

How ICT may contribute to teaching and learning in primary science

Teaching may be enhanced and learning considerably enriched through ICT. Pupils may independently use tools such as sensors, microscopes and software applications to handle data, simulate processes, present and communicate their findings. ICT enables learners to detect and analyse patterns and trends in data that they have collected. Spreadsheets and graphing software enable learners to present data visually. ICT tools such as light sensors and temperature probes enable accurate measurements that would otherwise be at risk of significant error.

ICT can help pupils to:

- access up-to-date statistics, images and factual sources using the internet
- obtain accurate measurements in experiments and investigations
- collect data over a period of time
- investigate real-life problems in an authentic context
- control variables in models and explore the effects
- explore simulations which animate, simulate or model a physical process, directly, safely and in depth
- store, retrieve, analyse and graph a range of data
- access a range of online resources to promote and support independent research
- plan, select and present their work using text, graphs, pictures, sound or video
- record all stages of an investigation, from initial questions to final outcomes
- evaluate processes and refine their work.

Digital still photography and video have an important role. The youngest pupils may use a digital camera to record evidence, for example of the first signs of Spring. The Intel QX5 microscope (first allocated to schools in the QX3 version as part of Science Year 2002) features time-lapse photography, enabling pupils to record processes such as the germination of cress seeds. The Digital Blue movie camera may be used to record experiments in real time, contributing to pupils' recording of their work.

Data logging equipment enables pupils to make accurate spot measurements, typically of temperature, sound and light levels. Tables of results and line graphs of change over time are automatically produced by the software. Features of graphs may be labelled using the text tool, focusing on the interpretation of key features.

Logging may be carried out in real time (with computer connected to the logger) or remotely. The logger may be set up to collect data (e.g. in the classroom overnight) and connected to the computer later, to download and display. Used well, sensors add depth, challenge and substance to the work. Pupils employ higher-order thinking skills as they interpret, discuss and hypothesise.

Interactive whiteboards are now in many teaching areas. Learning resources online and on CD Rom may be shown, with full audio, to the whole class. Using the TASC planning format, the teacher may outline the stages of an investigation, capturing children's prior knowledge and questions using the writing tool. Data may be recorded and saved as the investigation proceeds. The large display also enables the whole class to see the progress of an experiment, for example the emergence of a 'cooling curve' as insulated containers are tested using stainless steel temperature probes connected to a data logger.

There are websites which provide continuous live data and a 'window' into natural processes that would otherwise be extremely difficult to observe. An excellent example is the RSPB webcams:

www.rspb.org.uk/webcams/, projects such as the South East Grid for Learning Bird Box enable pupils to record their own observations and contribute to a large scale collaborative project:

www.segfl.org.uk/birdbox/.

The Becta Schools site contains advice, case studies and short 'inspire me' features:

<http://schools.becta.org.uk>

The Kent NGfL website contains case studies and ideas for using ICT effectively in Science:

www.kented.org.uk/ngfl/subjects/science/

BBC Science Clips provides a free, interactive resource, with simple models and simulations related to physical and natural processes:

www.bbc.co.uk/schools/scienceclips/

Inclusive Science and Special Educational Needs provides advice and resources, with an online version of the interactive CD:

www.issen.org.uk

For further information and exemplars, visit the 'National Curriculum in Action' website:

www.ncaction.org.uk/subjects/science/ict-lrn.htm

Further information is available from the Association for Science Education:

www.ase.org.uk