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"In everything you do, take the best that exists and make it better. When it does not exist design it. Accept nothing nearly right or good enough"

- Henery Royce

Mechanic
Design & Technology in Wirral Primary Schools

The purpose of this publication is to provide a snapshot of best practice in the teaching, classroom organisation and planning of Design and Technology. This publication draws on the work of Wirral Primary schools during the period July 1998 to June 1999. This period in Primary schools was characterised by two major developments;

- The introduction of the National Literacy Strategy and
- Preparation for the introduction of the National Numeracy Strategy.

It is testament to the professionalism and dedication of D&T Co-ordinators and Primary teachers that they continued to develop the subject in creative and innovative ways during one of the most demanding years in primary education since the introduction of the initial Design & Technology Order in September 1990.

Chris Rice
Director of Education

'A Celebration of Best Practice'
"It is through creativity and imagination that Britain will succeed in the 21st century"

- Rt. Hon. Tony Blair
Prime Minister
September 1997
Introduction

Design and Technology was introduced to the Primary curriculum in September 1990 as part of the statutory National Curriculum Orders under the 1988 Education Act. Whilst the designing and making activities contained in the new order built on a tradition of craft work in primary schools, much of the knowledge, skills, and conceptual content was a departure from the previous curriculum experiences of pupils, and outside the training experience of the majority of teachers.

With the introduction of such a radically new subject as Design & Technology, along with the wholesale change that the National Curriculum wrought in education, the Authority sought to provide additional support and guidance for Wirral teachers. The Design and Technology Inspection and Advisory service developed Key Stage 1 and 2 Schemes of Work which, after initial trialling were published, and copies were sent to all Wirral schools. A rolling programme of INSET began in order to develop teachers confidence and assist them in delivering the units of work from the Wirral scheme.

Since 1996 Wirral has produced a range of guidance material for teachers to support;

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Regular termly meetings of Design and Technology Co-ordinators were initiated in 1990 to disseminate best practice and to update teachers on the latest subject developments. The impact of this programme of curriculum support and in-service training on the quality of teaching and learning in Design and Technology in Wirral schools is reflected in the observations made by Inspectors in Ofsted reports. The majority of schools follow the Wirral Scheme of Work for design and technology and this is frequently praised in the subject section of reports for providing a progressive development of knowledge and a broad and balanced range of experiences in which children gain and apply designing and making skills.

A summary of all Ofsted inspection reports for design and technology in Wirral up to 1997/98 reveals the following:-

- Children enjoy their design and technology experiences and respond with enthusiasm to the challenge of design and make activities.

- 100% of teaching in Key Stage 1 is satisfactory or good.

- Most children in Key Stage 1 make good progress. In Key Stage 2 100% of children make satisfactory or good progress.
The schools included in this document were identified initially from Ofsted reports which indicated that the standard of design and technology was very good or excellent. Each school was visited by the Authority Inspection and Advisory team who collected examples of work and discussed with teachers and children their approaches to design and technology in the classroom.

This document attempts to record the work of twelve Wirral schools and to identify the common factors which contribute to their success. Much has already been written in national documents about best practice in design and technology; what it is and how it can be recognised in the quality of teaching and in the progress children are making and in their attitudes to learning.

This document is not a textbook which seeks to cover aspects of subject pedagogy in depth. Instead it has been developed very much as a visual resource which can be dipped into to see for oneself how Design and Technology Co-ordinators have gone about the task of developing schemes of work, how teacher colleagues have translated them into lesson plans, and the practical outcomes that children have produced. What follows is a visual tour around some of the schools in Wirral to see best practice ‘in action’.
What should children be learning in design and technology in Key Stage 1 and 2?

The detailed answer to this question is given in the (non statutory) national Schemes of Work for Design and Technology at Key Stage 1 and 2 published in 1998 and designed to cover the period up to September 2000. From that date the answer to the question will be found in the revised orders for the National Curriculum. A summary is given below:

As children move through Key Stage 1 and 2 they develop knowledge and understanding of:

- materials and components
- mechanisms and control
- systems structures
- existing products
- quality
- health and safety

The details of what teachers must teach are given in the National Curriculum statutory programmes of study. This document provides a clear statement of what Design and Technology is, the subject knowledge, skills and understanding that must be taught and an overview of expectations Key Stage by Key Stage. Design and technology is very much a ‘hands on’ subject in which children learn and apply their knowledge and understanding in a varied and exciting and stimulating programme of practical activities. During the ages 5 to 11 children will be developing a range of skills in designing and making which together with the application of skills from other areas of the curriculum will enable children in Key Stage 1 and 2 to progressively develop design and technology capability;

- developing designing skills, including generating and developing ideas, clarifying a task, creating design proposals, communicating ideas, planning and evaluating;

- acquire and refine the practical skills associated with making, including working with materials and components, tools and processes, eg planning, measuring and marking out, cutting and shaping, joining and combining, finishing and evaluating;

- apply scientific skills, for example ‘predicting’ and ‘fair testing’;

- apply mathematical skills eg. Measuring to an appropriate number of decimal places, drawing and interpreting tables, graphs and bar charts;

- apply ICT skills, eg making things happen by use of control, handling information through using a database or spreadsheet, communicating information using a range of CAD, Dtp packages and e-mail and Internet technologies;
• apply art skills eg investigating texture and colour or recording visual information.

The challenge for Design and Technology Co-ordinators and teachers is to cover all of the content in good quality and thorough planning.
"Practical competence grows from the knowledge of how things work, partly gained from explanation and partly from the active manipulation of materials and components".

- From Hemming in Skilbeck 1984
Progress and Expectations

Where design and technology is taught most effectively the Co-ordinator, working with the Key Stage 1 teachers, will have planned a programme of work to ensure that by the end of the Key Stage most children will be able to:-

- use a range of materials to design and make simple products;
- select materials, tools and techniques and explain their choices;
- understand simple mechanisms and structures;
- measure, assemble, join and combine materials in a variety of ways using basic tools safely;
- investigate and evaluate simple products, commenting on the main features.

(Reference: Design & Technology National Schemes of Work KS1&2 - QCA 1998)

In the most effective work at Key Stage 2, children will be following a carefully planned programme of work developed by the co-ordinator and the Key stage 2 teachers to ensure that by the end of the Key Stage most children will be able to ;-)

- use knowledge and understanding of a range of materials, components and techniques to design and make quality products;
- evaluate work as it develops and, if necessary, suggest alternatives;
- produce designs and plans which list the stages involved in making a product, and list the tools and materials used;
- accurately measure, mark, cut, join and combine a variety of materials, working safely and recognising hazards to themselves and others;
- understand the use of electrical and mechanical systems and more complex structures;
- evaluate what is or is not working well in a product.

(Reference: Design and Technology National Schemes of Work KS1&2)

Progression

Best practice in teaching and learning begins with quality planning which is structured to teach children the knowledge, skills and understanding progressively. As children move through the Key Stages they will be ;-)

- increasing in knowledge, skills and understanding;
- moving from familiar to unfamiliar concepts;
- meeting needs which demand more complex or difficult solutions;
- increasing their own understanding of their learning.
Planning for Design and Technology

The Design and Technology Order underpins the planning for a range of activities and experiences which develop children’s knowledge and understanding of the world around them. Good planning is essential to developing pupils design and technology capability. There are three levels of planning within the subject;

- Long Term
- Medium Term
- Short Term

Long Term Plan

A Long term plan shows how the teaching units are distributed across all the years in both Key Stage 1 and 2 in a sequence that promotes curriculum continuity and progress in children’s learning. Planning at this level may well be undertaken in relation to the whole school curriculum plan to ensure that units link with work in other subjects.

At Christ the King R.C. Primary School pupils follow closely the Wirral Schemes of Work for Design and Technology. The D&T Co-ordinator at the school has cross-referenced the plan to units selected from the curriculum support material and has highlighted the link to the focus areas of Food, Textiles, Mechanisms, Structures and Control.

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<td>Context: Motorised Victorian Fair ground rides</td>
<td>Context: Moving Bridges</td>
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Good examples of planning are found in each of the schools featured in this publication. In some schools the planning is kept in design and technology files and folders by the Co-ordinator, and each teacher in the school will have a copy of the yearly plan for their class. In other schools the Key Stage plan is illustrated on a wall in the staffroom showing all subjects. In this way all teachers can see how work in design and technology can compliment, augment and link to the work going on in other curriculum areas.
**Medium Term Plan**

A medium term plan illustrates in more detail what will be taught to a particular year group in a given time period. This type of planning is also known as a unit of work. The planning identifies the learning objectives and outcomes for each part of the unit and suggests activities which will enable these to be achieved. A medium term plan usually shows a sequence of lessons which will promote progression through the unit along with an estimate of the time each unit will take to deliver. The class teacher would normally complete a medium term plan in discussion with the D&T Co-ordinator in order to ensure that there is a consistency within the units and that they promote progression from one year group to another.

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### Units of Work

Following the publication of the national Scheme of Work for Design and Technology Key Stages 1 and 2, (QCA 1998), a series of clear examples of medium term plans, or units of work have been produced. Whilst these are similar in content to the Wirral Schemes there are some noticeable differences in the organisation and layout of the content. Each of the units of work in the QCA Scheme are based on a planning model which organises the content in three sections:

1. **IDEA’s, FPT’s and DMA**

The three sections in each unit help to reinforce the concepts underpinning the design process. For example, in the investigative, disassembly and evaluative activities of the units children undertake activities which focus their attention on existing products, and how they work, how they are made and who might use them. This is very similar to the structure of many of the Wirral units of work although this is described as Products and Applications within the Wirral Schemes of Work.

Products and applications, focussed practical tasks, and design and make assignments are categories of teaching activities. They all feature in units of work because they make a differing but complimentary contribution to developing children’s design and technology capability.
An Example of a Medium Term Plan

The following example is from Christ the King R.C. Primary School and it follows on from Year 1 and 2 of the long term planning.

**AUTUMN TERM**

**UNIT 4 - Textiles**

Focus: Structures

**Learning Objectives:**
To develop understanding of the design process and the importance of teamwork
To develop understanding of, and skill in using techniques to join fabric

**IDEA:** Read - Little Red Riding Hood. What did she need a bag to able to do? examine a wide range of fastenings and joining techniques.

**FPT:** How to make a simple pattern. How to make a permanent join and use simple fastenings.

**DMA:** Design and make a bag for Little Red Riding Hood to carry some cakes to Grandma
(for further information see Wirral Scheme of Work KS1-Unit 4)

**UNIT - Breakfast Cereal**

Focus: Food

**Learning Objectives:**
To develop skills of sensory evaluation and making choices about ingredients chosen.

**IDEA:** story as stimulus - Tiger comes to the forest and has breakfast. What kinds of cereals do we eat at breakfast time.

**FPT:** How to weigh ingredients

**DMA:** Design a breakfast cereal for Tigger.
(for further information see Wirral Scheme of Work Food Technology KS1-Unit 28)

**SPRING TERM**

**UNIT I - Wheels and Axles**

Focus: Mechanisms

**Learning Objectives:**
To develop understanding of the role of wheels and axles in a basic mechanical system.

**IDEA:** Investigate a collection of vehicles for different purposes - how they move etc.
Identify components and their function and the sequence of building using construction kits.

**FPT:** Carry out a series of tasks to join wheels securely to axles.

**DMA:** Design and make a car to take teddy on a journey.
(For further information see Wirral scheme of works KS1-UNIT 1)

**SUMMER TERM**

**Unit 3 - Levers and hinges**

Focus: Mechanisms

**Learning Objectives**
To develop understanding of how a lever and hinge works

**IDEA:** Investigate how levers and hinges are used to make moving pictures in story books.

**FPT:** Make simple lever pictures, develop understanding of linear and rotational movement.

**DMA:** Design and make a face with a moving part
(for further information see Wirral Scheme of work KS1-Unit 3)

Examples of how Wirral schools have delivered a range of units of work are included in the schools section of this document.
Short Term Plan

Short term plans, or lesson plans as they are more usually known, are produced by each individual teacher. A short term plan builds on medium term plans but takes more direct account of the needs of individual children within a particular class and identifies the way in which activities will be delivered.

Planning to meet the individual needs of children within the classroom requires an assessment to be made of each child’s strengths and weaknesses in relation to the skills and processes needed for a particular task. In this way specific learning targets can be set for each child which progressively develop their D&T capability.

Development in skills may require carefully considered intervention by the classroom teacher. For example, if a child is likely to have difficulty cutting a piece of wood with a saw the teacher may plan to solve this problem by using masking tape or a G-clamp to provide more grip. Taking over the task, or asking another child to help, may also be options in this situation but the teacher will need to decide which intervention will help the individual child to make progress in the skill of sawing.

One of the challenges in delivering design and technology is that of organising the activity so that it is safe for pupils, the teacher, and other adults such as assistants and parent helpers. An example of how a colleague organises the children to undertake an activity is shown in the following lesson plan.

With any practical demonstration that is required in a lesson it is recommended that teachers try out the task themselves beforehand. This will help in gaining familiarity with the task and confidence in delivering it. It will also be very handy to show the stages involved in completing the task. The ‘here’s one I made earlier’ ploy favoured by TV presenters is actually a good way of demonstrating the sequence and identifying the possible pitfalls that children may have in completing practical tasks.

An example of a lesson plan which comes from (Unit I - Wheels and Axle) from (the Medium Term plan, which was illustrated earlier, is included in this section)

Good planning involves many people in a collaborative partnership - the classroom teacher, the D&T Co-ordinator and the Senior staff within the school. Good planning, as we have seen illustrated in this section is somewhat akin to peeling an orange. Its tough to get into but as you delve through each layer more and more of the juicy bits of what will actually happen in the classroom are revealed.
Lesson Plan

Unit: Wheels and Axles Time: 1 hour Year Group: Y1 and 2

Lesson Objectives:
• To develop understanding of how wheels are connected to an axle.
• To know that there are many different types of vehicles and that they have different features.
• To know that vehicles are made up of different parts/components.
• To develop graphic skill in making labeled drawings.

Lesson Structure:
1. Investigate collection of toy vehicles and some made from construction kits.
   • 'Pass the Vehicle' Activity (similar to Pass the Parcel in that children pass a vehicle around and each has to name a part, describe a feature, or answer a question from the teacher. Introduce a new vehicle as appropriate).
   • Questions during the activity are:- Why do vehicles have wheels?, Do all vehicles have the same number/size of wheels?, Which parts of the vehicle move?, Why are some vehicles different shapes?, How do you think the wheels join on to the vehicle?, Are they fixed or do they move freely?, What stops the wheels from falling off?, Do the wheels turn at different speeds or in different directions?
   • Individual Activity
     Children to draw picture of the vehicle on the prepared sheet. In the 'close-up' box make a drawing to show how the wheels join to the vehicle.
     Prior to adding labels to the drawings - go through matching names to parts. Use flashcards to remind children of following words; wheel, axle, window, roof, light, engine.

Differentiation
Children work in ability groups within the class
Blue group - Work with classroom assistant and use 'card frames' to isolate wheel and axle joint during close-up drawing. Use prepared sheets with printed labels at side. Draw a line to the correct word at the adding labels stage.
Orange Group - Using prepared sheets make drawings of side, front and underneath of the vehicle. Add labels using ruler and hand written label.
Green Group - As above but also using prepared sheet describe the vehicle eg. What material is the vehicle made from, what is it used for, which parts move, how are the wheels joined to the axle?

Resources
Collection of vehicles eg. Coach, van, lorry, tractor, car, construction kit models
Investigation drawing sheets for each group.
Pencils/coloured pencils, rulers, flashcards, 'Wheels on the bus' music and tape recorder.

Learning Outcomes
Children
• Identify wheels and axles and explain how they work.
• Make drawings of vehicles and describe how they work.
• Use appropriate vocabulary to describe vehicle features.

'A Celebration of Best Practice'
What Makes A Good Design and Technology Lesson

Both OFSTED and the NAAIDT (National Association of Advisors and Inspectors in Design and Technology) have identified the qualities that are most commonly found in good Design and Technology teaching. They are;

- Each design and technology activity is well planned and has clear aims and learning objectives which are shared with the children.

- The teaching programme is carefully structured to include a range of effectively sequenced activities in which children investigate, disassemble and evaluate products and processes, undertake focussed practical tasks and apply their developing knowledge and skills in assignments in which they design and make products.

- Teachers are confident in their knowledge and understanding of the aspect of design and technology that they are teaching and teach with enthusiasm.

- Teachers set high expectations so as to challenge children and deepen their knowledge and understanding, often demonstrating this through probing questions and demonstrations.

- Time and resources are used effectively. Safe and hygienic routines are promoted and children are well managed to achieve good standards of discipline and personal safety.

- Children’s work is assessed thoroughly and constructively and assessments are used to inform further teaching and learning strategies.

- Children are highly motivated and enthusiastic about design and technology and have a sense of achievement at all stages of a project or unit of work.

By contrast a poor design and technology lesson may have some, or all, of the following characteristics.

- practical activity which requires children only to make products to designs produced for them and does not significantly advance their design and technological capability.

- makes insufficient or unstructured use of product analysis, where pupils ‘investigate disassemble and evaluate’ products which is unrelated to designing and making activities.

- pupils spend excessive time colouring in design sheets or work sheets, and/or make unnecessary drawings of components or ingredients.

- features group work which is in name only, where roles and expectations are not clear and collaboration is not fostered.
One of the keys to determining whether design and technology is effective is to look at the results of the teaching. This means looking at the children’s work to determine the standards of attainment and the rate of progress that each individual child is making. The attitudes to learning and the response of the children to the lesson also provide clear indicators about the quality of the design and technology curriculum they are receiving. A checklist to show the indicators that OFSTED Inspectors look for when judging an effective design and technology lesson are included below.

Examples of quality design and technology experiences are included in this publication in the section on individual schools. The photographs illustrate the outcomes of the units of work and the text goes some way towards explaining the process and sequence of learning that the pupils experienced.

Further information on standards of Design and Technology at Key Stage 1 and 2 can be found in the following publications;-

‘Quality Through Progression in Design & Technology’- published by the National Association of Advisors and Inspectors of Design & Technology (NAAIDT) and available from;-

The Design & Technology Association (DATA)
16 Wellesbourne House
Walton Road
Wellesbourne
Warwickshire
CV35 9JB

‘Expectations at Key Stage 1 & 2 - Design and Technology’ - published by the Qualifications and Curriculum Authority. The booklet can be ordered from the QCA publications unit.
Promoting Design & Technology

Design and technology, whilst still a relatively new subject has nonetheless begun to develop a distinct identity. As the subject has evolved there is a clear need to continue to inform and communicate what design and technology is, the standards that are achieved, and the contribution it makes to the development of all children.

Pupils have overwhelmingly taken to design and technology and clearly enjoy the experiences and challenges it provides. Increasingly teachers have found the in-service training and curriculum resources very useful and are becoming more confident in delivering D&T in classrooms. Information about the subject is being communicated to parents and governors through the work that the children produce and through the explanations that they give when asked about their work. Displaying pupils work is a valuable tool to not only publicly celebrate achievements, but also to communicate to all the standards that are expected and the vast range of creative and innovative work that comprises design and technology. Displays can also be used to highlight the sequence of the project or unit of work. This can make a good teaching point as it reinforces the ‘design process’ and emphasises the value of all sketches, ideas, bits of research, prototypes and testing that need to be carried out before arriving at a finished product.

Wirral schools have been advised to keep a ‘portfolio of standards’. Such a portfolio may include for each year group the work produced by three students representing the high, middle and low grades. In this way a very comprehensive record of standards will be available to assist planning and to demonstrate progression across the Key Stage. A number of schools have used digital cameras and ordinary photographs as a means of recording the finished product which the children value greatly and want to take home with them.

A number of Wirral Primary Schools have already begun to gather together examples of children’s written work and their drawings. A number of schools have used digital cameras and the more traditional photographs as a very useful means of recording the stages in the design and manufacturing process as well as the end product. Cameras have been used very effectively to record children’s work in the Food Technology units of work at a number of local schools.

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"I like design and technology - its fun. I want to be a D&T teacher when I grow up."

- Ryan
Age 7
Children at Overchurch Junior School were digitally photographed as they undertook each stage of the process of making their own healthy drinks. In this photograph they are testing the drinks currently available and which their new product would have to compete with. Their challenge was to improve on the taste and appearance of children's drinks and produce a healthy alternative product.

This display of design and technology work in a Reception classroom was initially inspired by the children’s reaction to the story of Incy Wincy spider. The teacher developed a unit of work around the story which focused on the materials and techniques involved in making three dimensional hairy spiders. The whole process involved in making the spiders was displayed. Parents regularly visited the classroom to collect their children and to talk to the teacher and this display was not only admired but helped to raise awareness of design and technology.

The finished products that children produce can be very bulky and difficult to display given the rarity of space in most classrooms. Open shelving has been pressed into use as a special Technology display stand for these Tudor houses produced by Year 4.

The difficulties of storage of work in progress and the display of large numbers of finished products is yet another factor which has to be taken into account by D&T Co-ordinators when arranging the timetabling or sequence of units of work across the Key Stage.

Effective display of design and technology work is often a challenge but happily it is one which is being addressed in many innovative and creative ways in Wirral schools.
"The teaching of quality design and technology in our schools is a vital requirement for the country's future in the 21st century."

- James Dyson
Classroom Organisation

Careful preparation and attention to the details of the lesson plan, and the needs of individual pupils are the essential skills that many experienced teachers have built up throughout their careers. The way in which they organise their classrooms to enable a variety of activities to take place is also a major skill which is rarely shared beyond the classroom walls. Here for the first time are examples of how they deliver design and technology.

Organising the Classroom for Group

Work In this lesson at Pensby Infants the teacher has arranged the Year 1 and 2 classroom to take place after break. This enables the teacher to rearrange the room in preparation for group work. The children’s task is to work in groups of 4 or 5 to make a 3D large scale ‘Iron Man’ using reclaimed materials and a range of permanent fixings. In a corner of the classroom in Cathcart Street Primary children from Year 5 and 6 make use of a workshop bench to cut and assemble wood.

Teacher Demonstrations

Prior to the teacher demonstration taking place the resources have been gathered together - full size tools for the teacher, small tools for the children to use as they fit the hand better and give them more control. Safe and hygienic practises are demonstrated. Demo’s can be given to the whole class but they often are more effective when used with small groups of children, as this photograph from Christ The King R.C. Primary illustrates.

At Bromborough Pool Primary the class teacher has organised the resources for the lesson in such a way as to encourage the children to become more responsible and independent in making decisions about what they will use and when they will use them. This organisation also allows the teacher to move around the room supporting individual children, monitoring progress and challenging some children to explore ideas in more depth.

Construction Areas and Mechanics Workshops are just two of the many ways in which Wirral teachers have organised their classrooms to enable children to use construction kit resources safely and conveniently.

One of the difficulties in providing opportunities for children to use construction kits is the tremendous cost of these resources. This makes it virtually impossible for all the children in the class to use the same construction kits at the same time. Teachers have overcome this problem by creating designated areas within the classroom for

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small groups of pupils to use for making products using Duplo, Mobilo, wooden blocks, K’nex, Bauplay etc. In both cases ‘entry’ to the construction area or mechanics workshop is highly prized by the children who are very keen to have their turn and who also learn to work co-operatively with each other. The teacher keeps a record of which children have had experience in using the mechanics workshop and ensures that throughout the term everyone in the class had an opportunity to use construction kits.

Textile materials need to be carefully stored for fire safety purposes and yet easily accessible for children to use in Design and technology work and in other subjects. At Dawpool Primary children have access to a rummage box which is kept in a central resource area. ‘Interactive’ displays which encourage the viewer to press buttons, turn cogs or which ask stimulating questions are a good way of motivating children.

In this display about construction at Ganneys Meadow the children get involved and begin to make a range of fantastic structures using the duplo construction kit pieces from the display.

Another way of stimulating children to investigate how products are designed and manufactured is to provide a gadget table or an area of the room designated as a research centre. In these areas children would access a ‘handling collection’ of products such as a range of toys that move, or, different kinds of slippers, or chairs. The results of these investigations could be used to inform their own designing and making.

Each of the various aspects of organisation illustrated here offers a glimpse at at the way in which colleagues organise their room, the children, and themselves to deliver the subject in a highly professional and effective way. Building in opportunities to see other colleagues at work is a very rewarding form of in-service training.
The Schools Section

This section highlights the work of some of Wirral’s Primary schools and it shows how they have undertaken particular units of work. Every year group in Key Stage 1 and Key Stage 2 is featured in this section along with examples of work from Early Years.

In addition some Wirral schools, identified by Ofsted as providing outstanding design and technology have volunteered to provide almost a ‘virtual visit’ around their classrooms to show how they deliver the subject across the whole school.

Each of the schools have features, identified earlier in this document, which demonstrate ‘best practice’ in teaching, classroom organisation, planning, and promotion of design and technology.
Ganneys Meadow Early Years Centre is a DfEE recognised Early Excellence Centre providing an integrated service of education and care for young children aged 0 - 5 years and their families. It is situated in the Woodchurch area of Wirral. There are 87 full time equivalent pre-school places within the centre.

Children at Ganneys Meadow are provided with learning opportunities in which they find out and learn about the world in which they live. These experiences include asking questions about how things work. Some building work on the school site prompted teachers to set up a display about a construction site. The children played with the toys on display, talking about what they were doing and making connections with the actions of the construction workers, the cement mixers, lorries and building work that was going on literally outside their classroom window.

The children experience investigating and using a variety of construction kits, materials, tools and products. They develop making skills such as cutting, folding, mixing, joining and building for a variety of purposes. Along with this they have many opportunities to handle appropriate tools and construction materials safely and with increasing control.

The children work with food and staff have made use of the Wirral Food Technology Resources for Key Stage 1 and Early Years. In addition they have developed their own ideas and resources and the children enjoy a broad and varied range of experiences.

In the photographs you can see the two to three year olds being supported in using equipment as they help to prepare corned beef hash.
The children at Leasowe Nursery undertake a range of guided work with construction kits. This develops co-ordination skills and enables the children to gain experience in joining materials together and in assembling components, identifying shapes and size and in interpreting aural and pictoral information. They are also able to interact with each other and learn to work together and to help and support each other when engaged in a task in pairs or small groups.

The children experience a range of different construction kits such as duplo, mobilo and bauplay. Character sets of duplo have been purchased to fit in with the theme of dinosaurs that the three and four year olds are exploring in a broad range of learning activities.

Parents were invited in to an open day and they worked with the children to make large and stable tower structures before going on to make push along vehicles.

The children work well together and they have made a number of large scale constructions such as road and track layouts that cover as large an area as possible. They have used the constructions they make to play on with cars and trucks. As they use the things they have constructed they make changes and improvements to their original design, modeling the changes quickly and easily using the kits.
YEAR GROUP: Nursery
Unit: ‘Incy Wincy Spider’

At Pensby Infants School, the Nursery class had been introduced to the story of ‘Incy Wincy Spider’ in their Literacy work. The children’s interest in the antics of ‘Incy Wincy’ provided the motivation for undertaking this unit of work. The aim of the unit was to develop knowledge of the working characteristics of materials and how to plan and sequence the making. The children had an idea of what ‘Incy Wincy’ should look like, and the class teacher showed them how to make a spider body and legs using wool and pipe cleaners. The children wrapped the wool around a card disc or plastic lids to create the body. As each spider began to take on its own identity, stick-on eyes were added to ‘bring Incy Wincy alive’ like the character in the book.

The children were keen to complete their spider and were fully involved in the display of their work. They each wrote out a part of the story of Incy Wincy Spider which was displayed in sequence along one side of the classroom. They suggested the need for a water spout around which they placed their spiders. A large display to show how the spiders were made, the raw materials they were made from, along with the process of manufacture became a focal point for comment and discussion between the teacher, the children and their parents. The children learnt how to develop their ideas of what an ‘Incy Wincy Spider’ should look like by shaping and assembling materials and components. They discussed their work as it progressed making suggestions about how to proceed and considering each stage as it developed.
YEAR GROUP: Year 1  
UNIT OF WORK: Levers and Tabs

Bromborough Pool is a small school of 76 pupils, situated on the banks of the River Mersey in the village of Bromborough Pool. It is surrounded by industrial units and cranes from the nearby docks. The Levers and tabs unit built on an earlier focused practical task which involved making cards with a simple moving part using tabs. The next stage of the project introduced the Year 1 class to the sequence of developing and improving initial ideas and applying them in a slightly different context. The class teacher, Mrs Boden, introduced the pupils to a new problem, ‘how could the clowns hat be moved up and down’.

The children made a sketch of the clown face with tabs, and after discussion with the teacher, they went on to collect the resources they would need to model the face using different shaped pieces of card and fastening materials. When they had modelled the design in card, each child turned the model over and drew the back to show how the tabs and levers interconnected.

The children are able to select materials and equipment independently due to the excellent organisation of resources.

The clowns were modelled in card and attractively painted and crayoned.
Ted Hughes story of ‘The Iron Man’ and an investigation into permanent and temporary fastenings provided the inspiration for the development of this unit of work by a combined Year 1 and 2 class.

Work began with a focused investigation into how things were joined together. This introduced the concept of permanent and temporary fastenings. In groups of 3 - 4 the children experimented with ways of joining the arms, legs and head onto the torso of a paper ‘Iron Man’. They used string, staples, rubber bands, glue, and treasury tags. They tested each joint and made notes about the effectiveness of each fastening.

This first stage of the project was displayed in the corridors around the classroom. The idea was then ‘scaled-up’ and the children were given a design and make challenge to use their knowledge of fastenings to design and make an ‘Iron Man’ display to promote the book during the National Year of Reading. The display was to be located in a particular area of the classroom. At this stage the children worked in groups of five and six to develop their skills in working with others.

Skills such as careful measuring and marking out were developed and the groups assigned tasks to ensure everyone had something to do.

All of the groups made an ‘Iron Man’ and built on their knowledge and understanding of fastenings, skills in using materials and equipment, and awareness of how to work together.
UNIT OF WORK: Structures                      Unit 6: ‘Making a Picture Frame’

This very short unit of work is closely directed by the teacher and includes an analysis of existing picture frames a focused practical task and a design and make assignment. Prior to the lesson the teacher assembles all the materials and equipment in order to ensure a well organised start to the lesson.

The Year 2 children have been investigating the construction of picture frames and have been given a brief to design and make a picture frame as a gift item to appeal to a relative. They are shown how to make a wooden picture frame using square section jelutong and assembling the framework using the ‘jinks’ construction method. This involves using triangular card sections to reinforce the corner joints. The teacher demonstrates how to mark out the work prior to cutting and how to use the saw safely.

As the children begin the task of measuring wood and using the saws the teacher is able to move around the group guiding and supporting children where necessary. The classroom has been organised into areas for cutting, gluing and decorating the picture frames.

The children move around the room to complete each stage in the manufacturing.

Children applied decoration to the frames to reflect the specific interests of the user. They used various decorative techniques such as paint, glitter and glue or wrapped wool or string around the frames.
West Kirby Primary School have followed the Wirral Scheme of Work for Design and Technology since it was introduced. However, since the introduction of the Literacy Strategy curriculum time for Design & Technology, and other Foundation subjects, has had to be reduced. This has necessitated a revision of the D&T Scheme of Work. The Year 2 bags unit has remained in the Scheme of Work as it provides an opportunity to work with fabrics and develops understanding of making a template / pattern, measuring, cutting out and assembling materials.

The children began the unit by investigating existing bags to find out what materials they were made from, how the bag was joined together, what kinds of fastenings were used and who might use it and for what purpose. The children made drawings of the bags and showed details of fastenings. The children undertook two focused practical tasks. They were shown how to make a pattern and how to use different stitching to join materials securely and to provide decoration. Following this the children were given the design brief; ‘To design and make a bag for a purpose’. They developed ideas and made drawings and plans which indicated style features, and made a pattern to the correct size.

They produced step-by-step plans to explain the sequence of actions they would need to follow to make the bag. The children worked together, in pairs, to construct their bags and helped each other with the pattern making, cutting out, and helping to position and sew the fabric edges, zips, handles and velcro. When finished the bags were checked and seams and fastenings tested.
Prior to beginning work on the Moving Vehicles unit the Design and Technology Co-ordinator produced a booklet for each child to complete to record their investigations and the development of their design ideas.

The booklet helped to promote a positive and professional image of the subject. The children valued their booklets and took pains to ensure that their ‘best work’ was recorded in them. Not only did the booklets provide a portfolio of developing designs and planning, they also contained an evaluation and a digital photograph of the moving vehicle model that each child helped to design and build.

The children spent some time on a focused practical task investigating how the energy released by twisted elastic bands could harnessed to provide a power source to make the model move. They went on to apply their knowledge and skills in a design and make task in which they produced a moving vehicle for a particular purpose.

The children’s designs included tractors, army trucks, black vans and cars.
Year Group: Year 4  UNIT OF WORK: 3D Cube - Unit 11

St George’s Primary School is one of the largest in Europe with over 800 pupils on the roll. The Design and Technology Co-ordinator is Jenny McIntyre who is also the IT Co-ordinator. With this unit of work Jenny has developed the design and make activity to link to, and support, children’s learning in history. The project began with an investigation into the construction of Tudor buildings and houses. This introduced the context to the children and enabled them to investigate further the methods of construction, the materials and appearance of Tudor houses.

The children then undertook a focused practical task in which they built on earlier experiences of manufacturing 2D frameworks to construct a 3D structure. They were shown how to record on 1cm squared paper a cutting guide for the lengths of square section timber that they would use. They were taught how to use a mitre saw to cut angles and make mitre joints.

The children worked in groups of two and three to make the houses. Plans to show the sequence of construction were made by the groups and construction jobs/tasks were allocated by the children. Each child’s investigation and research, cutting plans, house designs, manufacturing plans and evaluation sheets were collected together and made into a booklet.

The children produced drawings to show the design of the front and side elevations of the Tudor house.
Children at Cathcart Street Primary School undertake a wide range of activities in the Key Stage 1 and 2 programme of work for design and technology. In this unit of work the children have investigated what a gear does and how they work using construction kits. This gave them a further opportunity to explore how gears mesh, the direction they travel and the speed at which they travel. They have also investigated how cams can be used to transfer movement.

The children were introduced to the design and make activity, (DMA) and given a design brief. They developed their ideas through sketches and ‘hands on’ modeling using construction kits. They tested the prototype products they made to see how well they worked and made modifications to improve performance.

The children went on to make a framework and to build the moving mechanism applying their knowledge of gears and cams and using the practical skills of measuring, cutting and joining materials that they learnt earlier in the Key Stage. At the end of the project all the models were tested and a major evaluation took place to highlight further improvements that could be made.
Overchurch Juniors

YEAR GROUP: Year 6

UNIT OF WORK: Food - Unit 17 ‘A Healthy Drink’

Year 6 children had to design and make a new product, a ‘healthy’ fruit drink. They began the task by finding out about competitors’ products. They undertook sensory testing of a range of commercially produced drinks and compared their taste. They presented the results of the taste tests in a chart.

This project emphasised the vast amount of investigation and research work that goes into new product development in the food industry. The children investigated the effect of differing amounts of water on the strength and taste of fruit squash drinks.

They worked together in ‘development teams’ during the investigation and manufacturing stages and each child developed designs for a fruit drink. The chosen design was manufactured and the children were taught about health and safety and the need to follow safe and hygienic practises when producing food products.

Each child evaluated the drink and the process they had worked through.
YEAR GROUP: Year 6
UNIT OF WORK: Structures

Children in Year 6 undertook a special unit of work on structures condensed into a one day ‘hands on’ activity session in the school hall.

An external group of Architects were brought in to work with the children for the day. Children worked in teams to investigate tension and compression and how these forces could be controlled in the design of a large framework structure. They demonstrated how large canes could be fastened together to make strong and stable components. They showed how the triangular components could be used to reinforce the larger shapes of the structure.

As the children went through each stage of the project they saw how components could be joined together using temporary fastenings. They saw how large structures were built from components and they worked to a large scale that they had not previously experienced in design and technology lessons.

Photographs show Year 6 working together to create a huge structure.

The one-day session enabled the children to undertake an exciting and relevant activity which delivered all of the knowledge, skills and understanding normally associated with unit 18 of the Wirral Scheme of Work for design and technology.
Design and Technology in Key Stage 1

Christ The King RC School is a voluntary aided primary school based in Bromborough. Children in the two Reception classes undertake a range of design and technology activities to fit in with a termly theme. The current theme is Sunshine and Showers and children are making simple linear movement pictures which visually illustrate the theme.

Within the classroom are ‘construction areas’ where a variety of different construction kits are used to challenge and extend the children’s experiences. A large construction area shared between both reception classes has related theme activities and children are encouraged to experiment and explore ideas for making things. At the moment the area is a Garden Centre.

Children in Year 1 and 2 have been making ‘Jack Frost Masks’ as a joint project with Art. The children have used mouldable materials, paper mache on box corners bases to make features and have applied a decorative finish using paint and textiles.

Year 2 explored different ‘fastenings’ when they made their ‘hungry caterpillars’ linked to their literacy work. They made 2D wooden picture frames and used construction kits to explore structures.

The children have also investigated moving toys and have modeled their ideas using construction kits and components.
In Year 4 and 5 children worked in groups to make a 3D structure. They made a 3D cube and learnt how to make a structure more rigid and stable using triangulation. They then added card cladding to the framework cube structure and applied a variety of surface decoration techniques to the make Tudor homes. This allowed the children to apply the information that they had researched in history in a practical way to make the Tudor homes. They also learnt how to work co-operatively sharing tasks and resources.

Earlier in the year the children had been introduced to the concept of making things move using fixed and moving pivots, levers, and simple linkages. They built upon this understanding of linkage mechanisms when they made pop up books and cards with moving pictures.

Using this very simple and quick method to model ideas they produced a range of storybooks to illustrate things that were real and imaginary situations.
Dawpool C.E. Primary is a small school situated in the rural village of Thurstaston. There are 7.5 teachers and a headteacher and 230 children. The school is well supported by parents with many coming in to help with lessons. The Design & Technology Co-ordinator post is rotated every five years. The current D&T Co-ordinator is Pauline Evans who took over shortly before the recent visit from Ofsted.

Year 4 worked in teams of three or four to investigate basic pneumatics in unit 12. They designed and made a penguin with a moving arm, a Roman soldier who could raise his arm holding a dagger, and a whale that spouted water.

Their work built on earlier units in which they had made flowers and vehicles move using pneumatics. “All the children really seem to enjoy Design and Technology as it gives them an opportunity to turn their ideas into reality.” - Pauline Evans

The children really enjoy their D&T work and the staff take time to ensure it is displayed well.

Photos show from top: Yr2 at work drawing, making and class evaluation of their moving models.

Yr.1 - Unit 4 Textiles: The finished bags are put on display

The Reception class designed shoe-box bedrooms.
Year 5 and 6 designed and made motor powered buggy's. They also produced an instruction book which showed the step-by-step process of assembly. The models were well made and care was taken to create a high quality finished product. The class had a buggy race to test the models speed and performance.

Photos show from top: A couple of the finished motorised buggy’s and a selection of the design sheets and step-by-step guides. A Yr. 1 display of clown faces to illustrate the Levers and hinges unit.

Below: The study of materials and their properties is a key part of Design and Technology and provides a good opportunity for links to the science curriculum.

Good quality display is a feature of the school. The displays celebrate the achievements of all children in Design & Technology.
"The children's enthusiasm for design and technology, the satisfaction they get from making their moving faces and bags has given me more confidence to try new areas and set them greater challenges"

- Design & Technology Co-ordinator
- From a Wirral Primary School
FEATURES OF ‘GOOD PRACTICE’ CHECKLIST

- Samples of work from each year group across the whole school are collected into a portfolio of standards. The standard of the portfolio is regularly monitored and discussed by the Co-ordinator and the Senior Management Team.

- Designated areas for activity are built into classrooms, i.e. A ‘Mechanics Workshop’ or a ‘Food Manufacture and Production Line’, in order to emphasise how design and technology is applied in real life, and to motivate and enthuse children.

- Clear records are kept by the Co-ordinator to show the planning for each Key Stage, and each year group. Each class teacher retains their plans for each design and technology lesson.

- Resources are well organised and easily accessible to teachers and children.

- Health and Safety Policy and Guidance are communicated to all staff at regular school INSET sessions and practised by staff and children in the classroom

- Teachers and children are enthusiastic and keen to take on the next design and technology challenge.
Credits

Our thanks to the Headteachers, Design and Technology Co-ordinators, teachers, and children from the following schools for allowing us the opportunity to share their work more widely.

Bedford Drive Primary School
Bromborough Pool Primary School
Cathcart Street Primary School
Christ The King R.C. Primary School
Dawpool C of E Primary School
Ganneys Meadow Early Years Centre
Greasby Juniors Primary School
Leasowe Nursery
Pensby County Infants School
St Georges Primary School
Overchurch Juniors
West Kirby Primary School