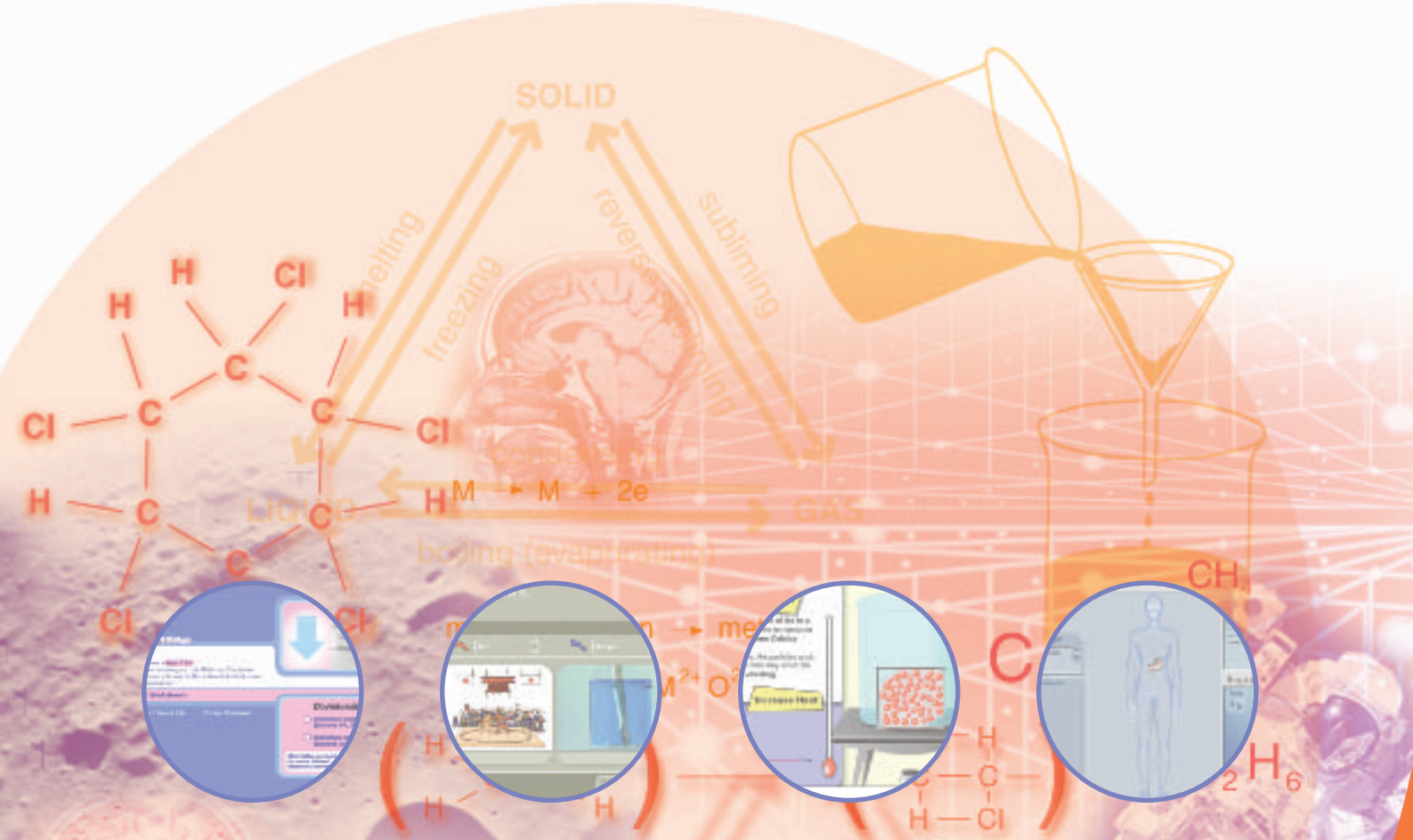
Becta
ICT Advice
Promoting Effective Practice



Using web-based resources in Secondary Science

Using web-based resources in secondary

The internet has many useful resources to support secondary science. You can bookmark these resources and use them offline, or download them and adapt them to meet the teaching and learning of specific key objectives. The examples given here describe a number of lessons in which ICT is used effectively to support the teaching and learning of science at Key Stages 3 and 4. The examples show just one of the many ways in which these web-based resources can be used. They are just that – examples of how the resources could be used. You will have your own ideas which will be just as relevant as those given here.

When planning your science lessons you will probably want to start with the National Curriculum statements, or those learning objectives in your own scheme of work. When planning Key Stage 3 lessons reference should also be made to the yearly teaching objectives from the Key Stage 3 Framework and/or the learning objectives set out in the DfES/QCA exemplar scheme of work for Key Stage 3. ICT should be chosen as a resource only if it will support the lesson's learning objectives. When used appropriately ICT can enhance teaching and learning, for example, by providing animations and video clips of the concepts involved, which can help pupils to understand scientific phenomena. ICT can also give pupils and teachers an opportunity to use a model to change variables and investigate the effects in situations that are impossible to create in the classroom.

If you have access to a projector and a large-screen, or liquid crystal display (LCD), ICT can enhance the learning of a whole class because pupils then have access to a shared experience. For example, you can demonstrate how to use a datalogger to collect and analyse data (for instance, changes of mass when an acid reacts with carbonate salts) and display the information graphically, or model concepts and ideas using software simulations and video. Pupils can benefit from the interactive nature of the technologies to explain and present their work.

The role of the teacher is paramount in raising standards in science. When ICT is used as a demonstration tool it allows teachers to:

- show scientific concepts and models
- explain and ask questions
- stimulate discussion
- invite interpretations of what is displayed
- encourage individuals to give a response, explanation or make a prediction.

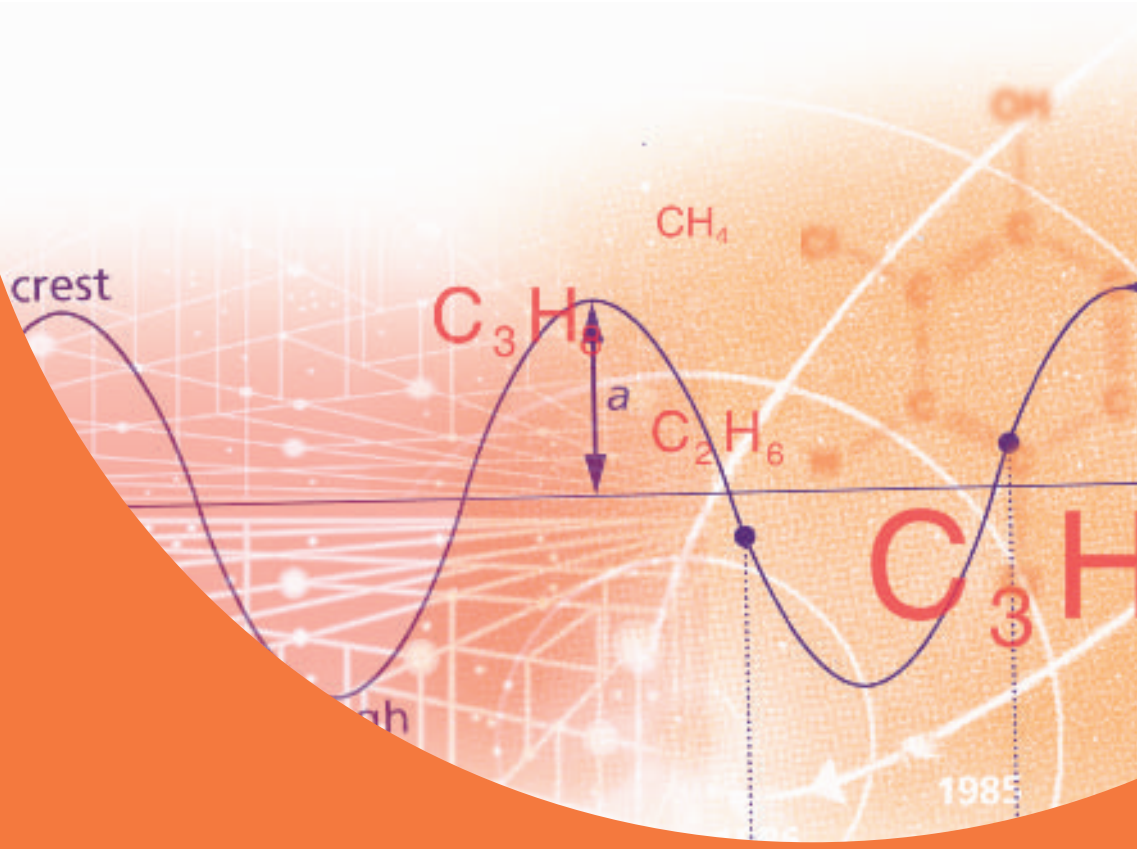
All web addresses have been checked and were correct at time of printing.

science

ICT can also be used to enhance individual learning, with structured tasks and activities focused on scientific ideas. ICT can be used just as effectively in the plenary session where children can demonstrate and explain what they have learned and display their work. The key to success in all of these applications is the quality of the whole-class discussion about the observations and their implications. The class should be encouraged to:

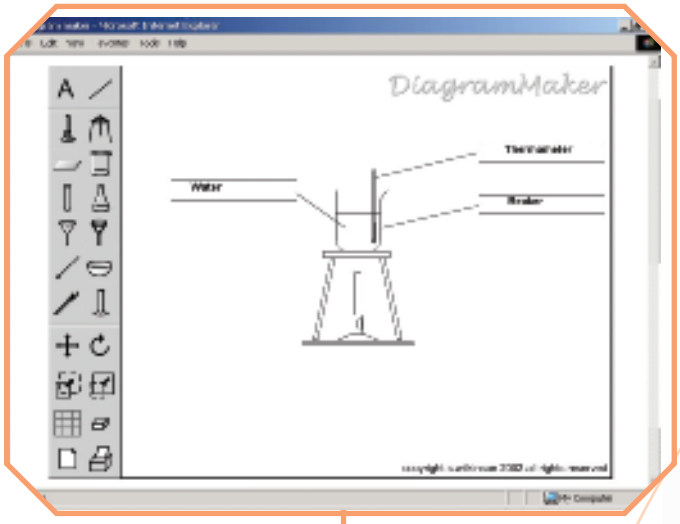
- ask questions, predict and hypothesise
- observe, measure and record, and manipulate variables
- interpret results and evaluate scientific evidence
- present and communicate their findings in a variety of ways.

Just as you select appropriate science activities for your pupils, you need to select computer activities that involve appropriate levels of ICT skills. If the pupils are struggling with a new aspect of technology this may have a negative effect on their learning in terms of science. The science lesson should not normally be used for teaching new ICT skills – with the possible exception of datalogging. ICT skills – learning how to use a spreadsheet for instance – should not be taught within science lessons.



You can view all of the web-based resources online at:
www.ictadvice.org.uk/webbasedresources

Secondary Science



DiagramMaker – ASE/NASEN ISSEN online CD-ROM KS3

A useful drawing tool for both teachers and pupils.

URL: **http://www.ase.org.uk/sen/resources/onlinelab/diagrammaker.html**

Relevant to:

Scheme of work
Unit 7H – Solutions

National Curriculum
Sc1 – Scientific enquiry: investigative skills

2a use scientific knowledge and understanding to turn ideas into a form that can be investigated, and to decide on an appropriate approach

2c carry out preliminary work and to make predictions, where appropriate.

When planning a lesson for an investigation about dissolving, the teacher discussed with the pupils the possible variables that could be investigated and presented them with a range of equipment that could be used.

When asked to draw a scientific diagram of the set-up of the equipment they had chosen to use, some pupils went to the computers to use DiagramMaker. This enabled them to produce accurate, tidy diagrams that could be labelled, printed off and included as part of their write up of the final investigation.

As a starter activity, the teacher asked a Year 7 class to write down the names of the planets in the solar system. Displaying the solar system 'jigsaw' from the BBC website, the teacher asked if they could name a planet, identify it and put it into the correct position. Using an interactive whiteboard, pupils were asked to drag and drop the planets in the correct order from the Sun outwards. Having completed the jigsaw, the teacher used the animation of the planets to stimulate discussion on how the planets differed in:

- appearance (size, structure)
- orbit (speed, distance from the Sun).

The pupils were then asked what they thought it would be like on other planets, for example, surface, temperature, atmosphere, day length, and year length. Using the BBC website the pupils were asked to either:

- write a travel brochure for future visitors to their chosen planet

OR

- identify 10 things you want to know about a planet and find the answers.

An alternative site (Planet Science) was recommended for pupils to look for additional information [**http://www.scienceyear.com/wired/index.html?page=/planet10/index.html**].

Space – BBC KS3

BBC Space is aimed at Key Stage 3 and 4 pupils aged 11 to 16 years. It covers the solar system, the life of stars, and information on other space topics.

URL: **http://www.bbc.co.uk/science/space/solarsystem/index.shtml**

Relevant to:

Scheme of work
Unit 7L – The solar system and beyond

National Curriculum
Sc4 – Physical processes: the Earth and beyond

4a how the movement of the Earth causes the apparent daily and annual movement of the Sun and other stars

4b the relative positions of the Earth, Sun and planets in the solar system

4c about the movements of planets around the Sun and to relate these to gravitational forces.

Human Torch – ASE Science Year – Online CD-ROM KS3

Students are challenged to solve a mysterious case of burning using their scientific skills, whilst learning about safety and chemical reactions.

URL: **http://www.sycd.co.uk/can_we_should_we/ ht/home.htm**

Relevant to:

Scheme of work
7F – Simple chemical reactions

National Curriculum
Sc1 – Scientific enquiry: ideas and evidence in science

1a about the interplay between empirical questions, evidence and scientific explanations

1b that it is important to test explanations by using them to make predictions and by seeing if evidence matches the predictions

1c about the ways in which scientists work today and how they worked in the past, including the roles of experimentation, evidence and creative thought in the development of scientific ideas.

Sc1 – Scientific enquiry: investigative skills

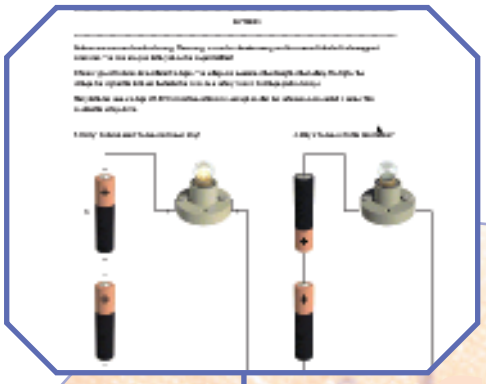
2o consider whether the evidence is sufficient to support any conclusions or interpretations made.

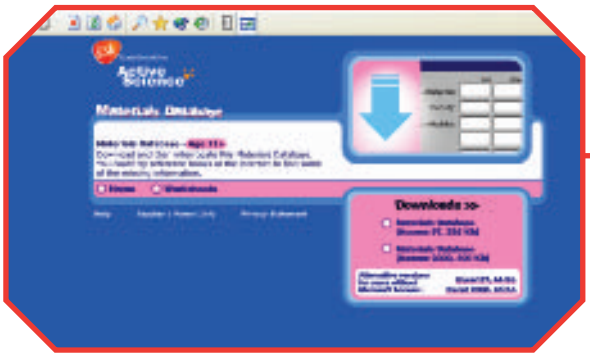
The teacher used this interactive adventure as an imaginative way to reinforce some of the concepts associated with burning and combustion and, more importantly, to introduce the concepts and ideas of scientific enquiry.

Human Torch begins with a short dramatic video scene showing a victim who burned to death under bizarre circumstances. (This was shown on the interactive whiteboard.) The pupils then began to investigate the case using the computer activities. They collected evidence at the crime scene, tested clues in a simulated laboratory, and questioned experts.

During the activity they gained points as they learnt about the science surrounding chemical reactions and about safety. They recorded their notes on the pupil worksheets [**http://www.sycd.co.uk/can_we_should_we/pdf/human_torch/torch_pupil.pdf**]. The notes were compared and discussed before the class went on to perform the burning investigation experiment. To solve the crime and complete the tasks they used the second computer-based lesson, Human Torch Lesson 2.

Secondary Science





Crocodile Clips – Science Year KS3

Free software from Crocodile Clips Limited. This downloadable simulation software allows users to construct their own model circuit.

URL: **http://www.crocodile-clips.com/m6_4_1A.htm**

Relevant to:

Scheme of work
Unit 7J – Electrical circuits

National Curriculum
Sc1 – Scientific enquiry: investigative skills

2g make observations and measurements, including the use of ICT for datalogging to an appropriate degree of precision.

Sc4 – Physical processes: circuits

1a how to design and construct series and parallel circuits, and how to measure current and voltage

1b that the current in a series circuit depends on the number of cells and the number and nature of other components and that current is not 'used up' by components

1c that energy is transferred from batteries and other sources to other components in electrical circuits.

A teacher used this program as an extension to practical work with a Year 7 class. The class had already carried out work on simple circuits by constructing and comparing parallel and series circuits. The teacher demonstrated how the program worked using a computer and a projector.

The program enabled the class to construct circuits which required more, and different, components than they had used practically.

The pupils were set the task of constructing different circuits with components in series and parallel. They were encouraged to add different components to their circuits such as variable resistors and buzzers. They were then asked questions such as: "In which circuit are the bulbs the brightest?" – "What happens to the buzzer as the slider on the variable resistor is moved?"

Placing the cursor on the circuit displayed the voltage and current. Pupils were asked to note the current at various points in the circuits; pupils were then asked: "How does the current change in a series/parallel circuit?"

In the plenary session, the teacher showed the class a series circuit and, using the cursor, displayed the value of the current at a certain point. The pupils were then asked whether the current would be greater or smaller at another point on the circuit. This was then repeated for a parallel circuit.

Graph Shots – ASE Science Year – Online CD-ROM KS3

This resource looks at speed and distance time-graphs based on the motion of football players during a game (with live action video clips).

URL: **http://sycd.co.uk/dtg/**

Relevant to:

Scheme of work
Unit 9K – Speeding up

National Curriculum
Sc4 – Physical processes: force and linear motion

2a how to determine the speed of a moving object and to use the quantitative relationship between speed, distance and time.

Using an interactive whiteboard, the teacher introduced the activity and gave the pupils a support sheet on which to summarise their findings [**http://sycd.co.uk/only_connect/pdf/graph-shots/dt_pupil.pdf**].

Working in pairs at computers the pupils worked through the different sections. The pupils watched the video and discussed how the footballer was moving and how this would be displayed graphically. They then selected one of the graphs that matched the motion. They continued to work through the sections, having their understanding tested with more multiple choice questions based on the movement in the football action.

Materials Database – Active Science KS3

Active Science from GlaxoSmithKline has a number of activities for Key Stage 1 to 3. This is a downloadable database of materials.

URL: **http://www.activescience-gsk.com/resources/index.cfm?module=8**

Relevant to:

Scheme of work
Unit 8E – Atoms and elements

National Curriculum
Sc3 – Materials and their properties: classifying materials

1a how materials can be characterised by melting point, boiling point and density

1d how elements vary widely in their physical properties, including appearance, state at room temperature, magnetic properties and thermal and electrical conductivity, and how these properties can be used to classify elements as metals or non-metals.

Before the lesson the teacher downloaded the database and worksheets from Active Science. Using the database and some of the ideas from the worksheets, a Year 8 class compared the properties of materials and elements. The teacher split the class into groups setting them different tasks:

- Find materials for a specific situation, having been given a list of conditions.
- Find materials to match certain criteria and then determine the most appropriate, with reasons.
- Compare physical properties.

During the plenary session, each group presented its findings to the rest of the class.

(For work on all of the elements, a database can be downloaded from the Virtual Teacher Centre [**http://vtc.ngfl.gov.uk/docserver.php?docid=1387**].)

Secondary Science

The Human Body – BBC KS3

An interactive drag and drop activity which involves placing the body's organs in the correct position.

URL: **http://www.bbc.co.uk/science/humanbody/body**

Relevant to:

Scheme of work
Unit 8A – Food and digestion

National Curriculum
Sc2 – Life processes and living things: humans as organisms

2b the principles of digestion, including the role of enzymes in breaking down large molecules into smaller ones

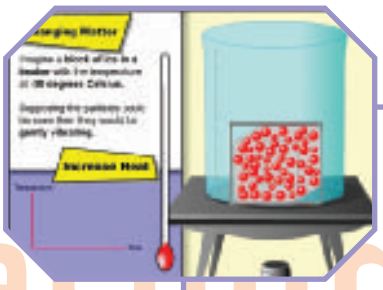
2c that the products of digestion are absorbed into the bloodstream and transported throughout the body, and that waste material is egested.

As a starter activity, a Year 8 teacher used an interactive whiteboard with the BBC's Organs Game. The teacher asked pupils in turn to select one of the organs from the list and position it in the body. When a pupil selected an organ from the digestive system, the teacher asked the rest of the class to explain its role. Using the 'Did you know?' feature the class read about each organ and noted any interesting information they had not already learned.

As part of the main activity, the class had to complete a worksheet previously downloaded from the Teacher Resource Exchange [**http://tre.ngfl.gov.uk/server.php?request=cmVzb3VyY2UuZnVsbHZpZXc%3D&resourceId=192**]. The worksheet had been adapted so that pupils could label the organs of the digestive system and describe the function of each organ using the information they had gained from the starter activity.

In the plenary session, the teacher used an interactive diagram of the digestive system from the Schoolscience website [**http://www.schoolscience.co.uk/content/4/biology/medicines/medicine5.html**] to show the correctly labelled digestive system.

The explanation of the organ's function given on the Schoolscience website was used to 'mark' what the pupils had written on their worksheet.



Changing Matter – Birmingham Grid for Learning (BGfL) KS3

An online animation of a model of the particle theory of matter as water changes state.

URL: **http://www.bgfl.org/bgfl/activities/intranet/ks3/science/changing_matter/index.htm**

Relevant to:

Scheme of work
Unit 8I – Heating and cooling

National Curriculum
Sc1 – Scientific enquiry: investigative skills

2g make observations and measurements, including the use of ICT for datalogging to an appropriate degree of precision.

Sc3 – Materials and their properties: solids, liquids and gasses

1b how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state, gas pressure and diffusion.

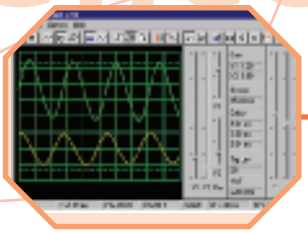
A Year 8 class was investigating changes of state. The pupils were working in pairs with several pairs recording temperatures for one of the following:

- Ice as it melts
- Water as it boils
- Salol as it melts
- Salol as it freezes

As the material they were investigating changed state, pupils measured and recorded the temperature every half-minute. The data was then plotted on a graph.

In the following lesson the teacher used a temperature sensor and datalogger to demonstrate changing ice into steam. The datalogger was connected to a PC and a projector was used to project the data onto the board.

During the plenary session the teacher asked the class questions: "How are the particles arranged in the solid/liquid/gas?" and "What happens to the particles as the solid/liquid/gas is heated?" To illustrate the answers, the teacher ran through the model on the BGfL website.



Torches and Colours – ASE/NASEN/ISSEN – Online CD-ROM KS3

This is a series of interactive demonstrations that teachers or students can use to reinforce ideas relating to light.

URL: **http://www.ase.org.uk/sen/focus/torches.htm#resource**

Relevant to:

Scheme of work
Unit 8K – Light

National Curriculum
Sc1 – Scientific enquiry: ideas and evidence in science

1b that it is important to test explanations by using them to make predictions and by seeing if evidence matches the predictions.

Sc4 – Physical processes: light and sound

3e that white light can be dispersed to give a range of colours

3f the effect of colour filters on white light and how coloured objects appear in white light and in other colours of light.

Online Digital Oscilloscope KS3

This downloadable tool converts a PC into a dual-trace oscilloscope.

URL: **http://polly.phys.msu.su/~zeld/oscill.html**

Relevant to:

Scheme of work

Unit 8L – Sound and hearing

National Curriculum

Sc1 – Scientific enquiry: ideas and evidence in science

1b that it is important to test explanations by using them to make predictions and by seeing if evidence matches the predictions.

Sc4 – Physical processes: vibration and sound

3j the relationship between the loudness of a sound and the amplitude of the vibration causing it

3k the relationship between the pitch of a sound and the frequency of the vibration causing it.

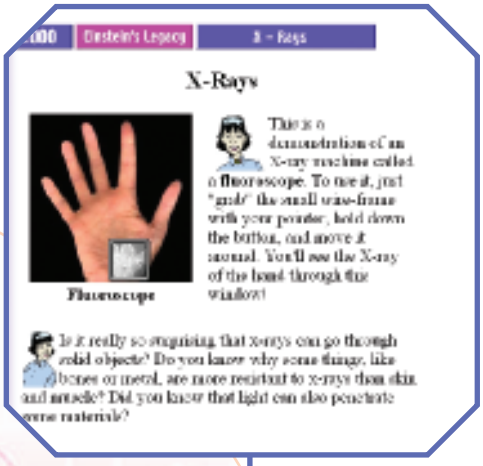
Having introduced the ideas behind sound being a wave, the teacher opened the digital oscilloscope resource, displaying the output on a digital projector. Using the speakers of the laptop computer as a microphone to sense the sound, the waveform outputs for different musical instruments and sounds were displayed on the screen.

Using the digital oscilloscope meant it was easier to see the results, freeze the waveforms and discuss the differences. Loud, quiet, high and low pitched sounds could be compared emphasising the key learning objectives. The pupils were encouraged to take part in these demonstrations, predicting the patterns, playing the instruments and singing into the microphone.

In a plenary session, a teacher used these simulations to summarise the key points following on from practical experiments in which the class looked at different coloured objects through filters.

The pupils were asked questions such as: "What colour does blue sky appear when viewed through a red filter?"

The children were able to clarify their understanding as the ideal simulated results were displayed using a digital projector. The teacher used the simulation to investigate how objects appeared in different coloured lights and how objects' appearance changed when different coloured lights were added. The children were asked to predict the results. They compared the results with the outcome of their original experiments and discussed any differences.



Electromagnetic Waves – Physics 2000 KS4

This site is an interactive journey covering modern physics. The section 'Einstein's legacy' covers the electromagnetic spectrum.

URL: **http://www.colorado.edu/physics/2000/index.pl**

Relevant to:

National Curriculum

Sc4 – Physical processes: the electromagnetic spectrum

2c that the electromagnetic spectrum includes radio waves, microwaves, infrared, visible light, ultraviolet waves, X-rays and gamma rays

2d some ways in which microwaves, infrared and ultraviolet waves are used and the potential dangers of these

2e some uses of X-rays and gamma rays in medicine

2f that radio waves, microwaves, infrared and visible light carry information over large and small distances, including global transmission via satellites

2g the difference between analogue and digital signals.

Before starting a unit of work with Year 11 on the electromagnetic spectrum, the teacher set the class homework. The task was to research the properties and uses of the electromagnetic spectrum.

The teacher recommended several sites one of which was Physics 2000. (Other sites included the BBC [**http://www.bbc.co.uk/schools/gcsebitesize/physics/waves/electromagneticspectrumrev1.shtm**] and NASA [**http://imagine.gsfc.nasa.gov/docs/science/know_l1/emspectrum.html**].)

Those students who did not have internet access at home were able to use the school's computers during the lunch breaks or after school (homework club). The time allowed for the homework recognised that not all students were able to access the internet immediately.

Having collected the information, the students were asked to produce a presentation on one type of radiation, its properties, how it is used, and its potential dangers. Each presentation was then shown to the class.

Science

Chemwars – ASE Science Year – Online CD-ROM KS3

This site uses video clips of displacement reactions shown alongside an animation of a Sumo wrestling contest.

URL: **http://www.sycd.co.uk/chemwars/index.htm**

Relevant to:

Scheme of work

Unit 9E – Reactions of metals and metal compounds

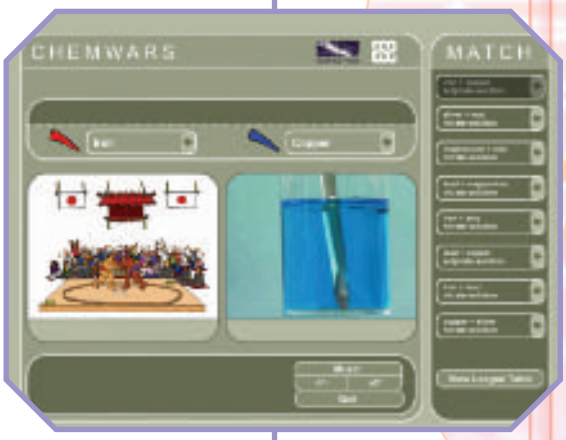
National Curriculum

Sc3 – Materials and their properties: metals

3a how metals react with oxygen, water, acids and oxides of other metals, and what the products of these reactions are

3b about the displacement reactions that take place between metals and solutions of salts of other metals

3c how a reactivity series of metals can be determined by considering these reactions, and used to make predictions about other reactions.



Using an ICT suite, the teacher used this resource as an introductory lesson to the reactivity series. (The pupils had some awareness of the reactivity series from their prior studies though they had not performed all the displacement reactions.)

The teacher showed the video clips of displacement reactions (alongside the animation of a Sumo wrestling contest). When displacement occurred the defeated Sumo wrestler was pushed out of the ring, to the great amusement of the class. The pupils were asked to predict the outcome of the contest and bet on each bout, accumulating points according to the results. The results of the bouts enabled them to form the reactivity series for the metals. The children recorded their findings onto pupil worksheets [**http://www.sycd.co.uk/aka_science/pdf/chem-wars/chemwars_pupil.pdf**] as they progressed through the different reactions.

The plenary session discussed the pupils findings and their versions of the reactivity series. (Teacher's notes can be found at [**http://www.sycd.co.uk/aka_science/pdf/chem-wars/chemwars_teach.pdf**].)

Cell Cycle – Inside Out KS4

An online quiz activity in which pupils match diagrams representing the stages of mitosis with the correct description.

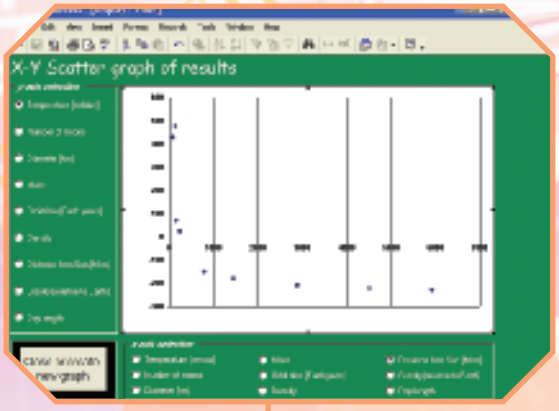
URL: **http://insideout.rigb.org/insideout/dna/index.html**

Relevant to:

National Curriculum

Sc2 – Life processes and living things: cell activity

1b how cells divide by mitosis during growth, and by meiosis to produce gametes.



Planets Database – Virtual Teacher Centre KS4

This Access database contains information on the planets in the solar system. It can be downloaded from the Virtual Teacher Centre on the National Grid for Learning.

URL: **http://vtc.ngfl.gov.uk/docserver.php?docid=1380**

Relevant to:

National Curriculum

Sc1 – Scientific enquiry: considering evidence

2k use diagrams, tables, charts and graphs, and identify and explain patterns or relationships in data.

Sc4 – Physical processes: the solar system and the wider universe

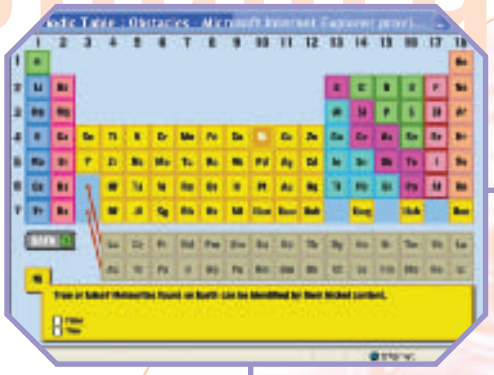
4a (3a) the relative positions and sizes of planets, stars and other bodies in the universe [for example, comets, meteors, galaxies, black holes]

4b (3b) that gravity acts as a force throughout the galaxy.

When covering mitosis with a GCSE class, a teacher introduced the topic using the animation on the Cells Alive website [**http://www.cellsalive.com/mitosis.htm**].

Using a data projector linked to a PC the teacher explained the stages of mitosis using the animation. Working in pairs the class was then asked to complete the cell cycle on the Inside Out site [**http://insideout.rigb.org/insideout/dna/how_do_we_grow/index.html**].

Students were encouraged to discuss the cell cycle and then record the stages of mitosis on an electronic worksheet.



The Periodic Table – Obstacle – Inside Out KS4

An online activity in which pupils answer questions about the elements in the periodic table in an attempt to 'cross' the periodic table (similar to the 'blockbusters' game).

URL: **http://insideout.rigb.org/insideout/elements/periodic/index.html**

Relevant to:

National Curriculum

Sc3 – Materials and their properties: the periodic table

3a that there are approximately 100 elements and that all materials are composed of one or more of these

3b that the periodic table shows all the elements, arranged in order of ascending atomic number

3c the connection between the arrangement of outer electrons and the position of an element in the periodic table

3d that elements in the same group of the periodic table have similar properties

3e how the properties of elements change gradually from the top to the bottom of a group, illustrated by the study of at least one group.

This lesson was taught in a computer suite that had an interactive whiteboard. When starting a unit of work on the periodic table with a Year 10 class, the teacher used Obstacle from the Inside Out website as a starter activity. This gave the teacher an idea of what the class already knew about individual elements, and it allowed him to introduce the structure of the table and use terms such as 'group' and 'period'.

The main activity of the lesson was about investigating the properties of an element. The teacher asked the class to visit the Periodic Table of Comic Books and select a metal that they knew something about [**http://www. ky.edu/Projects/Chemcomics/**].

The pupils were asked to read the references to the chosen metals and decide whether the properties of the metal 'character' were accurate. The pupils were able to refer to other online periodic tables, such as Schoolscience [**http://www.schoolscience.co.uk/periodictable.html**], to check any data they were unsure of. (Another periodic table can be found on the Web Elements site [**http://www.webelements.com/webelements/index.html**].)

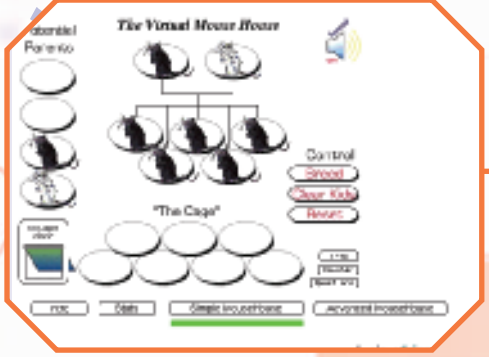
As an introduction to the plenary session, the teacher played the elements song [**http://www.privatehand.com/flash/elements.html**], and then data on the metals was collated and possible patterns discussed.

A physics teacher downloaded the database to the school server to allow students to access it from the computer suite.

The teacher introduced the class to the database and showed them how to produce a graph of (planet) temperature against distance from the Sun. The students were then asked to explain the pattern they observed using scientific knowledge.

Working in pairs, the class was then asked to investigate possible relations between the variables. Where patterns were observed the students were asked to identify the type of relationship (linear, inversely proportional) and suggest a scientific reason why this was so.

In the plenary session, pairs of students were asked to demonstrate a graph they had produced and to explain what this showed to the rest of the class.



Seismic Waves – Matter KS4

This interactive site provides information and online activities on seismic waves. Animations show the difference between transverse and longitudinal waves. It includes activities for locating the epicentre of an earthquake and measuring the Earth's core.

URL: **http://schools.matter.org.uk/Content/Seismology/index.html**

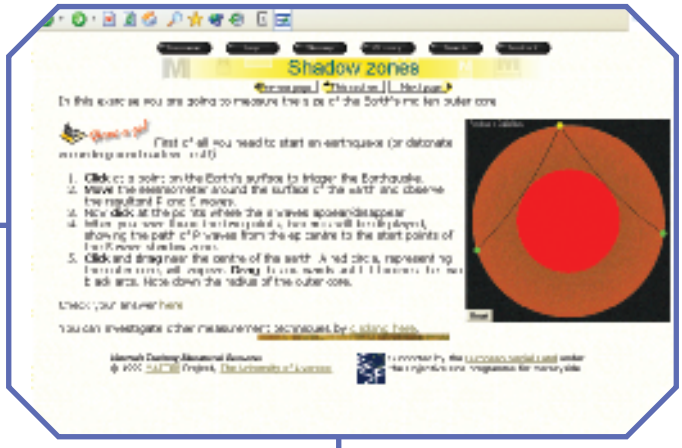
Relevant to:

National Curriculum

Sc4 – Physical processes: seismic waves

3m that longitudinal and transverse earthquake waves are transmitted through the Earth and how their travel times and paths provide evidence for the Earth's layered structure

3n that the Earth's outermost layer, the lithosphere, is composed of plates in relative motion, and that plate tectonic processes result in the formation, deformation and recycling of rocks.



The computer suite was used for this GCSE lesson on seismic waves. The teacher used the 'matter' website throughout the lesson for whole-class teaching and for group work.

Using an interactive whiteboard, the teacher introduced the topic by using the simulation of longitudinal and transverse waves and asked the students to predict what would happen to the wave as the frequency and amplitude changed.

The class was then asked to study the sections on seismometers and 'volunteers' were asked to explain to the others how these worked and what they measured.

On the interactive whiteboard the teacher demonstrated one of the differences between P and S waves using animation from the website.

Working in pairs, the students were then asked to carry out the activities to measure the Earth's core and find the epicentre of an earthquake.

In the plenary session, students were invited to use the whiteboard to show the class how they had completed the activities and reached their answers.

Mouse Genetics – Explore Science KS4

An online activity to breed mice to study the effect of recessive and dominant genes.

URL: **http://www.explorescience.com/activities/Activity_page.cfm?ActivityID=39**

Mirrored site **http://webphysics.ph.msstate.edu/javamirror/Default.html**

Relevant to:

National Curriculum

Sc2 – Life processes and living things: variation

4a how variation arises from genetic causes, environmental causes, and a combination of both

4b that sexual reproduction is a source of genetic variation, while asexual reproduction produces clones

4e the mechanism of monohybrid inheritance where there are dominant and recessive alleles.

A Year 11 class was studying genetics. Working in pairs in the computer suite, the students were asked to use the 'mouse genetics' website to cross pairs of black and white mice together and note the numbers of each colour of mouse produced. They were asked to determine the genotypes of the parents and offspring and explain the probabilities of obtaining a certain coloured mouse from each cross.

The students were then set the challenge of breeding white offspring from two black parents. During the plenary session, students were asked to demonstrate how they had done this and explain the science behind what they were showing.

During the lesson some students who had worked quickly were able to use the 'advanced mousehouse' to study the effects of a second gene and how the genes might be inter-linked.

Hormones – Schoolscience KS4

The materials on this site are designed to support science in the curriculum using applications of science in industry. This is a very popular site with information on many curricular topics.

URL: **http://www.schoolscience.co.uk/content/4/biology/abpi/hormones/index.html**

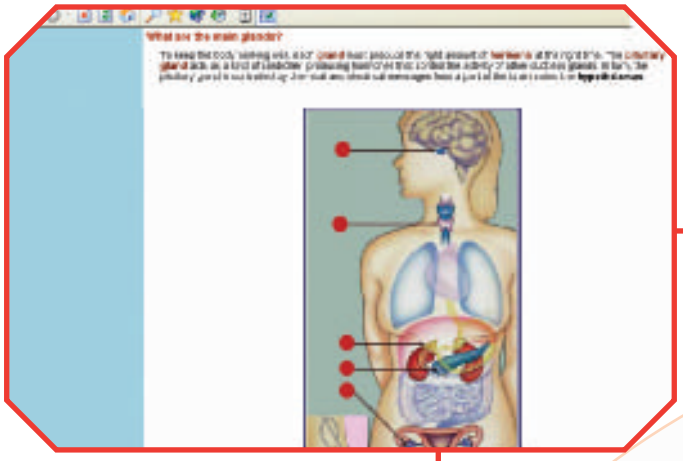
Relevant to:

National Curriculum

Sc2 – Life processes and living things: hormones

2j the way in which hormonal control occurs including the effects of insulin and sex hormones

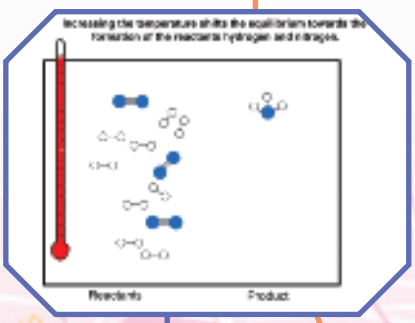
2k some medical uses of hormones, including the control and promotion of fertility and the treatment of diabetes.



When teaching 'humans as organisms' with a GCSE class, a teacher used the Schoolscience 'Where are the major glands?' diagram to introduce the topic on hormones. Having previously made the pages available offline the teacher used a data projector to show the diagram. The class was asked if they could name any of the glands and/or describe their functions.

Homework was set and the class was asked to research the function of hormones in the body and how hormones are used in medicine. The teacher recommended several sites, one of which was Schoolscience. Those students who did not have internet access at home were able to use the school's computers during the lunch breaks or after school (homework club). The time allowed for the homework recognised that not all students were able to access the internet immediately.

Having collected the information, the students worked in groups to produce a presentation about one gland, its function and the hormone it produces plus any use the hormone might have in medicine. Each presentation was then shown to the class.



The Haber Process – Ferl KS4

This online activity can be downloaded and used offline. (Needs a Flash plug-in – available from the Macromedia website.)

URL: **http://ferl.ngfl.gov.uk/display.cfm?page=25&catID=9&resID=3594**

Relevant to:

National Curriculum

Sc1 – Scientific enquiry: planning

2c carry out preliminary work and make predictions, where appropriate.

Sc3 – Materials and their properties: rates of reaction

3h about the great variation in the rates at which different reactions take place

3i how the rates of reactions can be altered by varying temperature or concentration, or by changing the surface area of a solid reactant, or by adding a catalyst

3j how the rates of many reactions depend on the frequency and energy of collisions between particles.

The teacher downloaded this activity for use offline. Using a data projector, the students were shown the animation of the reaction and asked to complete the 'Is the reaction exothermic or endothermic?' worksheet which the teacher had printed and copied. The class then went through the calculations on screen.

Before running the other animations, which show the effect of changing the temperature and pressure, the teacher asked the students to predict what would happen and explain their answers using their scientific knowledge. After watching the animations, the class discussed their predictions.

In the plenary session, the discussion centred on the best conditions for the production of ammonia. The final screen of the animation was displayed and the students then compared the conditions they had selected to those on the screen.

Secondary Science

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Becta
British Educational Communications and Technology Agency

Millburn Hill Road
Science Park
Coventry CV4 7JJ

Tel: 024 7641 6994
Fax: 024 7641 1418
Email: becta@becta.org.uk
URL: http://www.becta.org.uk