

Science & Technology Equipment News

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For Primary Schools and Teachers of S1/S2 courses

STS National Support Services in
Science, Technology, Safety

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We apologise for the delay in publishing this issue which effectively has meant that there was no Summer Term Newsletter. A great deal had to be done before the *Improving Science Education 5-14* project described herein could be approved and then got up and running. Issue 25 is largely devoted to news of progress on this national, Scottish, project. A third phase of the Science Online Support Network



(SOLSN) project, managed by SSERC, has also received further funding. The ISE 5-14 team and the SOLSN project staff in SSERC intend working closely together providing an integrated approach to development work, resource provision, ICT applications and continuing professional development (CPD). A new version of the SOLSN website will provide support and a means of communication for wider ISE 5-14 activities.

The ISE 5-14 project

Origins

The Improving Science Education 5-14 project is a response to a series of national reports which have been published in the last few years [1,2,3]. These reports have identified some fairly deep rooted problems in Scottish science education. These are seen in parts of the primary sector and in the early stages of secondary education - particularly in secondary 1 and 2. The project was also thought timely because of a number of other factors. For example, the Scottish Science Strategy had created the right small 'p' political climate for considered, rational reform and the ink was barely dry on the revised guidelines for science within Environmental Studies.

The initial impetus came from the local authorities' Scottish Science Advisory Group. They proposed to the Scottish Executive Education Department that there should be a collaborative national project to tackle a number of long-standing issues affecting the quality of science education in Scottish schools. Learning and Teaching Scotland and a number of other organisations were identified as potential partners. These others included the Association of Directors of Education in Scotland (ADES), NGfL in Scotland and SSERC (including the SOLSN team).

Participation was never intended to be restricted to these initial partners. Others with useful contributions to make will be welcomed. Already, such offers have been forthcoming from a number of the Scottish Councils as Education Authorities, the Universities, from professional scientific institutions and from members of the Science Centre and SETPoint networks.

Current position

At the time of writing (September 2002), a Project Manager and three Development Officers have been appointed and have been in post for about a month. They are all secondees from Scottish Local Authorities. LT Scotland is providing accommodation, some ICT support and administrative backup.

The Project Manager is Bill Fleming, previously an adviser with Renfrewshire Council. The three Development Officers are:

Peter Gorrie who has been seconded from his post as Depute Headteacher in Kelvindale Primary Glasgow; Janette Kean, Senior Teacher at Linlithgow Primary, West Lothian and Neil Taylor, Principal Teacher of Physics at Auchmuty High School in Fife.

Contact details and specific responsibilities for each of these team members are tabulated overleaf (Table 1).

The overall project remains collaborative. It is being managed by a Steering Group drawn mainly from the initiating partners identified earlier in this piece: ADES, LT Scotland, SEED, SELLD, SSAG, SSERC and SOLSN. The Steering Group Chairman is Jim Goodall, a Senior Education Officer who is currently seconded to the National Priorities group within LT Scotland. An ambitious, but realistic, specification for a sustainable programme of support for science education 5-14 is now at the final draft stage. This development programme has a number of components each of which is being set up and managed as a specific project. However, these components will eventually come together constituting an integrated programme of support. The first task for the project team was to draw up a framework for planning science provision 5-14.

cont./

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Oversight of whole project plus some specific EA liaison (see below).	Assessment plus specific EA liaison with:	Homework plus liaison with:	Practical Activities plus liaison with:
Argyll & Bute Dumfries and Galloway East Renfrewshire Glasgow Highland Renfrewshire Shetland Western Isles	Aberdeen City Aberdeenshire East Ayrshire North Ayrshire Orkney South Ayrshire Stirling West Dunbartonshire	Clackmannanshire East Dunbartonshire Falkirk Inverclyde North Lanarkshire Perth & Kinross Scottish Borders South Lanarkshire	Angus Dundee East Lothian Edinburgh Fife Midlothian Moray West Lothian

Table 1 Improving Science Education 5-14 National Project Team : contact details, specific responsibilities and liaison with Scottish Education Authorities.

The set of planning tools is not prescriptive. It allows for considerable flexibility and different approaches to suit local circumstances. It is, however, intended to assist schools and managers in ensuring that their own science programmes exhibit balance, progression, coherence and continuity so meeting the needs of pupils. In that sense it is an illustrative programme of study. What it is not is a national course.

The framework is intended to form the 'backbone' for the whole project. Resources and other forms of support will articulate with it. Because this set of planning and audit tools is central to the whole initiative, it is critical that a broad and early consensus be reached on its major features. This is because it will serve as a set of reference points by which to identify the other components - such as exemplars for homework, formative assessment aids and suitable investigations etc. Agreement on this aspect thus assumes some considerable importance at the outset. Over the longer term, the detailed organisation

of the knowledge and understanding components - the "content" if you wish - may well prove to be one of the less significant parts of this ISE 5-14 development.

The team is keen to focus on effective learning and teaching and on making science courses, at both primary and secondary levels, more interesting and appealing to pupils. To that end some emphasis will be placed on taking account of childrens' preconceptions, on investigative work, skills development and on critical thinking using approaches such as those in *Let's Think!* and in *CASE* (Cognitive Acceleration through Science Education).

As for assessment, formal links have already been established with the national initiative on assessment is for learning. Materials developed by the ISE 5-14 project will also have an emphasis on integrating formative assessment as a contributor to effective learning.

Note that summative assessment is not seen as a task for this project since other agencies have the necessary expertise.

What about SOLSN?

Those unfamiliar with the various manifestations of the SOLSN (Science Online Support Network) project could do worse than consult issue number 18 of this 5-14 Newsletter. In that issue, we provided a fairly full description of the features of the SOLSN site and related CD ROM based resources. SOLSN was subject to independent external evaluation on two separate occasions once when managed by the Scottish Interactive Technology Centre (SITC) and again when hosted by SSERC. On balance, it was both well received and well regarded by practitioners. The lessons learned from that project [4,5] will now be applied to online resources and support for the ISE 5-14 project.

There will be a link from the National Grid for Learning (NGfL) Scotland site, currently hosted by LT Scotland, to the Home Page of a new ISE 5-14 site at:

www.ISE5-14.org.uk

At present this is a development site, hosted by SSERC and accessed at the old SOLSN URL : www.solsn.org.uk

The current home page is shown in Figure 1 opposite.

Figure 1 Opening screen for pilot ISE 5-14 website

The opening screen (Figure 1, foot of page 2) reflects all of the major, extant components of the project. There are a number of drop-down menus. Currently the most important of these is the menu for the planning framework which will be subject to consultation with authorities and teachers. There are similar menus for information on investigative approaches, links to a navigable version of the LT Scotland *Guide for Teachers and Managers* on Science within Environmental Studies.

Within the planning framework itself, Attainment Targets have been codified so as to provide a set of shared reference points for elements such as homework and assessment. The targets have also been grouped in an attempt to meet the usual curricular requirements for coherence, continuity and progression etc whilst evenly spreading the work across the primary and secondary stages. An alternative pathway has also been set up in a first attempt to reflect the realities of composite classes. There is articulation with the 3-5 curriculum.

This grouping of attainment targets is reflected on the website. Figure 2 opposite shows the screen which results from clicking on a group from the main drop down menu for the planning framework.

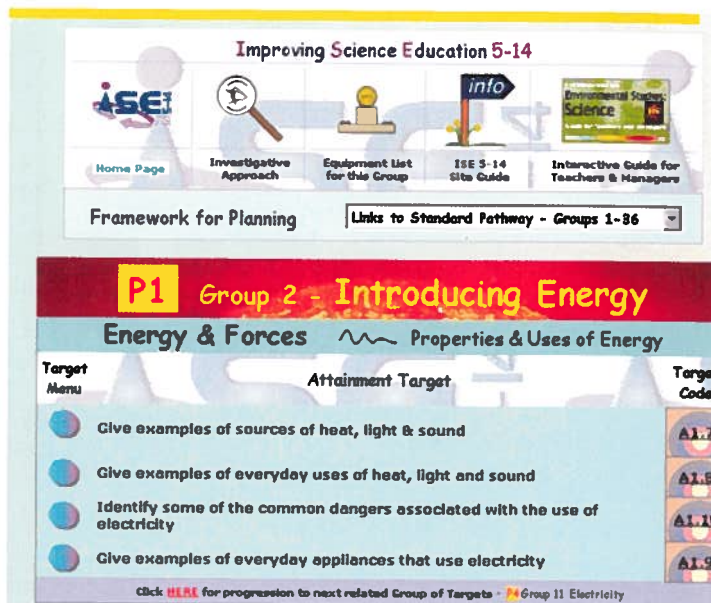


Figure 2 Screen showing a possible grouping of attainment targets at Level A for *Energy and Forces* within the strand *Properties and Uses of Energy*.

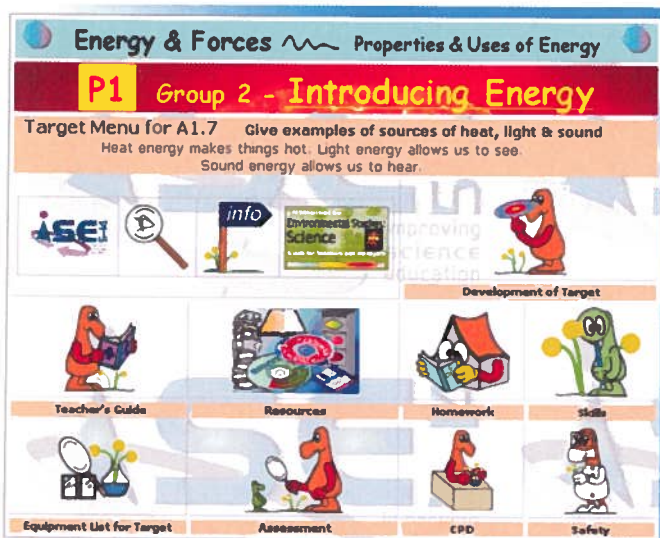


Figure 3 Menu screen for an individual attainment target within the suggested grouping shown in Figure 2.

References

1. *Improving Science Education 5-14* : A Report by HM Inspectors of Schools Scottish Executive Education Department, October 1999, ISBN 0 7480 8920 9. Download from : www.scotland.gov.uk/library2/doc09/imse-01.asp
2. *A Science Strategy for Scotland*, Scottish Executive, 2001. Download from www.scotland.gov.uk/library3/education/ssfs-00.asp
3. *Standards and Quality in Secondary Schools 1995-2000: the sciences*. HMIE, 2001. Download from: www.scotland.gov.uk/library3/education/sqss-01.asp
4. *Evaluation of the Science On-line Support Network (SOLSN) Feasibility Study*, Harlen and Schilling, SCRE, August 1998, The Stationery Office, ref. J21415.
5. *Using ICT to Support Teachers in Primary Schools: An Evaluation of Phase Two of the Science Online Support Network*, Plowman, Leakey and Harlen, SCRE, 2000, ISBN 1860030564. (See also: www.scre.ac.uk/cat1860030564.html).

Clicking the mouse on an individual target 'button' (Fig. 2 above) brings up a screen of the type shown in Figure 3 (opposite). This screen has a collection of icons each of which is relevant to one set of outcomes intended for the overall ISE 5-14 project. These will eventually be connected to an integrated set of resources which will include practical activities, homework exercises¹, assessment, safety references, notes for teachers, equipment lists and items for skills development.

As on the SOLSN sites there will also be references to third party resources both commercial and charitable and a lot of web links of direct relevance to the curriculum. Of particular interest to the SSERC based members of the overall ISE 5-14 team is the possibility of using the site to support the integration of ICT applications into science learning and teaching.

Teachers familiar with the old SOLSN sites, and the CD ROM derived from these, will recognise the intention to make the materials interesting, imaginative and fun to access as well as useful. Most of the credit for that again goes to Ian Birrell of SSERC who has designed the pilot site and drawn many of the icons and other figures from scratch. The ISE 5-14 logo is the work of LT Scotland to a brief by the project team. The project officers have also guided the site layout and continue to provide feedback both directly and from teachers who they introduce to the site. SSERC will be working with technical ICT specialists in LT Scotland in order to improve the speed of page loading and to ensure greater ease of access and navigation.

At the moment, entry to the development site requires a user name and password but anyone working in a Scottish educational establishment may apply for access. Eventually, when the content is better settled and more of the necessary links are reliably established, the site will be opened up to wider access.

Footnote¹ Homework will be innovative and not usually be for in-class correction so adding to workload. In some cases it will involve parents and other relatives so assisting with their own understanding of the science.

Components & Materials

Item	Description	Price	Item	Description	Price
593	Miniature motor, 1.5V to 3V, 2mm dia. shaft	30p	789	MES (miniature Edison screw) bulbs 3.5 V	10p
614	Miniature motor, 3V to 6V, 2mm dia. shaft. Both motors above can be used for project work but they run at fairly high speeds, some gearing will be required. See worm/gear, item 811.	45p	691	MES battenholders for above.	20p
621	Miniature motor, 1.5V to 3V, now with 8 tooth pinion. The open body of this motor makes it ideal for showing how such a motor is constructed	25p	866	Lens end lamps, 1.2 V MES. Ideal for use where a narrow, concentrated beam of light is needed. Bargain pack of 100	£3.50
798	Pack of 24 gears, 6 each of 12, 20, 30 or 40 teeth, dia. 15, 22, 32 and 40 mm. 12 tooth gear fits motor shaft and 40 tooth gear push fits in cotton reel	£2.00	508	LED (light emitting diode) 3 mm, red, per 10	50p
799	Pack of 24 cams, 6 of each of 4 shapes	£1.00	761	LED 3 mm, yellow, per 10	60p
800	Pack of 100 wheels, 39 mm dia., assorted colours, 3 mm axle hole	£5.25	762	LED 3 mm green, per 10	60p
811	Worm and gear, 34 to 1 speed reduction	35p	790	3V buzzer (works with solar cell see Item 838)	55p
817	Axles 3 mm dia., nickel plated, round ends, push fit on SSERC plastic wheels, gears and pulleys: 70 mm long, per pack of 4	40p	846	Sound module with 'melody' chip	£1.00
818	As above but 95 mm long, pack of 4	40p	838	Solar cell, 100 x 60 mm, 3.75 V per cell, max.	£2.10
819	As above but 12 mm long, pack of 4	40p	839	Solar motor, body 25 dia. 12 mm long with shaft 2 mm dia 6 mm long	£1.70
820	Worms to fit 2 mm electric motor shaft, pack of 5	£1.00	840	Solar pack : one of each solar cell, solar motor propeller (801), and 3 V buzzer - with notes.	£3.75
821	Reducers 3mm to 2mm enables gears, pulleys and wheels, to be fitted to motor shaft, per 5	25p	836	Motor mounts, plastic, push-fit with self adhesive base pad for SSERC motors 593 & 614, 10pk	£2.35
867	Reducers, 4 mm to 2mm, as above, per 5	25p	801	Propeller, 3 blade, to fit 2 mm shaft. Blade 62 mm long	35p
868	Reducers, 4 mm to 3 mm, as above, per 5	25p	792	Propeller kit with hub and blades for ten 3 or 2 bladed propellers	£3.50
710	Sonic switch. Clap your hands, the motor starts, clap again the motor reverses and on the third clap the motor stops. Needs 4 AA cells.	85p	794	Cotton reels (for making buggies, rubber powered tanks etc.) pack of 20*	75p
723	Microswitch miniature, lever operated	40p	796	Pack of 20 pulleys, 5 of each of 10, 20, 30 and 40 mm diameters.	£2.50
822	Plastic toggle switch, low voltage	40p	837	Ring magnet, 40 mm o.d., 22 mm i.d.	35p
688	Crocodile clips, red, miniature, insulated	5p	815	Ceramic square magnet, 19 x 19 x 5 mm	15p
759	As above, but black.	5p	823	Ceramic magnets, poles at ends, 10 x 6 x 22mm	12p
788	Crocodile leads, assorted colours, insulated croc. clips at ends, 36 cm long. Pack of 10	£1.35	824	Ceramic magnets, poles on face - SOLD OUT	
835	2 x AA Cell ('battery') holder	15p	861	Bimetallic strip, 10 cm length	30p
845	2 x C Cell ('battery') holder	20p	882	Quartz clock movement, dimensions 56x53x17mm, with wall hanging bracket, Suitable for dial thickness up to 10mm. Includes plastic hands suitable for dial diameter to 200mm. Requires an AA battery. See CD Clocks, Newsletter 18.	£1.75
729	Battery connector, PP3 type, snap-on press-stud, suitable for Items 835 and 845	5p	884	Onager kit. Wood cut to length etc.	£2.00
			885	Chariot kit. Templates and parts.	£2.00

*Item 794 ~~Not~~ 200 as previously stated in error

An interactive, fully illustrated, version of this list is posted on the SSERC site at:

<http://www.sserc.org.uk/Members/Primary/Surplus/body.htm>

Prices do not include VAT which will be charged at the ruling standard rate. Cash with order only when total value is less than £5 and please add £1 for carriage solely to these small orders (except where an inclusive price is indicated eg kits, etc). For orders totalling more than £5 please do not send payment etc but await delivery and then pay on our advice note or invoice.

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