CURRICULUM LINKS ON THE WEBSITE

http://www.chemsoc.org/networks/LearnNet/thats-chemistry.htm

The material below is included in the website with up to date curriculum links.

This book is not intended to be a scheme of work, but is a manual of ideas, activities and investigations about the science of materials for teachers to use with primary children. They may add to or offer an alternative to those already being carried out in schools. All the activities have been trialled, although in accordance with good practice should be tried by the teacher before using them with a group of children.

The book systematically covers the concepts dealt with in the Year 2000 revised Science Curriculum, Attainment Target 3, Materials and their Properties for England and Wales. It also is referenced where appropriate to the Science Curriculum for Northern Ireland and Environmental Studies 5-14 Curriculum for Scotland. It covers the chemistry, and some of the physics, studied in primary schools.

Each chapter begins with scientific background knowledge appropriate for the concepts covered in that section and these are intended to help the non-specialist teacher. There is a suggested vocabulary to introduce to children and a list of science skills.

Key ideas or learning intentions are followed by a variety of activities described in some detail. These are intended to help children to develop an understanding of the concepts by taking part in a practical activity themselves or watching a demonstration. Each set of activities may be targeted at a particular year group according to the Statements of Attainment in the curriculum. Some ideas however, begin with activities for younger children and continue with those for older children, in order to develop the concept further. Extension ideas are often offered for more able children. The intention is for teachers to select activities that best suit their children, school and classroom circumstances.

The activities' section always ends with a list of safety considerations, and in some cases additional reference is made to this within the section. It is a good idea to get into the habit of discussing hazards and risks with the whole class, especially for situations which may be particularly hazardous. This is also a statement in Science Attainment Target 1, Scientific Enquiry, of the National Curriculum.

LITERACY

Poetry and stories star* poems have been selected and included for all of the chapters. In addition, other poems and stories have been suggested in the resources section at the end of this book, to link particular scientific concepts with the language curriculum. The star* poems have been given specific Literacy Strategy links in this number form, the YEAR, TERM and then the STATEMENT from the strategy. So that 1. 3. 4. refers to year 1, term 3, statement 4. There are also very general statements from the strategy that are common to many poems which have not been mentioned specifically eg performing poetry, collections by a specific author.

Non-fiction Throughout the primary school, children are expected to experience non-fiction writing, which will often have a cross-curricular theme with a specific genre. Some suggestions have been made for these and are dependent

on the suggested activities in the chapter and the age of the children carrying them out. For example, year 4 term 3 requires children to design an advertisement for a product. This might follow a science activity on dissolving and jelly making.

INVESTIGATIONS AND SCIENTIFIC ACTIVITIES

Most of the ideas presented may be carried out in a variety of ways. These include demonstrations by the teacher, investigative and explorative activities and part or whole investigations.

Practical activities such as researching a topic, illustration (eg following instructions for crystal growing), observation, surveys, learning skills (using a thermometer), and handling secondary data are not investigations. They are valuable scientific activities, which may carry specific, skills-based learning intentions. Most of the time however, they can be incorporated into investigative and explorative activities where pupils are encouraged to make increasingly more choices and decisions for themselves. This is a valuable way of learning scientific and key skills, and building children's confidence to eventually carry out a full, independent investigation.
Investigations involve a set of scientific skills such as identifying a problem or need, planning the process and equipment, carrying out the task, observing and recording results and concluding from the results. This is time-consuming, so children should experience it when it is most appropriate, not all the time. Suggestions for investigations have been made in the book where they are particularly suitable.
In the revised orders for the Science Curriculum 2000 in England and Wales, there is a reference in Attainment target 1 that across Key Stage 1 and 2 children should experience different types of investigations. This is because the interpretations of the previous curriculum have led to children often only experiencing 'fair testing' type investigations such as 'How does temperature affect dissolving'?
Not all investigations are this type where variables are the focus. Scientists carry out a variety of investigations where the skills of planning, carrying out the task, recording results and concluding are needed. Whilst the investigation must be carried out in a scientifically 'fair' way, changing maybe one variable, the focus maybe on another skill, depending on what is appropriate eg pattern finding.
Children should experience a varied diet of investigations. The following give examples of other different investigation types:

(1) **Classifying and identifying,** eg which materials are magnetic? What is this small creature, its name and type?

(2) **Exploring.** Observations of an event over a period of time, eg germinating seeds or the development of frog spawn.

(3) **Pattern seeking.** Observing, measuring, recording then carrying out a survey to see if there is a pattern, eg do tall people have the longest legs?

(4) **Making things or developing systems.** This maybe a combined science/technology investigation, eg designing and making a traffic light system.

(5) **Investigating models,** eg does the mass of a candle increase or decrease when it burns?

There are many ICT opportunities that can be used in investigations eg data handling.

Many non-investigative activities may be turned into investigative ones if it is appropriate to do so by changing the task title. For example an illustrative activity such as making carbon dioxide using Alka-Seltzer and water can be made into an investigation by posing the question, 'does the amount of Alka-Seltzer used affect the amount of carbon dioxide made?'

USING ICT TO ENHANCE TEACHING AND LEARNING

Today's scientists model, measure and report on their experiments and they do this using a variety of ICT software. Children developing their scientific understanding also need to do these things. As they work they need to record their ideas, assemble data, perform measurements and communicate their thoughts and findings to others. In a modern world 'content free' ICT tools, ie word processing/spreadsheet packages etc, are crucial to this process. The use of such software allows the young scientist to focus on the science involved and not on elaborate drawing or time-consuming colouring-in of graphs.

To this end, this book has pointers, in the margins, towards opportunities for the use of ICT. The icons next to the activities are indications of the opportunities to use generic software to enhance teaching and learning in the contexts indicated. There are many different types of 'content free' pieces of software available that allow users to communicate and handle information to support work in primary science. It is important to be able to distinguish between the types so that decisions can be made about their suitability for specific purposes.

COMMUNICATION

The software tools used for communicating fit into the categories below. All have different functions but most will allow for the communication of information in text, graphics and sound.

- Word processors
- Graphics packages
- Presentation tools
- Multi-media authoring packages

Word processors can store both text and images and allow these formats to be reviewed. They are simple to use, can be accessed quickly and the data in them amended. Modern word processors are also good at handling text, graphics and sound making them useful multi-media tools. Tables built in a word processor are exceptionally useful for clarity of collation of information. It is possible to use a conventional word processor with a 'find' option to do some careful 'key word' sorting of collected data.

Graphics packages allow the creation and storage of images. Each child drawing a picture from observation and then saving it so that the images can be reviewed and re-ordered would be a good KS1 model.

Presentation packages such as MS PowerPoint allow for the input of text and images and these can be easily ordered and displayed. Sound and video can also be added here. It is important to remember that data is not just text and numbers but can be sound, still image, moving image and animation.

Multi-media authoring packages allow for many different kinds of information to be combined together to make a sensory experience out of searching and accessing information. The World Wide Web and the CD-ROM are manifestations of this idea.