



ICT in Science at Key Stage 3

Science stimulates and excites pupils' curiosity in the world around them and satisfies this curiosity with knowledge. The National Curriculum encourages linking practical experience with ideas by evaluating explanations through experimental evidence and modelling. Pupils are taught to understand how science contributes to technological changes impacting on industry, business, medicine and quality of life. ICT plays an important part in scientific investigation.

The QCA Schemes of work

The QCA schemes of work identify three main areas of ICT activity that are required to support work in Science. These are:

- Data analysis using spreadsheets and database.
- Monitoring using data loggers with a variety of probes.
- Using CD-ROMS and the Internet for research.

Spreadsheets are used for recording experimental data and for data analysis using graphs. Databases are used to look for trends in data. They may be pre-prepared or be written by pupils based on fieldwork or research.

The following paragraphs identify the science units where ICT is needed and give a brief description of how it is to be used. Some example of specific CD-ROMS and Internet sites are available on the software lists. Further links between ICT and Science can be found on page 19 of the Teacher's guide in the ICT scheme of work.

7A Cells

Using CD-ROMs to explore cell structures. Using the Internet to examine images of cells.

7B Reproduction

Using a Data handling package to create graphs showing ranges e.g. height/weight.
Using CD-ROMs to find out information on fertilisation.

7C Environment & feeding relationships

Using CD-ROMs illustrating diets of animals. An opportunity to use Datalogging equipment e.g. Weather station to confirm readings. Using a Data handling package to create a database from the information gathered. Using the Internet for an Interactive field trip- web cams from the Internet

7D Variation & Classification

Use a spreadsheet to produce graphs of variation for particular features. A tree database can be used for classification of results. A database or spreadsheet can be used to collect data to create and analyse graphs following their investigations into differences in species.
Use CD-ROMs and the Internet to observe a variety of plants and animals in motion.

7E Acids & Alkalis

Datalogging will obtain pH values using pH sensors. Using Inspiration to create a concept map showing connections between different ideas in a particular topic. The Internet can be used for information about uses and hazards of acids and alkalis.

7F Simple chemical reactions

Produce an Information leaflet using a word processor or DTP package to present observations.

7G Particle Model Of Solids Liquids And Gases

Use simulation software on CD-Rom showing three-dimensional models to illustrate particle arrangement and movement.

7L Solar system and beyond

Use CD-ROMs and the Internet to reinforce their knowledge. Use a spreadsheet to present evidence of relationships in data on aspects of planets. Produce a travel brochure using a word processor or DTP package.

8A Food & Digestion

Use CD-ROMs and the Internet on Diets to explore the constituents of food, and to show simple molecules. Use a spreadsheet or database to produce and interpret graphs from the data collected.

8B Respiration

Use CD-ROMs and the Internet to research e.g. the heart structure, or movement of blood and how organisms exchange gases with the environment.

8C microbes & disease

Datalogging can be used with pH sensors to monitor changes in pH in milk.

8D Ecological relationships

Datalogging can be used to monitor changes in environmental factors. A Video/digital camera could be used to make a record of habitats and organisms found. PowerPoint can be used to present their results on how they carried out their work. Use CD-ROMs and the Internet to research information on environmental conditions.

8E Atoms & Elements

Using CD-ROMs and the Internet to look at simulations and structures of elements.

8F Compounds & mixtures

Produce a leaflet using DTP about air reminding them about the importance of organising facts. Datalogging using a temperature sensor to monitor evaporation and boiling points of liquids.

8G Rocks & Weathering

Use a digital camera to generate time-lapse photos of granite in a solution, and use a PowerPoint presentation to explain changes.

8I Heating & Cooling

Datalogging using temperature sensors to monitor the experiments. Use CD-ROMs to investigate states of matter.

8K Light

Use a Data logger with light sensors to measure light transmitted through materials. Use CD-ROMs and the Internet to investigate and explain everyday reflections. Use Paint software for colour mixing. Use a spreadsheet to produce line graphs from their findings.

8L Sound & Hearing

Use a Data logger with sound sensors to extend pupil's ideas about sound. Use CD-ROMs to review work in this section.

9A Inheritance & Selection

Use graphing software and spreadsheets to record results and present data. Use CD-ROMs to provide software simulations on gametes and fertilisation, on plants for gardening reference work.

9C Plant & Photosynthesis

Use Datalogging with an oxygen probe demonstrate photosynthesis is taking place. Use an Intel QX3 microscope for time-lapse photography to show actions taking place. Interpret & draw conclusions from data and present results using tables & graphs. Construct a flow chart showing the process of photosynthesis.

9D Plants for food

Use spreadsheets, tables and graphs to process results. Use CD-ROMs and the Internet to find information on weed killers and on food production. Show how control Technology can be used to control conditions in a greenhouse.

9G Environmental Chemistry

Exchange information about local conditions using email. Use CD-ROMs to research global warming. Use Internet sites on volcanic eruptions and acid rain as a source of information.

9H Using Chemistry

Use CD-ROMs for simulation software to research activities in power stations, and about chemical elements. Results can be presented using a spreadsheet.

9J Gravity & Space

Use CD-ROMs and the Internet for simulation software to research on the solar system and weather satellites.

9K Speeding up

Use datalogging with light gates to measure different speeds of vehicles, use a spreadsheet to graphs results and for interpretation of speed/time graphs.

Long term Planning

The main ICT skills needed by pupils for science are how to use a data logger. Unit 7 (Measuring Physical Data) of the ICT scheme of work, fits in well with Unit 7C (Environment & feeding relationships). ICT work in year 7 should give pupils the skills they need for using spreadsheets and presentation packages in their science work in years 8 and 9. It is worth considering teaching ICT Unit 5 (Data) early in year 7 because of the amount of data handling opportunities in the year 7 science scheme of work.

Hardware

Data loggers are an essential hardware requirement along with light, temperature, sound, pH, and humidity sensors. An oxygen probe and light gates may also be useful. Data loggers should be capable of remote logging if they are to be used for fieldwork or if there are limited amounts of computers available in science labs.

Assessment

Unit 7C may be taught as a joint science/ICT unit and ICT skills will need to be assessed. In all other units the ICT should be seen as a means to an end and only the scientific aspects of the work should be assessed e.g. the interpretation of a computer generated graph should be assessed rather than the quality of the graph. It is important that pupils understand the concepts of drawing graphs and making accurate measurements before they use data loggers and graphing programmes.

QCA Unit of work	Application	Located
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7B Reproduction		
7C Environment & feeding relationships		
7D Variation & Classification		
7E Acids & Alkalis		
7F Simple chemical reactions		
7G Particle Model Of Solids Liquids And Gases		
7L Solar system and beyond		
8A Food & Digestion		
8B Respiration		
8C microbes & disease		
8D Ecological relationships		
8E Atoms & Elements		
8F Compounds & mixtures		
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8I Heating & Cooling		
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