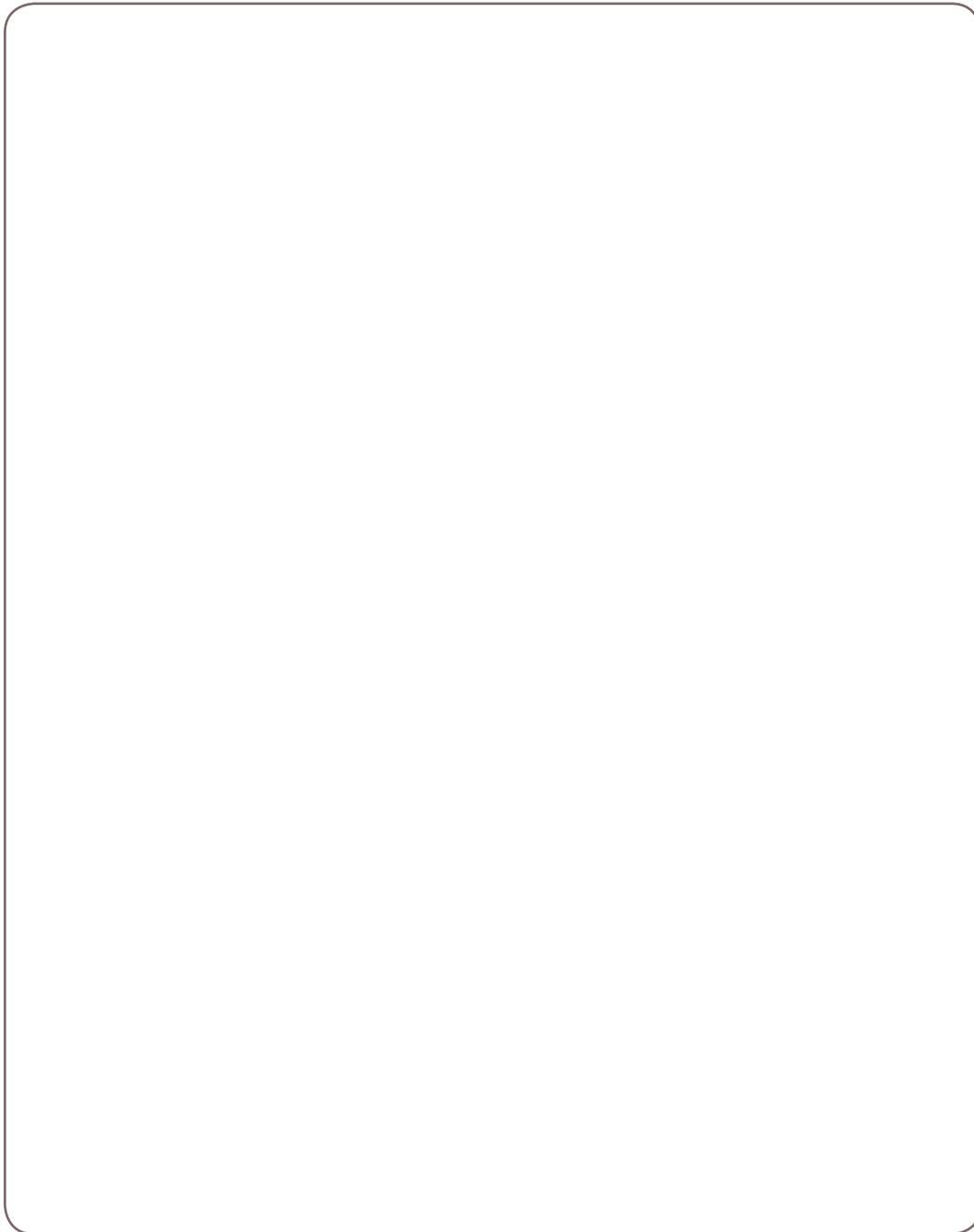
5.3   Connecting the Learning

The Northern Ireland Curriculum is designed to accommodate links across the subjects. Many natural links exist although they may be under-exploited. Where these links are identified and planned for, they have the potential to make learning more meaningful, informed and purposeful. Opportunities to connect the learning can range from small and informal activities to whole school and formally planned activities. Any of the following may be used as drivers for connected learning between two or more subjects:

• Skills/Learning Outcomes;
• Key Elements;
• Themes;
• Knowledge;
• Concepts;
• Learning experiences;
• Learning for Life Work;
• Other suitable approaches.

Questions for Departments

• Which of these could best be used as a starting point to make meaningful connections with other subjects?

Action
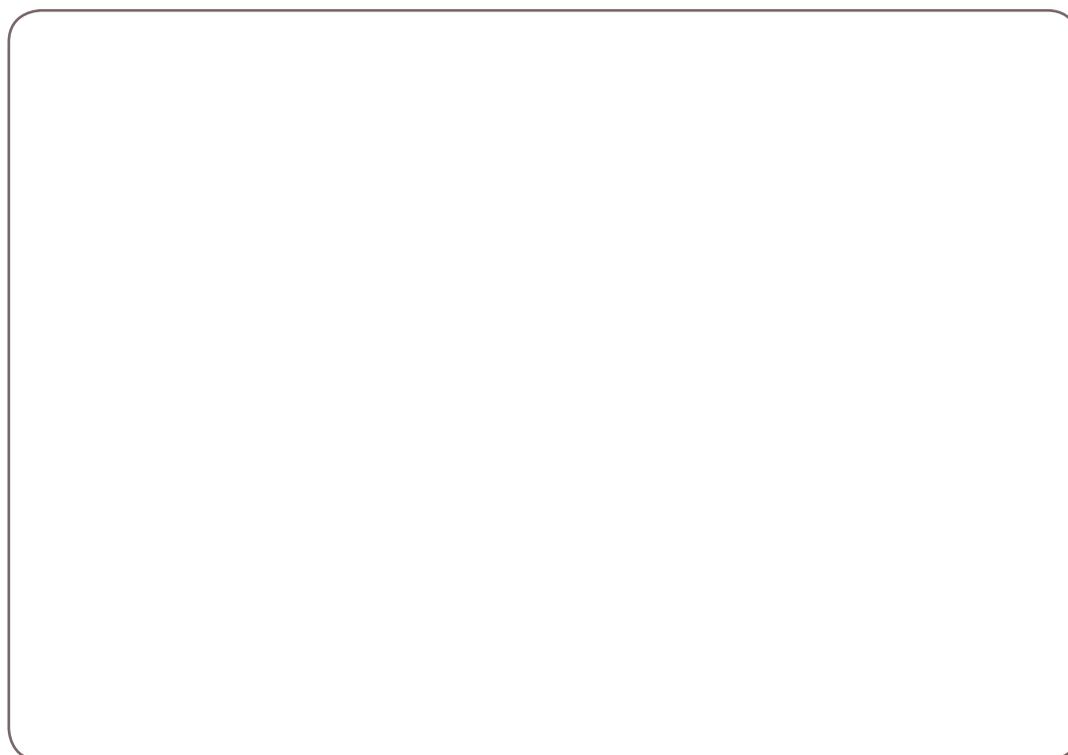
Technology and Design has many strong links with subjects taught in the curriculum. In particular the design aspects relate to skills taught in Art and Design, while much knowledge and understanding overlaps with Science, and in particular Physics. It is important to be aware of what is taught to pupils across the key stage through the Areas of Learning and when it is taught, so that pupils make real and relevant connections.

Examples of connecting learning across subjects are available in the Thematic Units and Collaborative Unit. Please refer to the Curriculum Support and Implementation Box or go to www.nicurriculum.org.uk.

Connecting to Learning for Life and Work

One way of beginning to make connections is to use Learning for Life and Work. The four subject strands within Learning for Life and Work (Personal Development, Local and Global Citizenship, Home Economics and Employability) contribute directly to the three curriculum objectives.

The other areas of learning also contribute to the curriculum objectives and to Learning for Life and Work. Well-planned and organised work within subjects makes a distinctive and natural contribution to Learning for Life and Work and helps to strengthen and enrich Learning for Life and Work provision as a whole. Relevant key elements within subjects can support learning related to Personal Development, Local and Global Citizenship, Home Economics and Employability.

It is important that opportunities for the development of skills, knowledge, attitudes and values in Learning for Life and Work are embedded in topical issues. Pupils need to be provided with structured opportunities to actively explore issues, problems and events through school and community involvement, and to take part in critical discussions that are challenging and relevant to their lives.

Teachers have flexibility to enhance the breadth and depth of their subject's contribution to Learning for Life and Work. Subject teachers can therefore:

• raise awareness about Learning for the Life and Work key concepts;
• develop more detailed understanding about the Learning for Life and Work key concepts within their subject context;
• explore particular Learning for Life and Work key concepts. When delivered in sufficient depth, an area of learning/subject strand can take full responsibility for meeting a particular statement of requirement.

Questions for Departments

How can we make connections with other curriculum areas in relation to:

• knowledge, understanding and skills?

• Thinking Skills and Personal Capabilities?

• Cross-curricular skills?

• Learning for Life and Work?

• Which aspects of our current practice promote connected learning?

• What are the issues around the management of connected learning?

• How will we know pupils are learning to make connections?
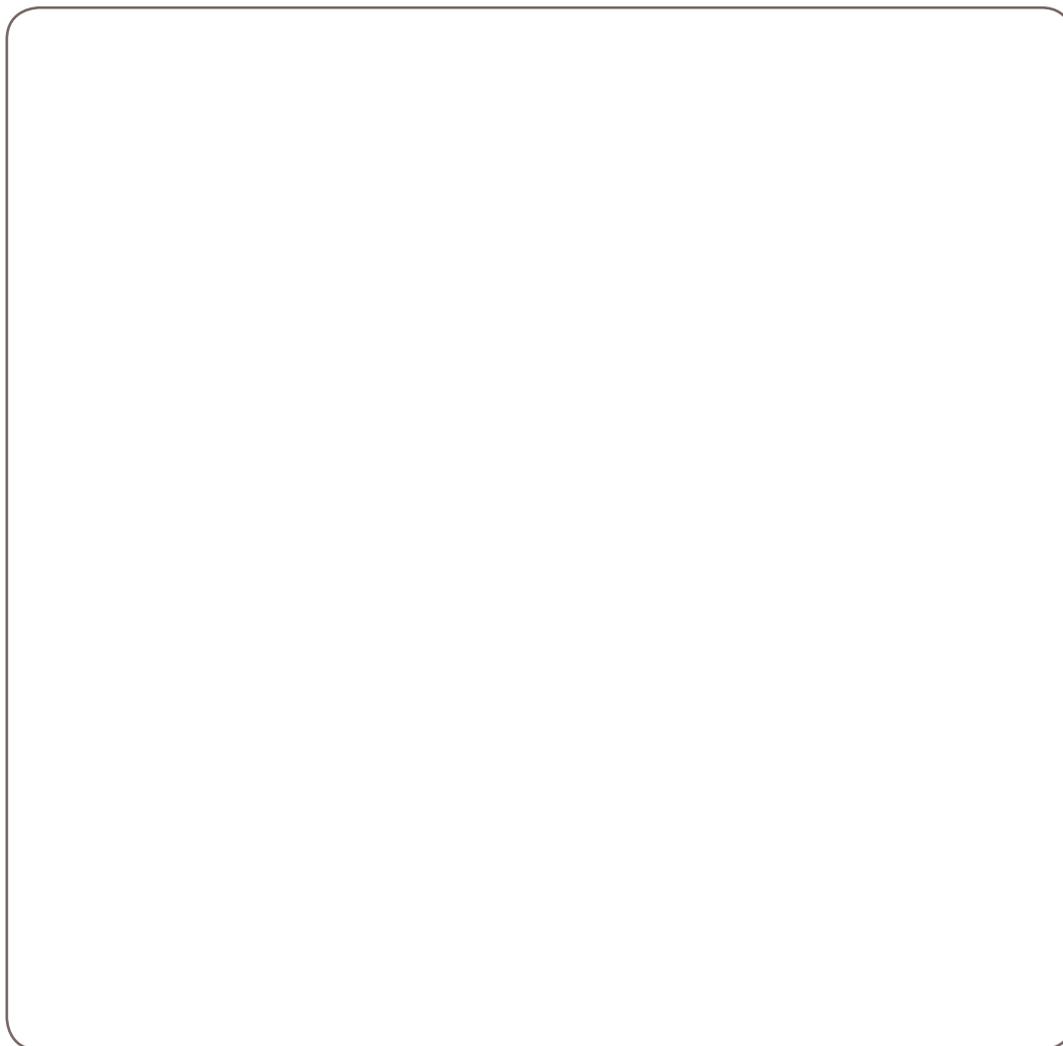
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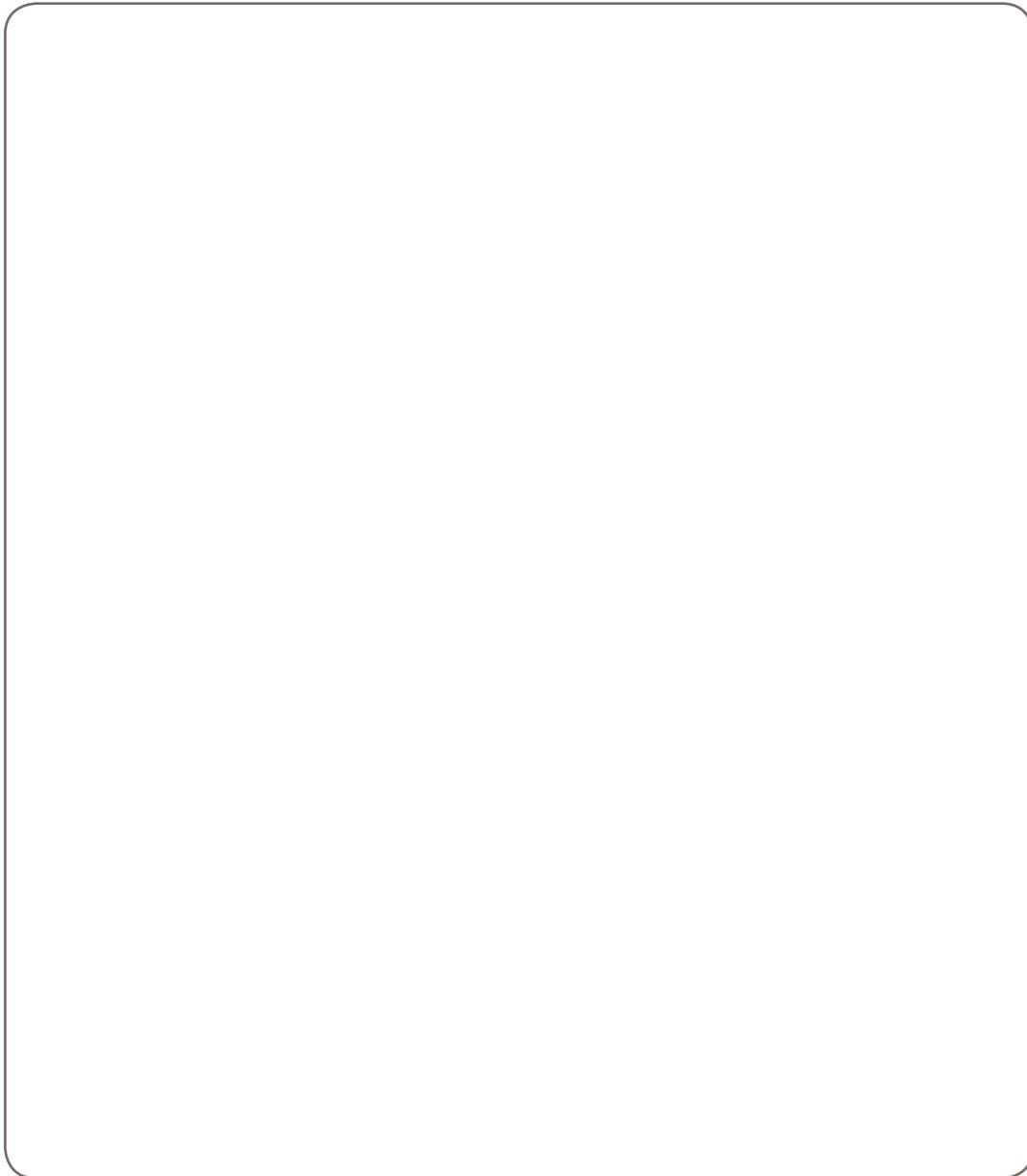
5.4   Active Learning

Engaging pupils more in their learning and providing them with opportunities to demonstrate Thinking Skills and Personal Capabilities requires an approach beyond traditional didactic methods.

The glossary *Active Learning and Teaching Methods for Key Stage 3* is available in the Curriculum Support and Implementation Box and at www.nicurriculum.org.uk. This resource contains a wide range of active and experiential strategies to promote pupils' participation and engagement. Technology and Design teachers already teach in a very active and practical way, and the subject provides rich contexts to use a range of active learning strategies.

Questions for Departments

• What active learning strategies might work for us?

• How does the climate in your classroom support the use of active learning?

• What are the implications for classroom management?

Action

Section 06
Auditing and Planning

It is important to evaluate existing schemes of work in relation to the statutory requirements for Technology and Design. Departmental planning for the Northern Ireland Curriculum should be informed by an evaluation process, and may result in a completely fresh approach.

6.1   Conducting a Departmental Audit

When planning to carry out a departmental audit, refer to the training materials *Planning for the Revised Curriculum at Key Stage 3*. Used in conjunction with the following guidance, departments can decide how to evaluate existing and planned provision.

Audits are a starting point for the long term planning process. There are a number of possible 'ways in' to an audit. Some of these are outlined in the table below. Further details are available at www.nicurriculum.org.uk.

Starting Point for Audit	Description of Process
Curriculum Objectives	**What** do we teach and **why**? Look at how the topics currently taught address the broad curriculum objectives. The objectives provide a rationale for the topic. The key elements can provide the footholds into the objectives.
Key Elements	Check where units of work contain aspects of the key elements, or could be re-focused to suit. Check for coverage across the key stage. Remove excessive duplication, add material to address any omissions.
Thinking Skills and Personal Capabilities	Starting with current units of work it is possible to audit the provision of Thinking Skills and Personal Capabilities using the statements from the "From – To Progress Map". After completing an audit in this way, gaps in provision can easily be detected and it will then be possible to develop opportunities to ensure overall coverage in a year and progression across the key stage.
Learning Experiences	List the categories of learning experience from the 'Big Picture' document in a column. Beside each, match the units of work in your scheme which fit with the category. Assess the coverage: is there a good mixture and variety of experience planned?
'Blue Skies'	Begin with aspirations for a completely new scheme of work, and work up details so as to match planned experiences with revised curriculum requirements.

6.2   Long, Medium and Short Term Planning

Long Term Planning

In producing long term plans or schemes of work you need to think about:

• how Technology and Design links with the wider curriculum objectives;
• how Technology and Design knowledge, understanding and skills (the left hand column) will be addressed;
• how and when to develop specific skills and capabilities;
• where and when can we contribute to assessment of the cross-curricular skills;
• what range of materials, techniques and processes will be studied;
• how Technology and Design can actively link with other curricular areas;
• how the scheme of work will reflect whole school circumstances and development planning.

Medium Term Planning

In planning units of work you need to think about:

• identifying big questions and issues to engage pupils and promote a creative approach;
• the teaching and learning activities and strategies to best develop the skills;
• what opportunities could be developed to contribute to assessment of the cross-curricular skills;
• how to build in time for time for review, reflection and remediation;
• resource implications: equipment, consumables, exemplar materials.

Short Term Planning

In planning a lesson or series of lesson you need to think about:

• making the learning intentions explicit to clarify what you want the pupils to know, understand and/or be able to do;
• agreeing and negotiating with the pupils what success in this task/activity will look like;
• using a launch activity to engage the pupils and develop their sense of inquiry;
• using a range of actives/challenges;
• supporting and prompting pupil performance;
• planning plenaries to feedback, reflect on thinking and learning, make connections to other learning and set up next lesson(s).

Quite naturally, teachers want their lessons to be relevant and stimulating, and by so doing to embody the various learning experiences highlighted within the diagram of the 'Big Picture' of the Key Stage 3 Curriculum. In planning work and activities which achieve this intention, Technology and Design offers ready opportunities to reflect the working practices, contexts and concerns of real-world examples within a design and manufacture environment.

The scheme of work is the long term plan for the whole key stage. It will take into account the progression of pupils' learning over the three years. It also contains the medium term planning for each Year group including the broader dimensions of the Northern Ireland Curriculum: Learning for Life and Work, key elements, cross-curricular skills and Thinking Skills and Personal Capabilities.

The units of work outlined in the scheme of work are the medium term plans. These will usually cover one term or part of a term. They will give details of specific learning objectives, teaching and learning activities and learning outcomes.

Short term plans will give details of the sequence and content of lessons for a unit of work. Long and medium term planning will involve all staff within a department. This is necessary to achieve coherence and continuity in planning the scheme of work.

Short term planning will be carried out by individual teachers, as they respond to the needs of pupils.

Questions for Departments

When planning a scheme of work ...

- what is the vision of the school?
- what time is available for Technology and Design in each year?
- what is the subject's contribution to the broader curriculum including Communication, Using Maths and Using ICT?
- how can the subject meet the curriculum objectives?
- how can experience of a range of skills, working with various materials and control systems and manufacturing processes best be covered in each year?
- how will pupils' progress be measured?
- how will resources and materials be acquired and used?
- what links with other curriculum areas will be appropriate?

Planning for Progression

- what information is available about pupils' experiences of Science and Technology and Design at Key Stage 2?
- are units of work adapted to suit pupils' earlier experiences?
- are your assumptions of pupils' previous hands-on experiences correct?
- are the units arranged so that later work takes earlier experiences further?
- which aspects are likely to be most difficult and therefore require more time?
- is development of practical skills taking place?
- how can you ensure design skills are being developed throughout the key stage?
- how will able pupils be challenged by planned experiences?

Curriculum development is a process and requires ongoing evaluation.
Try figuring out why some lessons work, while others don't succeed as we would like.

For any scheme of work it might be useful to ask:

- How well did the pupils respond to that?
  - did they enjoy it?
  - did they see the relevance?
  - were they motivated to learn?

- How well did they achieve?
  - what evidence of achievement was there?
  - was there evidence of deep learning?
  - how did I collect it?

- What modifications could I make?
  - in the content?
  - in the learning materials?
  - in the learning activities?

- When did you last experience a "buzz" in the classroom?
  - What place/theme/issue were the pupils learning about?
  - What was the big enquiry/key question?
  - What activity were they doing?
  - What was the purpose of their learning?
  - Why had you chosen these particular resources to use in this session with those pupils?

Action

Appendices
Appendix 1
Cross-Curricular Skills

Communication Across the Curriculum

Communication is central to the whole curriculum. Pupils should be able to communicate in order to express themselves socially, emotionally and physically, to develop as individuals, engage with others and contribute as members of society.

Pupils should be given opportunities to engage with and demonstrate the skill of communication and to transfer their knowledge about communication concepts and skills to real-life, meaningful contexts across the curriculum.

The modes of communication include talking and listening, reading and writing. However, effective communication also includes non-verbal modes of communication, wider literacy and the use of multimedia and ICT technologies which may combine different modes. Pupils are therefore encouraged to become effective communicators by using a range of techniques, forms and media to convey information and ideas creatively and appropriately.

The requirements for Communication are set out below.

Across the curriculum, at a level appropriate to their ability, pupils should be enabled to develop skills in:

Talking and Listening

Pupils should be enabled to:

• listen to and take part in discussions, explanations, role-plays and presentations;
• contribute comments, ask questions and respond to others' points of view;
• communicate information, ideas, opinions, feelings and imaginings, using an expanding vocabulary;
• structure their talk and speak clearly so that ideas can be understood by others;
• adapt ways of speaking to audience and situation;
• use non-verbal methods to express ideas and engage with the listener.

Reading

Pupils should be enabled to:

• read a range of texts* for information, ideas and enjoyment;
• use a range of strategies to read with increasing independence;
• find, select and use information from a range of sources;
• understand and explore ideas, events and features in texts*;
• use evidence from texts* to explain opinions.

* Texts refer to ideas that are organised to communicate and present a message in written, spoken, visual and symbolic forms.

Writing

Pupils should be enabled to:

• talk about, plan and edit work;
• communicate information, meaning, feelings, imaginings and ideas in a clear and organised way;
• develop, express and present ideas in a variety of forms and formats, using traditional and digital resources, for different audiences and purposes;
• write with increasing accuracy and proficiency.

Using Mathematics Across the Curriculum

Using Mathematics is the skill of applying mathematical concepts, processes and understanding appropriately in a variety of contexts. Ideally these should be in relevant real life situations that require a mathematical dimension.

Pupils are likely to acquire and consolidate their mathematical knowledge, concepts and skills within the area of learning for Mathematics and Numeracy. However, they should be given opportunities to transfer their understanding, as appropriate, to other contexts across the curriculum. Pupils can demonstrate their mathematical knowledge, understanding and skills in a variety of ways to communicate, manage information, think critically, solve problems and make decisions.

The requirements for Using Mathematics are set out below.

Across the curriculum, at a level appropriate to their ability, pupils should be enabled to:

• choose the appropriate materials, equipment and mathematics to use in a particular situation;
• use mathematical knowledge and concepts accurately
• work systematically and check their work;
• use mathematics to solve problems and make decisions;
• develop methods and strategies, including mental mathematics;
• explore ideas, make and test predictions and think creatively;
• identify and collect information;
• read, interpret, organise and present information in mathematical formats;
• use mathematical understanding and language to ask and answer questions, talk about and discuss ideas and explain way of working;
• develop financial capability;
• use ICT to solve problems and/or present their work.

Using Information and Communications Technology Across the Curriculum

Using Information and Communications Technology (ICT) provides powerful tools and contexts to support meaningful learning and has the potential to transform and enrich pupils' learning experiences and environments across the curriculum. The creative use of ICT can empower learners to become independent, self-motivated and flexible, helping in turn to develop self-esteem and positive attitudes to learning, with which to realise their full potential. It also provides opportunities to collaborate within and beyond the classroom to pose questions, take risks and respond positively to 'what if' questions.

To help develop skills in researching, handling and communicating information pupils should have opportunities, using ICT, to engage in genuine research and purposeful tasks set in meaningful contexts. They should be encouraged to re-work information, present and exchange their ideas and translate their thinking into creative products and productions which show an awareness of audience and purpose.

The requirements for Using ICT are set out below.

Across the curriculum, at a level appropriate to their ability, pupils should be enabled to develop skills to:

Explore

Pupils should be enabled to:

- access and manage data and information;
- research, select, process and interpret information;
- investigate, make predictions and solve problems through interaction with digital tools;
- understand how to keep safe and display acceptable online behaviour.

Express

Pupils should be enabled to:

- create, develop, present and publish ideas and information using a range of digital media;
- create information and multimedia products using a range of assets.

Exchange

Pupils should be enabled to:

- communicate using a range of contemporary methods and tools;
- share, collaborate, exchange and develop ideas digitally.

Evaluate

Pupils should be enabled to:

- talk about, review and make improvements to work, reflecting on the process and outcome;
- consider the sources and resources used.

Exhibit

Pupils should be enabled to:

- manage and present their stored work;
- showcase their learning across the curriculum.

Cross-Curricular Skills in Technology and Design

| Cross-curricular skill	Communication	Using Mathematics	Using ICT
Purpose	To provide opportunities for pupils to acquire, develop and demonstrate the cross-curricular skill of Communication	To provide opportunities for pupils to acquire, develop and demonstrate the cross-curricular skill of Using Mathematics	To provide opportunities for pupils to acquire, develop and demonstrate the cross-curricular skill of Using ICT
Examples of processes	Discussion, presentation, demonstration, asking questions, reading text for information, using evidence from text to explain opinion, communicate information in a clear and organised way, present ideas in a variety of formats for different audiences and purposes, etc.	Use mathematical knowledge and concepts, use mathematics to solve problems and make decisions, mental mathematics, make and test predictions, data handling, using statistics, developing financial capability, etc.	Explore information using electronic tools, create, develop, present and publish ideas using a range of digital media, communicate electronically, etc.
Examples of contexts in Technology and Design	• Use sketches to show thinking and convey information • Use text effectively to present findings of research, describe and analyse designs, show development of an idea, evaluate a product • Display safety in a practical environment through attitude and good working practice • Work within a group, and report back to an audience with decisions or findings • Produce a detailed manufacturing plan	• Use measuring tools such as ruler and protractor to accurately mark out materials • Use drawing tools such as compass and set square, parallel motion ruler and drawing board, to produce orthographic drawings • Calculate moments on a class 1 lever • Calculate the current through a resistor, using V=IR • Determine the speed of a driven pulley using the appropriate formula	• Research information about products, materials, manufacturing, designers • Design 3-D products using appropriate available software • Design and test electronic circuits using livewire/crocodile clips • Computer control programming activities • Presenting written project work, including scanned images, digital photos

Appendix 2
Thinking Skills and Personal Capabilities

Thinking skills are tools that help children to go beyond the acquisition of knowledge in order to search for meaning, apply ideas, analyse patterns and relationships, create and design something new and monitor and evaluate their progress.

Personal and interpersonal skills and capabilities underpin success in all aspects of life. It is important, therefore, that children's self-esteem and self-confidence are explicitly fostered along with the ability to understand and manage their own emotions and to interact effectively with others.

Teachers should help children to develop Thinking Skills and Personal Capabilities by focusing on the following areas.
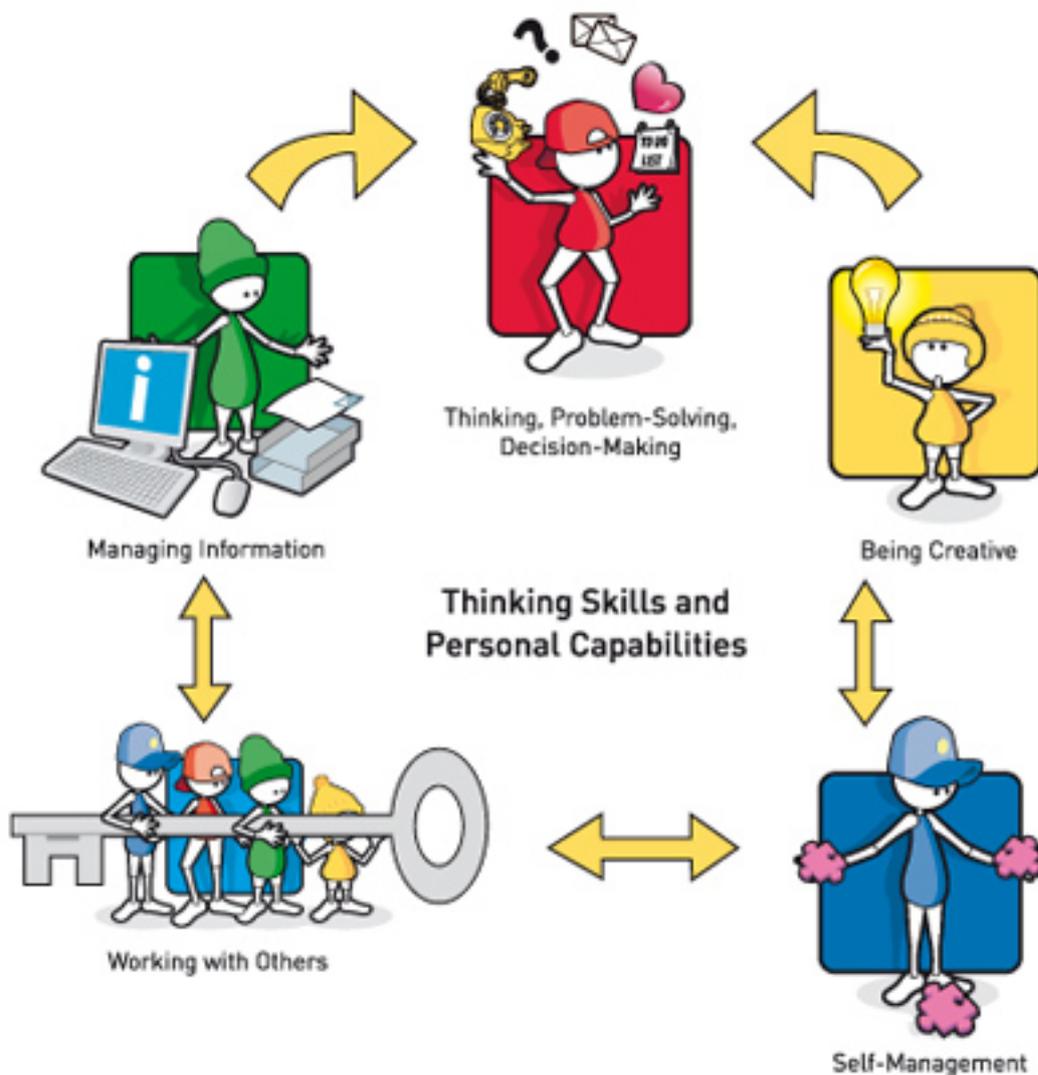
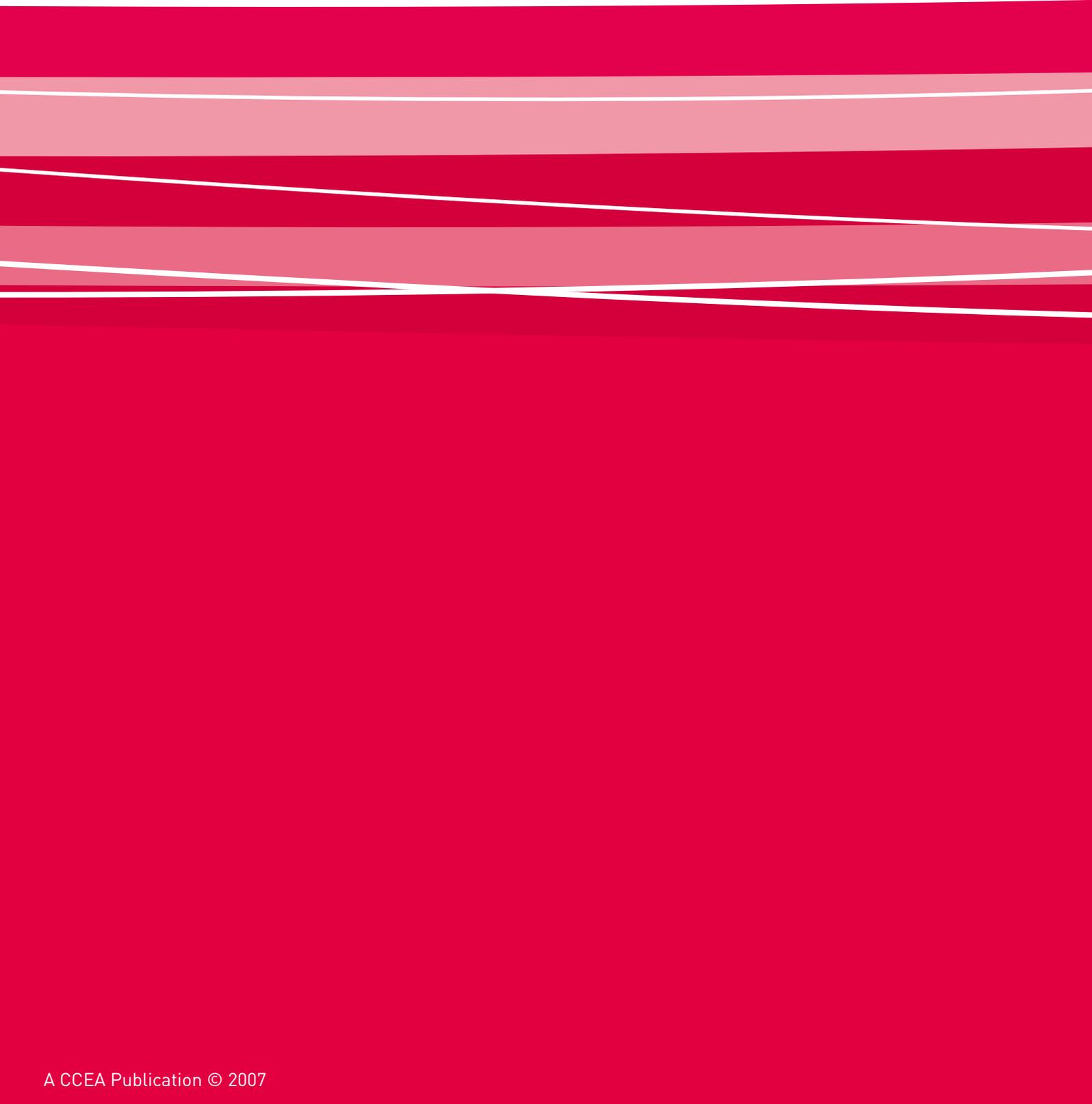# Thinking Skills and Personal Capabilities in Technology and Design

Thinking skills and Personal Capabilities strands	Managing Information	Thinking, Problem-Solving and Decision-Making	Being Creative	Working with Others	Self-Management
Purpose	To develop learners' abilities in an information intensive environment	To engage pupils in active learning so that they can go beyond mere recall of factual information and the routine application of procedures	To encourage personal response of the learner by promoting dispositions for curiosity, exploration, experimentation and invention	To enable learners to engage in collaborative activities and to make the most of their learning when working with others	To help learners to become more self-directed so that they can manage their learning in new situations and in the longer term
Examples of processes in which pupils are involved	Asking, accessing, selecting, recording, integrating, communicating	Searching for meaning, deepening understanding, coping with challenges	Imagining, generating, inventing, taking risks for learning	Being collaborative, being sensitive to others' feelings, being fair and responsible	Evaluating strengths and weaknesses, setting goals and targets, managing and regulating self
Examples of contexts in Technology and Design	Record instructions and retain hand-outs. Ask appropriate questions to clarify details of tasks Produce a design folio which is well structured and neat and tidy Store, print and retrieve digital files Use various sources of information including using a search engine, to locate relevant sources for research	Analyse a given problem, considering all aspects in detail Consider which gear system will cause the greatest reduction in speed Give thorough consideration to research undertaken and draw conclusions Consider the various manufacturing processes available and determine the most appropriate	Use materials, media and processes in ways which are personally chosen and individually directed to achieve innovative outcomes Extend repertoire of skills through acquiring increased facility in manipulating tools and equipment Incorporate a dimension of personal expression into activities Exteriorise personal aesthetic preferences through the production of visual responses	Take part in pair and group work as an active member of a team Identify how to improve another person's performance within a collaborative task by providing feedback and advice based on own experience of work being undertaken Share ideas, value others' contributions, accept changing roles within a group	Use insight into own qualities, aptitudes and skills to decide how to approach a design task Carefully plan course of action, considering time management and resources required Adapt to difficulties and set-backs within the production of work by persevering and staying motivated Practice social skills through sharing materials, equipment and ideas, understand responsibilities for collating and presenting own work and tidying up

Thinking skills and Personal Capabilities strands	Managing Information	Thinking, Problem-Solving and Decision-Making	Being Creative	Working with Others	Self-Management
Examples of contexts in Technology and Design	Present own work in ways which maximise legibility, visual impact, clarity and individuality of response	Propose a range of possible responses to a problem and clarify relevant possibilities	Exchange ideas, insights, responses and preferences with other members of group	Show consideration for others by working safely in a manufacturing environment Challenge gender stereotypes, and question assumptions	Be aware of personal learning preferences and style, and use this knowledge to optimise personal performance

Science and Technology: Technology and Design

The minimum content is set out below. The statutory requirements are set out in **bold** under **Knowledge, Understanding and Skills** in column 1, under the **Curriculum Objectives** and **Key Elements** in columns 2, 3 and 4 and in the **Learning Outcomes** at the bottom. Additional non-statutory guidance and suggestions are set out in plain text and italics.

Developing pupils' Knowledge, Understanding and Skills	[Objective 1] Developing pupils as Individuals	[Objective 2] Developing pupils as Contributors to Society	[Objective 3] Developing pupils as Contributors to the Economy and the Environment
Pupils should have opportunities through the contexts opposite, to develop creative thinking and problem solving skills through:

Design – identifying problems; investigating, generating, developing, modelling and evaluating design proposals; giving consideration to form, function and safety;

Communication – use of free-hand sketching and formal drawing techniques and ICT tools (including 3D modelling);

Manufacturing – selecting and using materials fit for purpose; safe use of a range of tools and processes appropriate to materials, demonstrating accuracy and quality of outcome;

Control – incorporate control systems, such as mechanical, electronic or computer-based, in products and understand how these can be employed to achieve desired effects. | Pupils should have opportunities to:

Respond to a personal design challenge in relation to their own lifestyle, for example, *create an organisational/ storage system for personal effects.* (Key Element: **Personal Understanding**)

Abide by health and safety rules when using tools, machines and equipment. *Investigate the design, operation and safe use of a range of lifestyle products, for example, develop guidelines for the use of popular gadgets.* (Key Element: **Personal Health**)

Explore issues related to Mutual Understanding *Agree criteria to evaluate the quality of products, for example, those of peers, local or international innovators/ designers etc.* (Key Element: **Mutual Understanding**)

Explore issues related to Moral Character *Demonstrate tenacity to meet design challenges, using failure as a learning experience.* (Key Element: **Moral Character**)

Explore issues related to Spiritual Awareness *Develop an appreciation of own or other's achievements, for example, the work of an individual/group, an historic or contemporary artefact, a man-made structure.* (Key Element: **Spiritual Awareness**) | Pupils should have opportunities to:

Explore technical inventions and designs that have met a social need cost-effectively, for example, *evaluate the design of the clockwork radio, flat-pack product, etc.* **Design cost effective and appropriate solutions to meet the specific needs of diverse local and global groups,** for example, *toddlers, people suffering from arthritis or visual impairment, villagers in the developing world without clean water, etc.* (Key Element: **Citizenship**)

Explore how developments in Technology and Design have changed the way we can access the media, for example, *the developments in both satellite communications (such as Satellite phones) and electronics (interactive television, mobile phones).* (Key Element: **Media Awareness**)

Explore issues related to Cultural Understanding *Critically evaluate the influence of cultural trends in products designed for young people, for example, the styling, colour schemes and materials used in sports and leisure equipment.* (Key Element: **Cultural Understanding**)

Explore issues related to Ethical Awareness *Investigate ethical dilemmas that can arise through technological change, for example, the impact of a consumer driven society, pirating, mass production of counterfeit goods, the need for regulation of the internet, technological warfare, etc.* (Key Element: **Ethical Awareness**) | Pupils should have opportunities to:

Investigate how the skills developed through Technology and Design will be useful to a wide range of careers, for example, *jobs involving designing, manufacturing and production in a wide range of contexts including communications, construction, engineering, landscape design, product design, fashion, lifestyle goods, media, etc.* *Investigate jobs/companies locally, in which Technology and Design skills are used.* (Key Element: **Employability**)

Pursue design solutions using environmental friendly materials and energy sources. **Identify product needs and pursue sustainable harmonious design solutions in a local outdoor/indoor context,** for example, *design a school playground; design a garden area with consideration of all five senses and native species; design a rest area in a park, shopping centre.* (Key Element: **Education for Sustainable Development**)

Explore issues related to Economic Awareness *Explore and assess the attributes of a successful local product, for example, in terms of design, quality, value for money, fitness for purpose, marketing strategy, etc.* *Respond to a design challenge offered by a local company or individual.* (Key Element: **Economic Awareness**) |

| **Learning Outcomes**

The learning outcomes require the demonstration of skills and application of knowledge and understanding of Technology and Design.

Pupils should be able to: | • **demonstrate practical skills in the safe use of a range of tools, machines and equipment;**
• **research and manage information effectively to investigate design issues, including Using Mathematics and Using ICT where appropriate;**
• **show deeper understanding by thinking critically and flexibly, solving problems and making informed decisions, demonstrating Using Mathematics and Using ICT where appropriate;**
• **demonstrate creativity and initiative when developing ideas and following them through;**
• **work effectively with others;**
• **demonstrate self-management by working systematically, persisting with tasks, evaluating and improving own performance;**
• **communicate effectively in oral, visual (including graphic), written, mathematical and ICT formats showing clear awareness of audience and purpose.** | | |

NB: *Teachers may develop activities that combine many of the statutory requirements, provided that, across the key stage, all of the statutory aspects highlighted in BOLD (including each of the Key Elements) are met.*

Rewarding Learning