

Technology and Design

Thinking Skills and Personal Capabilities
Progression Maps at Key Stage 3

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Purpose of this Guidance

The Northern Ireland Curriculum aims to empower pupils to achieve their potential and to make informed and responsible choices and decisions throughout their lives as individuals, as contributors to society and as contributors to the economy and environment.

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.

The Thinking Skills and Personal Capabilities are tools that need to be made explicit in order to improve the quality of learning and understanding. Thinking Skills and Personal Capabilities are part of the minimum statutory requirement for all pupils at Key Stage 3 (see the learning outcomes on the minimum content documents) and they are a statutory part of the revised assessment procedures.

This guidance supports the implementation of the Thinking Skills and Personal Capabilities Framework by providing teachers with subject specific progression maps to:

- foster the development of a shared language which pupils and teachers can use to focus on the acquisition and development of the Thinking Skills and Personal Capabilities; and
- support assessment and facilitate teachers in making judgements about pupils' progress in the Thinking Skills and Personal Capabilities within subject strands.

It is worth emphasising that when using the progression maps to arrive at judgements about an individual's development, progress is not expected to be smooth and linear (see p17 of *Thinking Skills and Personal Capabilities for Key Stage 3*, distributed in the *Key Stage 3 Curriculum Support and Implementation Box*).

The boundaries between the five strands of the Thinking Skills and Personal Capabilities are 'fuzzy', both conceptually and in practice. For example, working in a group ('Working with Others') is likely to support a range of other types of skills and capabilities in the classroom: pupils might be learning with and from others in order to group, select and record information, which is an aspect of 'Managing Information'. The five strands are best considered as overlapping sets.

This additional guidance for Thinking Skills and Personal Capabilities forms part of, and should be used in conjunction with, the support and implementation package for the Northern Ireland Curriculum. Already your school will have received a range of support materials, which include:

- the *Statutory Curriculum at Key Stage 3: Supplementary Guidance*;
- the *Curriculum Support and Implementation Box*, which includes the booklet *Thinking Skills and Personal Capabilities for Key Stage 3*; and
- Key Stage 3 Non-Statutory Guidance for Subject Strands.

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

Introducing the Thinking Skills and Personal Capabilities Progression Maps

The Thinking Skills and Personal Capabilities progression maps have been developed from CCEA's Thinking Skills and Personal Capabilities Framework (see Appendix 1 for a reminder of the strands within the framework). They are constructed using a 'from-to' grid, which provides suggestions on how to make comments that record learners' progress in a subject specific context.

Each of the five Thinking Skills and Personal Capabilities has been broken down into a series of key actions that contribute to the strand. The five Thinking Skills and Personal Capabilities are detailed in the *Thinking Skills and Personal Capabilities for Key Stage 3* booklet, which was distributed as part of the *Key Stage 3 Curriculum Support and Implementation Box*.

For the purposes of the progression maps, the bullet points used to outline the key actions in the Thinking Skills and Personal Capabilities Framework (see p2-7 in *Thinking Skills and Personal Capabilities for Key Stage 3* – available in the *Curriculum Support and Implementation Box*) have been amalgamated to provide a clear and concise encapsulation of the actions and processes. The progression maps provide subject specific examples for the five strands (see table opposite).

By breaking down the five strands in this way, teachers can choose particular actions as a focus for planning and for the purposes of assessment. **Note:** the sub-headings used here are an amalgamation of those seen in the *Thinking Skills and Personal Capability for Key Stage 3* booklet (reproduced in Appendix 1).

Across all subject strands, the language and structure of the Thinking Skills and Personal Capabilities progression maps is similar, this is to promote the use of a common framework that shares familiar language about Thinking Skills and Personal Capabilities across all subject strands in the Key Stage 3 curriculum.

Strands and Headings used in the Progression Maps

Managing Information	Thinking, Problem-Solving and Decision-Making	Being Creative	Working with Others	Self Management
Questioning and planning	Seeing relationships and patterns	Curiosity	Learning with and from others	Review and improve
Finding and selecting sources	Developing a line of reasoning	Exploration	Roles and responsibilities	Time management
Grouping, sorting and evaluating information	Examining evidence	Flexibility	Influencing and negotiating	Goals and targets
Recording and adapting information	Analysing multiple perspectives	Resilience		
	Making decisions/solving problems			

Components of the Thinking Skills and Personal Capabilities Framework

This table details the bullet-points which are used in the booklet *Thinking Skills and Personal Capabilities for Key Stage 3*, and relates them to the subheadings used in the progression maps. The bullet-points are listed down the left hand column, and to the right the relevant subheadings are shown. The only modification to the bullet-points as published in the booklet from the *Curriculum Support and Implementation Box*, is

that in some cases the order of the bullet-points has been changed. This is so that they can be grouped together, showing how they have been amalgamated for the purposes of the progression maps. The full list of bullet-points would be too unwieldy for the purposes of mapping progression. The subheadings retain the impetus, while condensing the language, of the bullet-points.

Table 1 Relationship between the subheadings used in the Progression Maps and the bullet-points in the Thinking Skills and Personal Capabilities Framework

Managing Information	
<ul style="list-style-type: none"> Ask focused questions Plan and set goals and break task into sub-tasks 	Questioning and planning
<ul style="list-style-type: none"> Use their own and others' ideas to locate sources of information 	Finding and selecting sources
<ul style="list-style-type: none"> Select, classify, compare and evaluate information Select the most appropriate method for a task 	Grouping, sorting and evaluating information
<ul style="list-style-type: none"> Use a range of methods for collating, recording and representing information Communicate with a sense of audience and purpose 	Recording and adapting information
Thinking, Problem-Solving and Decision-Making	
<ul style="list-style-type: none"> Sequence, order, classify and make comparisons 	Seeing relationships and patterns
<ul style="list-style-type: none"> Make links between cause and effect Justify methods, opinions and conclusions 	Developing a line of reasoning
<ul style="list-style-type: none"> Make predictions, examine evidence, and distinguish fact from opinion Examine options and weigh up pros and cons 	Examining evidence
<ul style="list-style-type: none"> Use different types of questions Make connections between learning in different contexts 	Analysing multiple perspectives
<ul style="list-style-type: none"> Generate possible solutions, try out alternative approaches, and evaluate outcomes 	Making decisions/solving problems

Being Creative	
<ul style="list-style-type: none"> Seek out questions to explore and problems to solve 	Curiosity
<ul style="list-style-type: none"> Experiment with ideas and questions Make new connections between ideas/information Make ideas real by experimenting with different designs, actions and outcomes 	Exploration
<ul style="list-style-type: none"> Learn from and value other people's ideas Challenge the routine method 	Flexibility
<ul style="list-style-type: none"> Value the unexpected or surprising See opportunities in mistakes and failures Take risks for learning 	Resilience
Working with Others	
<ul style="list-style-type: none"> Listen actively and share opinions Give and respond to feedback Adapt their behaviour and language to suit different people and situations 	Learning with and from others
<ul style="list-style-type: none"> Develop routines of turn-taking, sharing and cooperating Take personal responsibility for work with others and evaluate their own contributions to the group Suggest ways of improving their approach and working collaboratively 	Roles and responsibilities
<ul style="list-style-type: none"> Understand how words and actions affect others Be fair Respect the views and opinions of others and reach agreements using negotiation and compromise 	Influencing and negotiating
Self Management	
<ul style="list-style-type: none"> Be aware of their personal strengths, limitations and interests Seek advice when necessary Review learning and some aspect that might be improved Compare their own approach with others' and in different contexts 	Review and improve
<ul style="list-style-type: none"> Manage their behaviour in a range of situations Organise and plan how to go about a task Learn ways to manage their own time 	Time management
<ul style="list-style-type: none"> Set personal targets and review them Focus, sustain attention and persist with tasks 	Goals and targets

Structure of the Progression Maps

Each of the five strands of the Thinking Skills and Personal Capabilities Framework has a separate progression map. For each subheading within the maps a three stage progression is given, which can be read across from left to right.

The column which begins with the stem pupils begin to: represents a starting point for Key Stage 3 pupils to continue acquiring facility with the Thinking Skills and Personal Capabilities Framework. At this point, early in Key Stage 3,

pupils are likely to experience some aspect of the sub-heading in a subject context with teacher guidance. Later in the key stage pupils may have moved towards the middle column, which gives examples of developing independence in applying the skill component in practice. By the end of the key stage, some pupils will have reached a degree of independence and mastery in the skill component. This is outlined in the right hand column of the maps.

Sample Table:

Technology and Design Managing Information

	Pupils begin to	Stem
Questioning and Planning	<ul style="list-style-type: none"> Suggest some questions to explore a design brief. Identify where and how to find answers. 	Progression is exemplified in three stages, each beginning with a stem which describes progression in terms of pupil competence.
Subheading	<p>Each strand of the Thinking Skills and Personal Capabilities Framework is subdivided in to a number of components. (See table 1 for a breakdown of components.)</p> <p>Progression follows a common form across the maps for all subject strands.</p>	
Summary	<p>From formulating a design brief to developing the structure inquiry.</p> <p>Developing the structure inquiry.</p> <p>Developing the structure inquiry.</p>	At A Glance Provides an 'at a glance' outline of each stage of progression.
		Summary Provides an overview of the form progression towards developing mastery could take.

	Pupils can:	Learning Outcome
Research and Investigate	<ul style="list-style-type: none"> Identify a range of resources to explore a problem. Plan a sequence for investigation. 	The learning outcomes state the skills and capabilities pupils should be able to demonstrate over the course of the key stage. They can be found in the statements of minimum content for each subject strand.
Skill Statement	<p>General statements identifying nature of skill. From pupils needing teacher guidance and given resources, towards working with some independence, to pupils achieving a degree of mastery.</p>	
Subject Example	<p>For example:</p> <ul style="list-style-type: none"> Identify and draw similar characteristics from an existing/similar product or product. Research manufacturing materials suitable for a product. Use specialist vocabulary to show understanding. 	
	<p>For example:</p> <ul style="list-style-type: none"> Draw knowledge from previous projects in order to identify what they need and how to use it. 	
	<p>Ask focused questions.</p>	

Overview of Progression

A summary of what progression through successive degrees of facility and competence might look like within a skill component is shown in the tables below.

Managing Information
Questioning and planning
Summary: Questioning and planning
Greater focus on breadth of questions. More emphasis on using questions to help structure research/investigation/inquiry. More emphasis on ability to organise and plan independently – developing the ability to formulate questions and plan.
Summary: Finding and selecting sources
Focus here on identifying sources. Progression relates to comparing a range of sources and making a judgement between them. Developing an alertness to bias, error or inaccuracy.
Summary: Grouping, sorting and evaluating information
Moves from summarising information from single source to comparing and contrasting information from different sources and eventually synthesising information from a variety of sources – rearranging pieces of information from different sources until a new version emerges, fit for purpose and audience. Developing the motivation for precision and thoroughness.
Summary: Recording and adapting information
Shift the focus from recording to transforming information showing awareness of audience and purpose. Developing the ability to process information flexibly and precisely.

Thinking, Problem-Solving and Decision-Making
Summary: Seeing relationships and patterns
From describing patterns/characteristics to explaining relationships, then interrelationships between a number of variables. Developing a desire to explore the parts and functions of things, to seek connections and explanations.
Summary: Developing a line of reasoning
From giving reasons/opinions, to explaining reasons/opinions to addressing counter-arguments. From identifying causes, to explaining them, weighing them up and offering valid conclusions. Developing an ability to weigh and assess reasons, to build complex conceptualisations.
Summary: Examining evidence
From questioning evidence, to recognising different interpretations and validating findings. Developing an alertness for the need for evidence and to demand justification.
Summary: Analysing multiple perspectives
From showing awareness of another perspective, to empathising with different viewpoints to weighing up viewpoints and drawing own conclusions. Developing the tendency to explore, value and evaluate alternative views.
Summary: Making decisions/solving problems
Toward more systematic methods of decision-making/problem-solving to include a wider range of options/possible solutions. Developing the ability to generate and evaluate multiple options and solutions.

Overview of Progression

continued

Being Creative

Summary: Curiosity

From initial curiosity towards an eagerness for discovery and greater knowledge. Developing the tendency to wonder, probe and find problems.

Summary: Exploration

From generating ideas to building on them and following them through. Developing a zest for inquiry.

Summary: Flexibility

From being open to new ideas to trying them out and reflecting critically on them. Developing the tendency to be open-minded, to be alert to narrow thinking.

Summary: Resilience

From recognising that progress can come from mistakes as well as successes, to treating setbacks as part of learning. Developing a belief that there is no failure, only feedback.

Working with Others

Summary: Learning with and from others

From engaging with others to developing the interpersonal skills that help create the social context for learning to take place. Developing social and cognitive skills through cooperation.

Summary: Roles and responsibilities

From taking on a role towards actively organising monitoring and evaluating the efforts of the group. Developing responsibility for achieving collective goals.

Summary: Influencing and negotiating

From listening actively to positively changing the direction of group work/thinking taking account of others' opinions. Developing an understanding of others.

Self Management

Summary: Review and improve

From thinking about how to learn to developing a tool kit of strategies/approaches that can be used when required. Developing the ability to be aware of the flow of one's own thinking, to exercise control of thinking processes and to be reflective.

Summary: Time management

From following instructions to independently planning and organising. Developing a habit of prioritising and meeting goals.

Summary: Goals and targets

From agreeing targets to working towards own targets, redirecting and evaluating accordingly. Developing an alertness to lack of direction and an ability to be strategic.

Progression Maps

Managing Information

Thinking, Problem-Solving
and Decision-Making

Being Creative

Working with Others

Self Management

Technology and Design

Managing Information



Learning Outcome to which this strand relates:
Research and manage information effectively to investigate design issues, using Mathematics and ICT where appropriate.

Pupils begin to:

Questioning and Planning

- Suggest some questions to investigate a problem or a design brief.
- Identify where and how to find answers.

For example:

- Ask questions which are focused on a particular problem/design brief.
- Use specialist vocabulary associated with relevant design factors, materials and manufacturing techniques.
- Use this vocabulary when asking questions.

Ask questions.

Summary
 From formulating questions to using specific, telling questions to structure inquiry.
 Developing the ability to plan investigations so as to explore those questions further.

Pupils can:

- Identify a range of questions to investigate/ explore a topic. Use the questions to establish an appropriate sequence for investigation.
- Help develop a plan for locating and recording information.

For example:

- Identify and draw similar characteristics from an existing/similar product or problem.
- Research manufacturing skills needed and materials suitable or available.
- Use specialist vocabulary with developing understanding.

Ask focused questions.

Pupils can:

- Establish own sequence for investigation.
- Develop own plan for locating and recording information.
- Add further questions as appropriate.

For example:

- Draw knowledge from previous projects in order to identify precisely what they need and want to know in a variety of contexts when seeking advice or soliciting opinions from others.
- Use specialist vocabulary with understanding.

Ask focused questions using subject/specialised vocabulary.

Technology and Design

Managing Information



Learning Outcome to which this strand relates:
Research and manage information effectively to investigate design issues, using Mathematics and ICT where appropriate.

Pupils begin to:	
<p>Finding and Selecting Sources</p> <ul style="list-style-type: none"> Identify what information is needed. Begin to select and reject sources. <p>For example:</p> <ul style="list-style-type: none"> From given sources find and use examples of existing/similar products as a starting point. Draw relevant information from these sources to solve a problem or a design brief. <p style="text-align: center;">Identify where to find answers.</p>	
<p>Summary From identifying potential sources of information such as books, periodicals and internet sites to collecting and evaluating information at first-hand. Developing the facility to consider the reliability, objectivity and currency of available sources.</p>	

Pupils can:	Pupils can:
<ul style="list-style-type: none"> Compare sources, making a judgement between them. <p>For example:</p> <ul style="list-style-type: none"> Use a range of given sources alongside personal research to inform/make inferences to aid problem-solving. When researching design for housing, consider what will influence their choice of materials and manufacturing techniques as well as control systems. <p style="text-align: center;">Obtain responses and use supplementary inquiries to refine findings and consider the value of sources identified.</p>	<ul style="list-style-type: none"> Identify limitations in information and information still required. <p>For example:</p> <ul style="list-style-type: none"> Identify a wide range of appropriate sources and materials to investigate. Draw conclusions as to which sources are relevant and useful in aiding design work. Use these sources to collect and assemble information. Sift the materials to obtain a subset in keeping with desired factors needed to meet the design brief. <p style="text-align: center;">Draw conclusions based on the quality of responses and information obtained.</p>

Technology and Design

Managing Information



Learning Outcome to which this strand relates:
Research and manage information effectively to investigate design issues, using Mathematics and ICT where appropriate.

Pupils begin to:	
<p>Grouping, Sorting and Evaluating Information</p>	<ul style="list-style-type: none"> Extract key words/points from information. Group and sort into categories. <p>For example:</p> <ul style="list-style-type: none"> Assemble information under headings for given factors such as: size, material, safety, aesthetics, design, time, cost, manufacturing techniques, and control system. <p>Summarise or extract information from a given source.</p>
<p>Summary From rearranging and recombining information to generate new versions, to using own categories and justifying decisions when considering the meaning of information. Developing sensitivity when matching constructed meanings to audience and purpose.</p>	

Pupils can:	Pupils can:
<ul style="list-style-type: none"> Compare and contrast information from different sources. Evaluate usefulness of information. <p>For example:</p> <ul style="list-style-type: none"> Evaluate existing ideas/products by identifying relevant design factors drawn from the design brief. Draw conclusions as to suitability for inclusion in design work. <p>Compare and contrast a range of sources.</p>	<ul style="list-style-type: none"> Combine information from different sources. Assess the extent to which that information addresses the key questions/issues. <p>For example:</p> <ul style="list-style-type: none"> Match existing/similar products to a detailed factor analysis/specification required to solve problem. Use a quantitative scoring system to scale relevance of each product. Make and record evaluative comments to show thought process. <p>Construct meaning by combining information acquired from a range of sources. Draw conclusions.</p>

Technology and Design

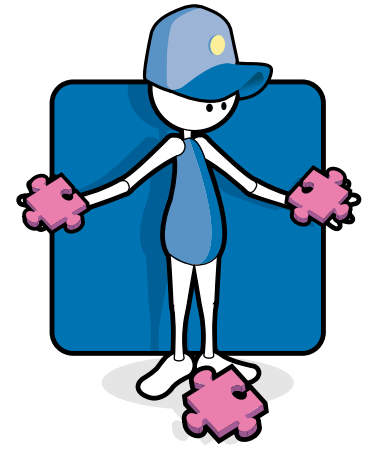
Managing Information



Learning Outcome to which this strand relates:
Research and manage information effectively to investigate design issues, using Mathematics and ICT where appropriate.

Pupils begin to:	
<p>Recording and Adapting Information</p>	<ul style="list-style-type: none"> Transform information to aid memorisation and understanding. <p>For example:</p> <ul style="list-style-type: none"> Collate information from a range of given sources. Record relevant factual data and design ideas using a combination of initial sketches and other media. Document work as it progresses, using a sketchbook, worksheets and/or electronic means of saving work. Make a record of demonstrations and instructions of materials and techniques used. <p>Keep accurate records of information and sources.</p>
<p>Summary From critically evaluating information to consolidating information collected from a range of sources. Developing an awareness of how to present conclusions taking account of audience and purpose.</p>	

Pupils can:	Pupils can:
<ul style="list-style-type: none"> Record and present information in a range of formats taking into account audience and purpose. <p>For example:</p> <ul style="list-style-type: none"> Present factual data in an interesting but clear format. Use freehand sketching/collage work to present initial design ideas. Use materials as a starting point for possible solutions and draw relevant parts of a range of sources to generate realistic ideas. Annotate work to show thought processes. <p>Adapt recording and presentation of information to suit specific audiences and purposes.</p>	<ul style="list-style-type: none"> Structure information in a logical way to present to audience using a range of appropriate formats. <p>For example:</p> <ul style="list-style-type: none"> Independently collate and retain personal work in formats appropriate to the media, materials and techniques used. Document and present materials investigated and used in class. Annotate all work in detail to show thought processes. Record and acknowledge source materials to avoid unintentional plagiarism. <p>Process recorded information so as to communicate meaning and make it available to specific audiences and purposes.</p>



Technology and Design

Thinking, Problem-Solving and Decision-Making

Learning Outcome to which this strand relates:
Show deeper understanding by thinking critically and flexibly, solving problems and making informed decisions, using Mathematics and ICT where appropriate.

Pupils begin to:

Seeing Relationships and Patterns

- Recognise and describe patterns within information and begin to offer reasons for why the pattern takes the shape it does.
- Describe some characteristics of a problem/image/issue/event.

For example:

- Recognise the pattern of the design process and the need for continual evaluation of design work.
- Use the design process to develop their work.
- Identify that many products are made up of parts, each of which has been designed using this process.

Discern common characteristics.

Summary
 From seeing patterns, to analysing and explaining the reasons for the existence of those patterns. Seeking connections and explanations.

Pupils can:

- Explain how two different factors relate to produce patterns.
- Compare and contrast characteristics of one problem/image/issue/event with another.
- Explain how different parts of a system are linked together.

For example:

- Compare and contrast the design process used for solving previous design problems and learn to recognise and effectively use each step.
- Recognise the link between the material chosen for their final design and how that can limit the manufacturing processes available.

Give reasons for interpretation offered.

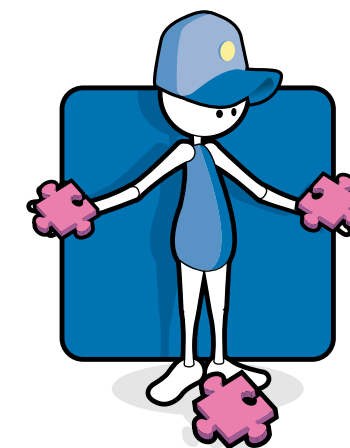
Pupils can:

- Explain how complex interrelationships between a number of different factors produce patterns. Assess the relative significance of these factors.
- Explain how the interpretation of different design briefs changes depending on circumstances and audience.
- Weigh up the impact of how changing one part of a design brief affects the whole.

For example:

- Be discerning about the value of the design process and how it provides scope for individual and innovative work.
- Understand that the design process possesses inbuilt and ongoing evaluation that can be used to inform the thinking for design and manufacture.
- Use the process of evaluation when taking decisions during the development of work.

Recognise, interpret and explain complex interrelationships.



Technology and Design

Thinking, Problem-Solving and Decision-Making

Learning Outcome to which this strand relates:
Show deeper understanding by thinking critically and flexibly, solving problems and making informed decisions, using Mathematics and ICT where appropriate.

Pupils begin to:

Developing a Line of Reasoning

- Offer ideas and give some reasons to support them.
- Describe the construction of a design/manufactured product and begin to give reasons for its characteristic appearance.

For example:

- Produce annotated design work which gives insight to the viewer about the thought processes involved. These annotations should relate to basic facts about size, materials, function etc.

State opinions and ideas.

Summary
 Move from giving unsupported opinion to making reasoned arguments and recognising the existence of alternatives.
 Weighing and assessing reasons, building complex concepts.

Pupils can:

- Use specific evidence and information to support an argument.
- Analyse a design.
- Explain the possible interpretations.

For example:

- Give detailed annotation to support design work which clearly demonstrates the thinking behind the solution and how the design might develop into a manufactured product.
- Provide facts and explanations referring to materials and manufacturing techniques used.

Construct an argument and support with evidence.

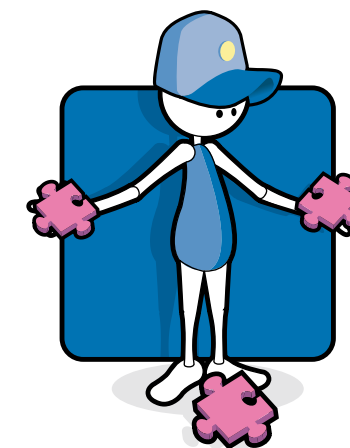
Pupils can:

- Explain how one set of actions can affect/are affected by another.
- Predict and address counter-arguments.
- Recognise flaws or weaknesses in an argument.
- Challenge assumptions.
- Make judgements about the most likely explanations.
- Draw conclusions based on sound and robust evidence.

For example:

- Develop an initial design solution to such a degree (i.e. working drawing of parts) that another qualified person could manufacture the design from the drawing alone.
- Make supporting evidence such as detailed sizes, materials to be used and assembly instructions available.
- Manufacture a final piece and suggest modifications to improve the product as part of the evaluation.

Consider and take account of alternative opinions.



Technology and Design

Thinking, Problem-Solving and Decision-Making

Learning Outcome to which this strand relates:
Show deeper understanding by thinking critically and flexibly, solving problems and making informed decisions, using Mathematics and ICT where appropriate.

Pupils begin to:

Examining Evidence

- Pose questions about reliability of evidence.
- Consider how useful and reliable evidence is.

For example:

- Examine and evaluate other existing/similar products to investigate materials and manufacturing processes used.
- Attempt to replicate the manufacturing techniques to make an informed choice about how to complete their work.

Treat unverified information as conditional.

Summary
 From questioning evidence to searching for reliability, developing the habit of seeking verification for theories and conclusions. Applying informed scepticism in weighing evidence.

Analysing Multiple Perspectives

- Recognise another view about an issue and give reasons for someone holding that view.

For example:

- Recognise that evaluation of products is dependent on context and culture.
- Explore the meaning and significance accorded to the design of products in their own and other societies (e.g. a water pump used in a developing nation will have fewer features but be more robust than one used for fountains).

Appreciate alternative views are possible.

Summary
 From seeing other viewpoints to gaining an insight into why they are held. Considering alternatives and arriving at own conclusions.

Pupils can:

- Recognise a range of different interpretations.
- Distinguish between fact, opinion, stereotyping and propaganda etc.
- Consider alternative interpretations.

For example:

- Research existing products in detail to determine a range of appropriate manufacturing techniques. Use this knowledge discriminatingly and where appropriate to produce a final product.

Apply appropriate standards in different circumstances.

Pupils can:

- Weigh up strengths and weaknesses of evidence/sources in order to determine usefulness.
- Identify ways of investigating more varied sources.

For example:

- Produce in-depth research into materials and manufacturing techniques used in existing products and comment on their appropriateness.
- Suggest alternatives to achieve similar or better results.
- Use this knowledge when manufacturing the final design.

Know that superficially convincing evidence can be unreliable.

- Recognise the views of other groups and explain why they hold them.

For example:

- Appreciate that different cultures have different needs and the design of many products will reflect this.
- Show this understanding when making judgements about the value of products.

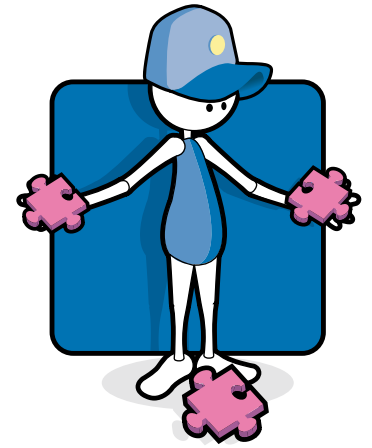
Consider alternative viewpoints and differences of opinion.

- Assess the relative merits of a range of viewpoints and come to own conclusions.
- Suggest ways by which conflicts of interest might be resolved to the benefit of most.

For example:

- Understand the significance of how the use of products is altered by the contexts in which they are made and used.
- Use this appreciation when considering how their designs/products will affect and be affected by audience and purpose.

Value the possibilities represented by alternative approaches.



Technology and Design

Thinking, Problem-Solving and Decision-Making

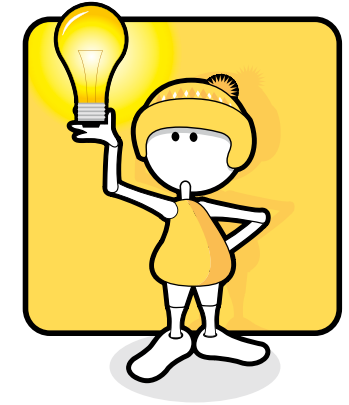
Learning Outcome to which this strand relates:
Show deeper understanding by thinking critically and flexibly, solving problems and making informed decisions, using Mathematics and ICT where appropriate.

Pupils begin to:	
<p>Making Decisions/Solving Problems</p>	<ul style="list-style-type: none"> Clarify problem. Identify some options/solutions in order to make a decision/solve a problem and outline some pros and cons for each. <p>For example:</p> <ul style="list-style-type: none"> Present several design/system proposals – some of which attempt to solve a problem/design brief and make a clear choice between them. Decide which solution is to be developed based on given knowledge about material choice and manufacturing techniques available. <p>Weigh alternatives.</p>
<p>Summary From developing a systematic approach to problem solving to generating and evaluating a range of options when making decisions. Becoming systematic in looking for solutions.</p>	

Pupils can:	Pupils can:
<ul style="list-style-type: none"> Explore a wider range of options, identifying the pros and cons for each and justifying choices. <p>For example:</p> <ul style="list-style-type: none"> Explore a range of solutions most of which would be feasible to develop into a final design capable of meeting the design brief. Evaluate each idea against a pre-determined design specification and base the decision to proceed on acquired knowledge of materials and manufacturing processes. <p>Explore possibilities, critically evaluating the feasibility of each.</p>	<ul style="list-style-type: none"> Systematically work through a range of options, identifying pros and cons and examining the likelihood of each to justify final decisions. Evaluate and refine choice based on experience of other related situations. Recognise that solutions have intended and unintended consequences. <p>For example:</p> <ul style="list-style-type: none"> Systematically and logically produce well defined design/system solutions which provide valid solutions to the problem presented. Apply a decision making process aided by an in-depth evaluation of each potential solution against a self-determined design specification. Show that the pathway to the development of the final solution is informed by experimentation with modelling. <p>Make reasoned decisions, taking cognisance of consequences.</p>

Technology and Design

Being Creative



Learning Outcome to which this strand relates:
Demonstrate creativity and initiative when developing ideas and following them through.

Pupils begin to:

Curiosity

- Show eagerness to pose questions that do not have straightforward answers.

For example:

- Seek to ask questions that invite the 'less obvious' answer to the problem presented.
- Be willing to explore solutions outside their immediate environment in order to deepen their knowledge of the world around them.

Speculate regarding possibilities.

Summary
 From initial inquisitiveness to an eagerness for discovery. Developing the tendency to seek out problems and find solutions, wanting to know and discover more.

Pupils can:

- Seek out and identify new issues or problems to solve.
- Pose thoughtful questions and probe for more information.

For example:

- Use 'new' knowledge to influence direction of research and investigation in order to acquire stimulus material which will aid the development of individual and innovative design solutions in a reasonably thoughtful manner.

Investigate alternatives.

Pupils can:

- Search for more meaningful answers.
- Keep a sense of purpose and direction in pursuing new problems.
- Show willingness to make meaning from, and give order to, inconsistent and contradictory information.
- Recognise and tolerate ambiguity.

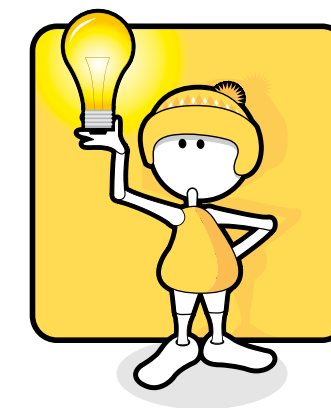
For example:

- Approach each new design and manufacturing exercise as a challenge.
- Draw from previous and learned material and seek to investigate a new way of working in order to acquire new skills.
- Show a determination to research and attempt to master new materials and manufacturing processes appropriate to the design solutions.

Actively seek to deepen comprehension.

Technology and Design

Being Creative



Learning Outcome to which this strand relates:
Demonstrate creativity and initiative when developing ideas and following them through.

Pupils begin to:

Exploration

- Use imagination, generating own and different ideas.
- Think through ideas, seeing where they might lead.

For example:

- 'Think outside the box,' be prepared to challenge the ordinary.
- Be imaginative in design work and not limited by material or manufacturing processes.
- Recognise that there is no single 'correct' outcome.

Feed imagination by enquiry.

Summary
 From generating new ideas to exploring how to achieve them. Using imagination to explore new ideas.

Flexibility

- Show openness to new ideas and methods.
- Be prepared to work in different ways.

For example:

- Appreciate the fact that there is likely to be more than one outcome to a given problem.
- Be prepared to challenge the usual solution and look for diversification of ideas.

Be inquisitive and receptive to ideas.

Summary
 From being open to new ideas to trying them out and reflecting critically on them. Developing the tendency to be open-minded and alert to narrow focus thinking, becoming ingenious and adaptable.

Pupils can:

- Generate, build and combine ideas in new and flexible ways.
- Make ideas real, translate them into outcomes.
- Deliberately pursue unusual and different solutions.

For example:

- Whilst maintaining the flow of imaginative work, use the design process to produce work in a clearly logical, planned and structured manner.
- Present several different solutions and rationalise which is the 'best' idea.
- Use acquired knowledge about materials and manufacturing processes to develop innovative design within a practical solution.

Play with possibilities and try alternatives.

Pupils can:

- Exercise individuality in linking own ideas to a bigger picture.
- Make new associations between ideas and information.
- Express understanding of problems and issues in a variety of ways.

For example:

- Independently produce several realistic design solutions which are well annotated.
- Provide a clear appraisal of which solution they wish to pursue and develop this imaginative solution into a final design which contains enough information to be manufactured.

Pursue personal insights, predilections, instincts and desires for new knowledge.

- Respond to trying out and developing new ideas.
- Be willing to take a chance and go beyond the most obvious solution.

For example:

- Enjoy the freedom of working to an open-ended design brief, adapting and modifying work and ideas in progress in order to produce outcomes which are both innovative, individual and meet the design brief.

Be prepared to experiment and take risks.

- Be critical in refining ideas and methods.
- Check fitness for purpose, responding to feedback.

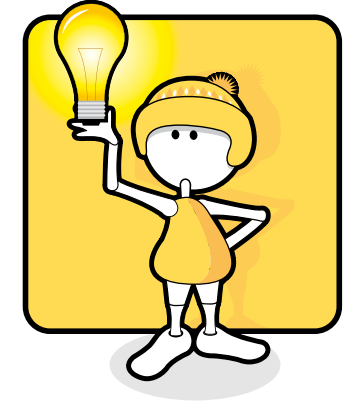
For example:

- Learn from experience – having the ability to develop innovative solutions bearing in mind the limitations of materials when producing practical outcomes.
- Use the knowledge obtained by experimentation with materials and manufacturing processes to inform subsequent work.

Become increasingly aware of alternatives.

Technology and Design

Being Creative



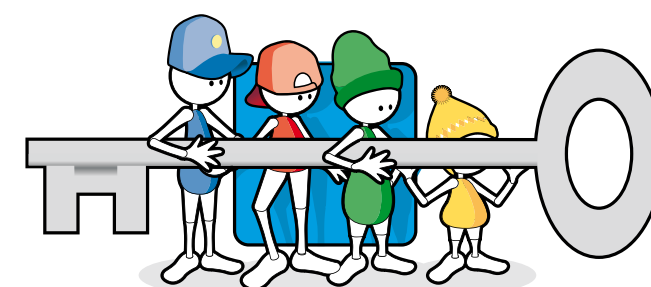
Learning Outcome to which this strand relates:
Demonstrate creativity and initiative when developing ideas and following them through.

Pupils begin to:	
<p>Resilience</p>	<ul style="list-style-type: none"> Recognise or accept that mistakes and setbacks are part of learning. <p>For example:</p> <ul style="list-style-type: none"> Take risks in terms of trying new materials and ways of working when making suggestions for personal ideas. Learn from experience that some materials are more suitable than others. i.e. a box can be achieved by fabricating acrylic sheet or by using comb joints in wood. <p style="text-align: center;">Anticipate difficulties.</p>
<p>Summary From understanding that experiments that don't produce the expected results are also useful, to systematically using trial and error to solve problems. Recognising that progress is not always smooth or easy.</p>	

Pupils can:	Pupils can:
<ul style="list-style-type: none"> Persist in the face of difficulty and setback. Be able to carry on. Develop own value judgements about the merits of their work. <p>For example:</p> <ul style="list-style-type: none"> Avoid being overly committed to a single course of action when manufacturing the final design. Be prepared to develop and amend the solution to suit the limits of the design/material. Change the direction of the design, without being afraid to readjust. Accept that experimentation is necessary to achieve the best solution. <p style="text-align: center;">Use determination to succeed.</p>	<ul style="list-style-type: none"> Turn mistakes and setbacks into new approaches. Seek excellence. <p>For example:</p> <ul style="list-style-type: none"> Model work in pliable materials i.e. cardboard or a computer simulation to achieve a number of possible ways forward when planning work and ideas. Experiment with other manufacturing methods and learn from the experience, particularly 'unsuccessful' outcomes. Appreciate that when things 'go wrong' it is always worth trying again to demonstrate the learning process and obtain new knowledge of working with materials. <p style="text-align: center;">Pursue excellence.</p>

Technology and Design

Working with Others



Learning Outcome to which this strand relates:
Work effectively with others.

Pupils begin to:

Learning With and From Others

- Engage with others. Be willing to interact and help others with their learning.

For example:

- Learn to listen and recognise the value of others' contributions, share their knowledge to aid others when asked, be helpful and share resources in workshop.
- Learn how to 'take turns' when using tools and machinery in the workshop.

Give and take within a group situation.

Summary
From sharing within a group to collaborative working to support each others' learning. Developing interpersonal skills to support mutual learning.

Roles and Responsibilities

- Show that s/he can work in different roles and take responsibility in group tasks.

For example:

- Accept changing roles within a group.
- Recognise where their personal strengths and weaknesses are in terms of the various roles available within a group.
- Vary these roles so as to play to their strengths and address in with which they have less confidence.

Take on a range of roles.

Summary
From taking on a role within a group to organising activities within a group. Optimising working methods to suit the situation.

Pupils can:

- Help others to learn by sharing ideas and opinions.
- Respond to each other in constructive and respectful ways.

For example:

- Learn from their own mistakes by discussing the relative advantages and disadvantages of using different techniques and equipment.
- Give and accept criticism and suggestions.
- Be helpful and sometimes recognise the need to let others go first.

Recognise the usefulness of sharing.

Pupils can:

- Demonstrate and share expertise with a genuine desire to help others to learn.
- Respond constructively and sensitively to others.

For example:

- Recognise when others are having difficulties and be forthcoming in offering help.
- Give and receive constructive feedback within a group, based on their own knowledge and experiences whilst taking account of the feelings and past experiences of other group members.

Work as a member of a group or team.

- Show initiative in assigning and organising work within a team. Contribute constructively towards team goals.

For example:

- Take on different roles at different times.
- Undertake a range of roles within group work and carry them out efficiently and with growing self reliance.

Understand the roles of others.

- Identify and agree collective goals.
- Organise roles and responsibilities.
- Review progress and evaluate outcomes.

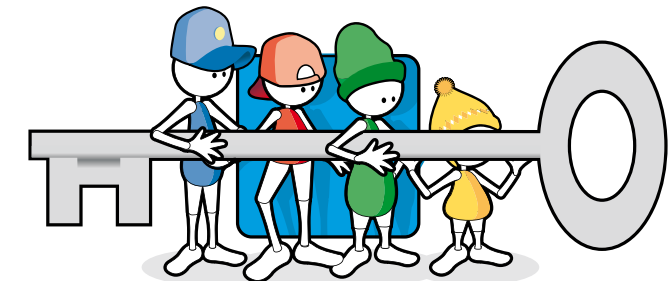
For example:

- Make an active contribution when working as part of a group.
- Adopt the roles within a group as a matter of course and with understanding of the structure and function of the group when determining how to proceed.
- Take a turn as leader of the group.

Distribute roles equitably.

Technology and Design

Working with Others



Learning Outcome to which this strand relates:
Work effectively with others.

Pupils begin to:

Influencing and Negotiating

- Show respect by listening to differences in opinion.

For example:

- Listen to all opinions before sharing own ideas and take account of these opinions before reaching a conclusion.
- Be willing to change their personal thoughts/opinions if a valid argument is presented.

Acknowledge diversity.

Summary
 From listening actively to changing the direction of group thinking. Developing an understanding of others and how to interact, using reasoned argument to convince or persuade.

Pupils can:

- Express their opinion using appropriate language.
- Explore differences of opinion to reach an outcome.

For example:

- Be aware of the range of attitudes, values and opinions which characterise groups (such as bias, favouritism and partiality) and take account of these before offering an opinion to others.

Be aware that standards and values vary with context.

Pupils can:

- Use explanation and reasoning to reach an acceptable outcome.

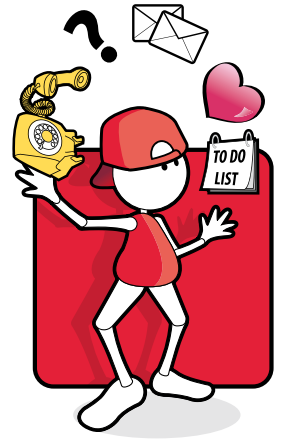
For example:

- Challenge values, attitudes and opinions by questioning assumptions.
- Be aware of prejudice and negative attitudes such as gender stereotypes and how these affect performance.
- Offer meaningful feedback to others in a way which does not undermine their contributions.
- Empathise with alternative viewpoints.
- Take collective decisions based on a shared understanding of how work is to proceed, valuing diversity of opinion.
- Understand that unanimity is not necessary in order to move forward.

Arbitrate between alternatives sensitively.

Technology and Design

Self Management



Learning Outcome to which this strand relates:
Demonstrate self management by working systematically, persisting with tasks, evaluating and improving own performance.

Pupils begin to:

Review and Improve

- Think before acting.
- Review and discuss their thinking and learning.

For example:

- Maintain a record of personal evaluations of work completed and reflect on previous experience when deciding how to proceed.
- Use exemplar material to aid evaluation of completed work.

Consider options and strategies.

Summary
 From thinking about how they learn to choosing favoured methods. Analysing and applying feedback to achieve intentions.

Pupils can:

- Explain their approaches to thinking and learning.
- Compare different approaches with a view to improvement.
- Respond positively to feedback.

For example:

- Apply the lessons from previous assessments and evaluations.
- Put in to practice what has been learned from using a variety of materials and a range of manufacturing skills.
- Begin to use exemplar material to aid evaluation of own work as it progresses.

Establish grounds on which to base decisions.

Pupils can:

- Avoid making quick decisions and snap judgements.
- Readily and independently evaluate approaches to thinking and learning.
- Make connections between different learning approaches and apply in new contexts.
- Seek out and act on advice.

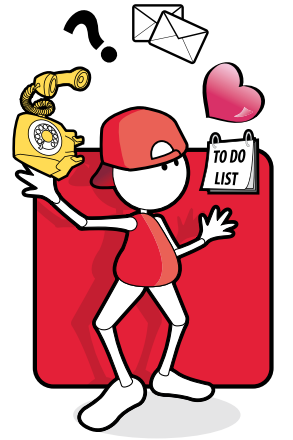
For example:

- Systematically include ongoing evaluation of work as it progresses so as to attempt to further develop skills and techniques and produce a quality outcome.
- Seek out specific advice or information where necessary.

Systematically adapt strategies to achieve intentions.

Technology and Design

Self Management



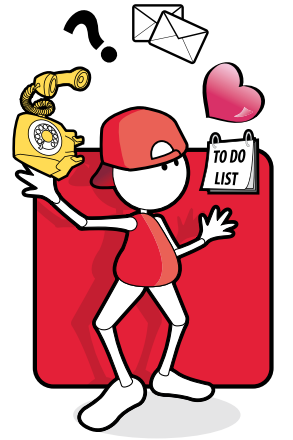
Learning Outcome to which this strand relates:
Demonstrate self management by working systematically, persisting with tasks, evaluating and improving own performance.

Pupils begin to:	
<p>Time Management</p>	<ul style="list-style-type: none"> Follow a sequence of activities and complete a task on time. <p>For example:</p> <ul style="list-style-type: none"> Keep work up to date by completing tasks on time without unnecessary delays. Manage practical work in class time by avoiding 'queues' in the workshop and beginning another task. <p style="text-align: center;">Focus on task.</p>
<p>Summary From following instructions to independently planning and organising activities so as to complete intentions within a required time. Prioritising tasks and activities.</p>	

Pupils can:	Pupils can:
<ul style="list-style-type: none"> Plan and organise a sequence of activities, managing resources to meet deadlines. <p>For example:</p> <ul style="list-style-type: none"> Begin to recognise the likely time commitments associated with specific design and practical tasks and estimate how best to complete work as a result. Set aside time to do this to meet deadline, taking account of other work commitments. Balance the time needed for practical and design work. <p>Decide on a strategy for completing work.</p>	<ul style="list-style-type: none"> Plan and organise different tasks, prioritising and reallocating resources in order to meet competing deadlines. <p>For example:</p> <ul style="list-style-type: none"> Organise time effectively. Begin tasks when given, as opposed to working to a deadline. If necessary, prioritise decisions, taking a realistic account of the time needed for practical work and of competing demands on time and attention. Aim to complete assignments on time and to a standard which is personally satisfying. Allow time for reflection. <p>Devote time to separate activities.</p>

Technology and Design

Self Management



Learning Outcome to which this strand relates:
Demonstrate self management by working systematically, persisting with tasks, evaluating and improving own performance.

Pupils begin to:	
<p>Goals and Targets</p>	<ul style="list-style-type: none"> Identify interests, aspirations, strengths and weaknesses. Work with others to agree personal goals for learning. <p>For example:</p> <ul style="list-style-type: none"> Reflect on previous personal and teacher-led evaluations of work. Identify those areas which can be the subject of special attention to maximise improvements in performance. Seek out specific advice on strengths and weaknesses from teachers. <p style="text-align: center;">Refine self-awareness.</p>
<p>Summary From agreeing targets to establishing personal goals and targets. Becoming alert to where there is a lack of direction and thinking more strategically.</p>	

Pupils can:	Pupils can:
<ul style="list-style-type: none"> Prioritise individual learning needs and follow steps for improvement. <p>For example:</p> <ul style="list-style-type: none"> Base priorities on personal needs and interests and monitor personal progress regularly to improve performance and answer outstanding questions. Seek out specific feedback on these areas from teachers. <p style="text-align: center;">Plan what needs to be done to build on strengths and address weaknesses.</p>	<ul style="list-style-type: none"> Show independence in setting and following through actions for improvement. Monitor progress and make appropriate changes. <p>For example:</p> <ul style="list-style-type: none"> Be reflective when evaluating and concentrate on improving one aspect within every new project. Seek to extend knowledge and improve with every new challenge by asking questions, using tutorials and guides, accessing reference materials and other contacts and sources of information. Don't be satisfied with anything less than 'your best'. <p style="text-align: center;">Systematically review progress and reflect on own performance.</p>

Appendices

Appendix 1

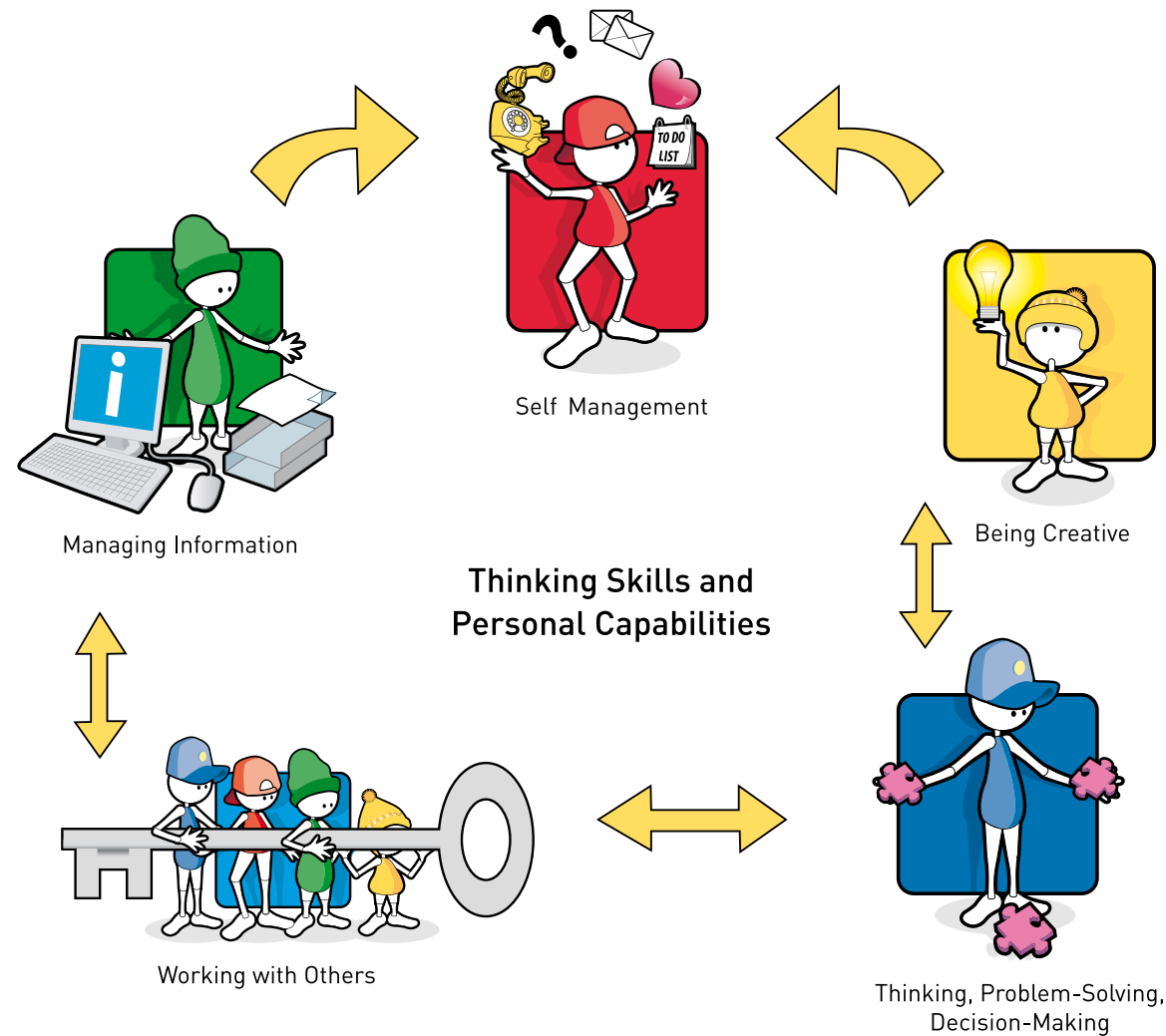
The Thinking Skills and
Personal Capabilities Framework

Appendix 2

Structuring a Thinking Skills and
Personal Capabilities Lesson:
Opportunities for Infusion

Appendix 1 The Thinking Skills and Personal Capabilities Framework

Thinking Skills and Personal Capabilities Framework

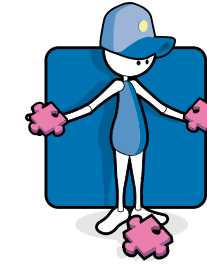


Managing Information

Asking, accessing, selecting, recording, integrating, communicating

- Ask focused questions.
- Plan and set goals, break tasks into sub-tasks.
- Use own and other's ideas to locate sources of information.
- Select, classify, compare and evaluate information.
- Select most appropriate method for a task.
- Use a range of methods for collating, recording and representing information.
- Communicate with a sense of audience and purpose.

The purpose of this strand is to develop pupils' abilities in an information-intensive environment. Pupils should understand the potential and usefulness of accessing, selecting and integrating information from multiple sources to support their own learning and creativity. To do this they need to ask questions, clarify their purpose and what needs to be done. They need to be able to access a range of information sources (books, ICT, people), to select and evaluate the information for a purpose and to develop methods for recording and integrating information. Pupils will also need to learn how to plan, to set goals when carrying out their tasks and to develop a sense of audience and purpose when communicating information.



Thinking, Problem-Solving and Decision-Making

Searching for meaning, deepening understanding, coping with challenges

- Sequence, order, classify and make comparisons.
- Make predictions, examine evidence and distinguish fact from opinion.
- Make links between cause and effect.
- Justify methods, opinions and conclusions.
- Generate possible solutions, try out alternative approaches, evaluate outcomes.
- Examine options, weigh up pros and cons.
- Use different types of questions.
- Make connections between learning in different contexts.

The purpose of this strand is to engage pupils in active learning, so they can go beyond the mere recall of factual information and the routine application of procedures. Pupils need to be explicitly prompted to engage with a range of different kinds of thinking appropriate to their age so that they can deepen their understanding of curricular topics, be more critical of evidence, think more flexibly, be able to solve problems and make reasoned judgements and decisions rather than jumping to immediate conclusions. As they progress, pupils will become more adept at managing their own learning and making connections.

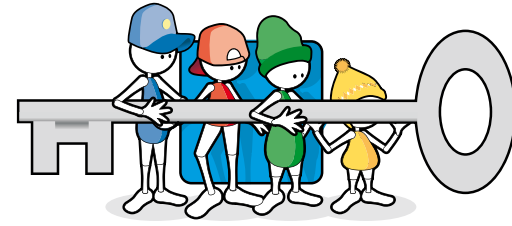


Being Creative

Imagining, generating, inventing, taking risks for learning

- Seek out questions to explore and problems to solve.
- Experiment with ideas and questions.
- Make new connections between ideas/information.
- Learn from and value other people's ideas.
- Make ideas real by experimenting with different designs, actions and outcomes.
- Challenge the routine method.
- Value the unexpected or surprising.
- See opportunities in mistakes and failures.
- Take risks for learning.

The focus of this strand is on being creative and on providing opportunities for all pupils to realise their creative potential across the curriculum. The purpose is to develop dispositions for creativity as well as ways of thinking and doing. Being curious, exploring and playing, inventing and experimenting are identified as important ways of interacting with the world. Pupils need to be given opportunities for self-expression, be able to follow their intuition and become more resilient by learning from their mistakes and perceived failures.



Working with Others

Being collaborative, being sensitive to others' feelings, being fair and responsible

- Listen actively and share opinions.
- Develop routines of turn-taking, sharing and cooperating.
- Give and respond to feedback.
- Understand how actions and words affect others.
- Adapt behaviour and language to suit different people and situations.
- Take personal responsibility for work with others.
- Be fair.
- Respect the views and opinions of others, reaching agreements using negotiation and compromise.
- Suggest ways of improving their approach to working collaboratively.

The purpose of this strand is to enable pupils to engage in collaborative activities and to make the most of their learning when working with others. To do this, they must develop the confidence and willingness to join in, the social skills associated with working in face-to-face groups. They must be able to show empathy and develop a more general social perspective. They also need to appreciate some aspects of group dynamics and the roles that can be assumed in groups. Collaborative work offers opportunities to learn negotiation skills and to develop a sense of fairness and respect that will connect with pupils' general social and emotional development (links with *Personal Development*).



Self Management

Evaluating strengths and weaknesses, setting goals and targets, managing and regulating self

- Be aware of personal strengths, limitations and interests.
- Set personal targets and review them.
- Manage emotions and behaviour in a range of situations.
- Organise and plan how to go about a task.
- Focus, sustain attention and persist with tasks.
- Review learning and some aspects that might be improved.
- Learn ways to manage own time.
- Seek advice when necessary.
- Compare own approach with others' and in different contexts.

The purpose of this strand is to help pupils become more self-directed, so that they can manage their learning in new situations and in the longer term. To do this they need to know more about themselves as learners, their personal strengths and weaknesses, their interests and limitations and how they feel about learning. They need to set personal targets and review them (with their teacher's help), set goals for their work and organise their time. By regularly reviewing their work and how they feel about learning, pupils become more aware of their learning and how it can be improved. This strand links closely with *Assessment for Learning* and *Personal Development*.

Appendix 2

Structuring a Thinking Skills and Personal Capabilities Lesson: Opportunities for Infusion

The Thinking Skills and Personal Capabilities Framework does not stand alone nor is it isolated from the established areas of the curriculum. Rather, the skills and capabilities highlighted in the framework need to be developed and assessed *in and through* the curriculum's Areas of Learning.

When planning to introduce a specific Thinking Skills and Personal Capabilities action, it is important to ensure that the acquisition and

development of the skill will deepen the learning. Consider carefully how to ensure that thinking is made explicit and that pupils can understand clearly the processes that are expected of them. The following template can be used to structure planning.

Outline of Lesson/Series of Lessons	Explanation
Launch	<p>Share with the pupils the purpose of the lesson (for example through the learning intentions). The learning intentions should make reference to both the subject knowledge and understanding and the particular Thinking Skill and Personal Capabilities strand being developed.</p> <p>Strategies for infusion:</p> <ul style="list-style-type: none"> • Make the context relevant to the learner's experience, for example make it a meaningful challenge. • Make thinking processes/personal capabilities explicit. • Establish a common vocabulary for talking about thinking by using the language of the Thinking Skills and Personal Capabilities Framework. • Model the thinking process, describe and explain the processes you want pupils to engage with. • Identify success criteria to ensure pupils know what is expected and what success looks like. • Link the skills and capabilities. <i>Where have you done this before? Where else could you use this skill?</i> • Pupils could identify other lessons or out-of-school situations when they used that particular skill/capability. • Scaffold visually for pupils, provide them with thinking diagrams, word banks, wall charts etc. to assist them in the task.

Outline of Lesson/Series of Lessons	Explanation
Activity	<p>This is the main part of the lesson. It is dependent on setting an appropriately challenging, often open-ended task or activity. The pupils may work individually or in small/large groups to address the task.</p> <p>Use modelling and effective questioning strategies to prompt and scaffold the learning. Thinking diagrams will help to focus the pupils on the relevant skill and make it important and explicit.</p> <p>Observe the individuals/groups at work and use the evidence as a basis for feedback and judgement.</p> <p>Strategies for infusion:</p> <ul style="list-style-type: none"> • Offer pupils opportunities to engage with the thinking process by providing challenging tasks. • Facilitate appropriate ways of learning, for example, paired work, small groups, etc. • Ask and respond to questions about thinking and learning while on-task. • Jointly construct meaning (combining ideas, challenging opinions etc.). • Allow pupils to explain and justify thinking. • Focus on pupil learning and its transferability. • Use the language of Thinking Skills and Personal Capabilities. • Monitor progress by using the Thinking Skills and Personal Capabilities Progression Maps.

Outline of Lesson/Series of Lessons	Explanation
Debrief	<p>This is about recognising the importance of allowing time for reflection and metacognition.</p> <p>Encourage pupils to reflect on the particular type of thinking they have just completed and comment on how challenging they thought it was, how well they thought they did and how they might improve. Pupils may compare and contrast the strategies used by different groups in the class.</p> <p>Enable pupils to apply the thinking to other areas of the curriculum and beyond. Near transfer is where the learner applies the new thinking to a similar situation or problem. Far transfer is where they apply it to unrelated contexts in other areas of the curriculum or beyond.</p> <p>Strategies for infusion:</p> <ul style="list-style-type: none"> • Teacher-led plenary with mostly pupils talking, writing or responding. • Review the specific Thinking Skills and Personal Capabilities used in the activity in order to focus learners on the processes of thinking. • Review the quality of collaboration and the quality of talk. • Evaluate what has been learned (for example, two stars and a wish). • Connect learning to other contexts.

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Rewarding Learning