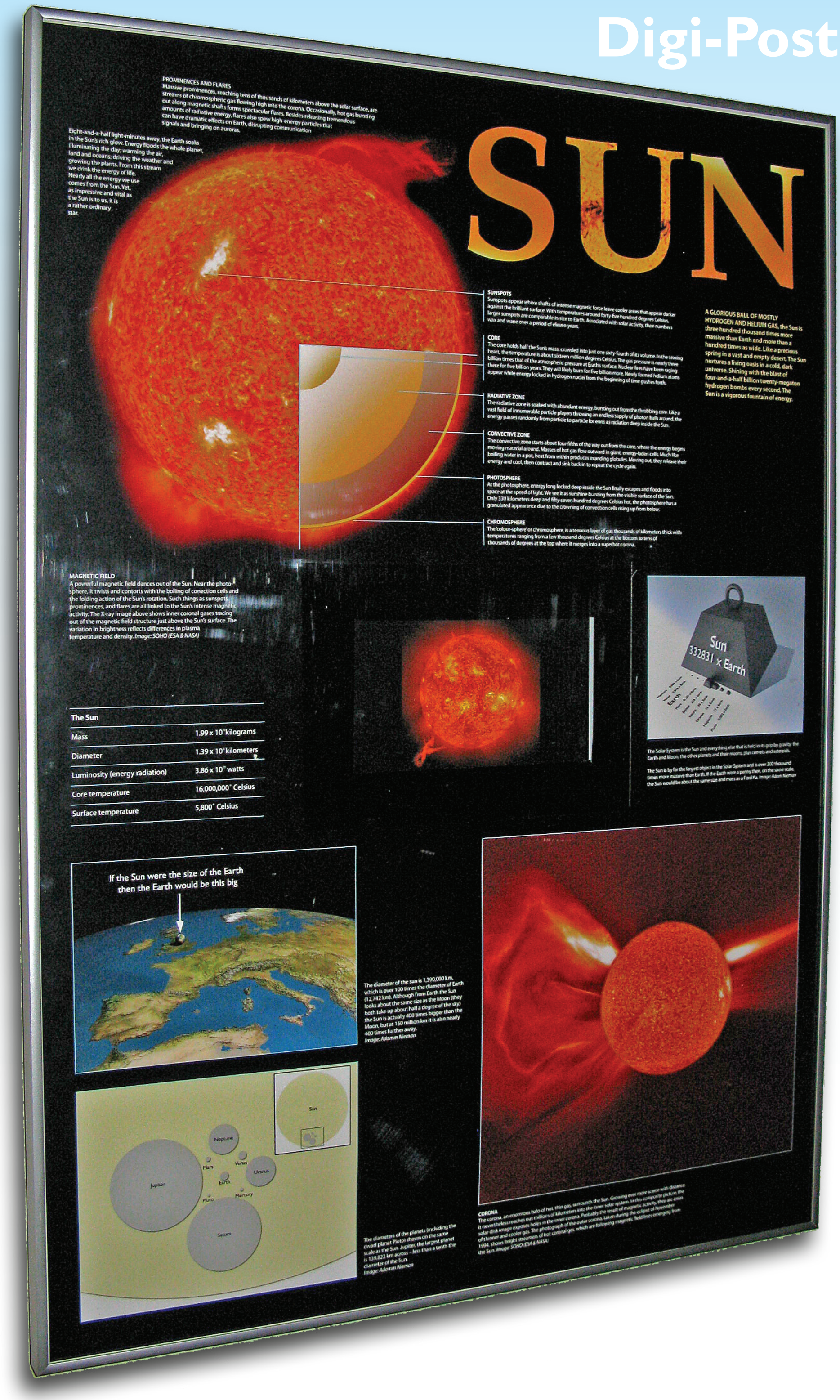
project
faraday
exemplar designs for science

GovEd Communications Consortium

Digi-Poster



GovEd Communications

Springboard Design Partnership

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Introduction

Digi-Posters – a union of digital and print media – support a wide range of teaching and learning approaches in science and other subjects. In particular, they support learners' own exploration of a topic, making it immediate and relevant.

Digi-Posters is an idea developed by the GovEd Communications consortium as part of the Faraday Project. The consortium comprises GovEd Communications, Alligan, Feilden Clegg Bradley Studios, Futurelab and Soda Creative. Springboard Design Partnership were sub-contracted to provide design expertise.

Conents

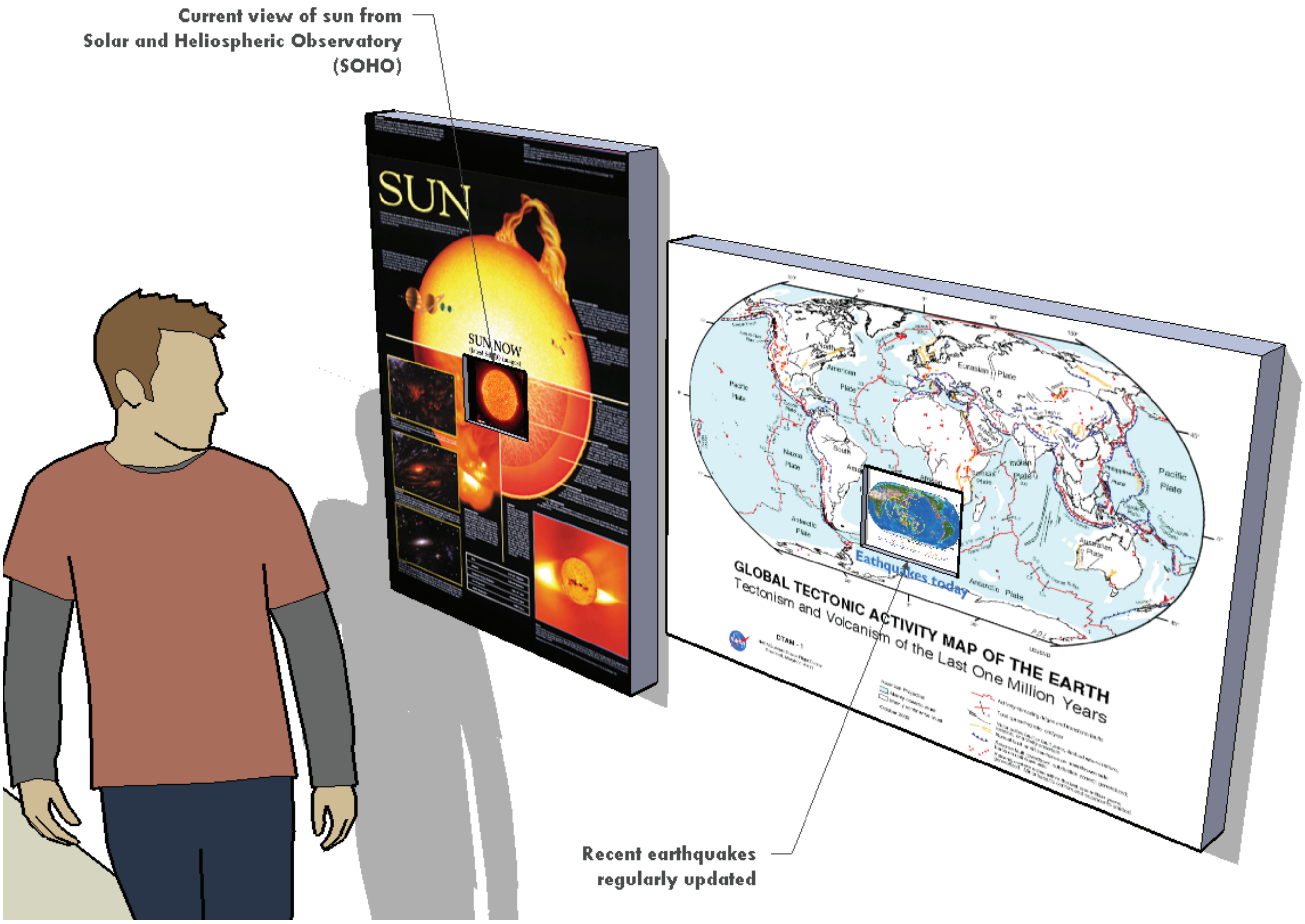
Background notes

Posters play a range of roles in schools today. The various reasons teachers use them include the facts that they:

- Give a room a scientific feel
- Inspire learners to think
- Remind learners of key ideas
- Prepare learners for new topics
- Help learners to consolidate their understanding
- Encourage learners to aspire to be scientists
- Bring information that would otherwise be hidden in books or websites out into the open
- Make learners smile
- Cover up cracks in the wall

However, posters are rarely used to their best advantage. The main problem with posters is that they are static. Learners cease to notice them after a very short period of exposure. One answer is to replace posters with digital displays, and these are increasingly common in schools. However, there are many aspects of posters that digital displays cannot replace – not least the fact that posters are cheap. Although digital displays are coming down in price, they will never be as cheap as paper – or display images as beautifully. Digital displays provide science education with new opportunities, but it would be a shame to throw the baby out with the bath water. We can get the most value from digital resources by focusing on what they do well rather than forcing them to take on roles better served by non-digital media.

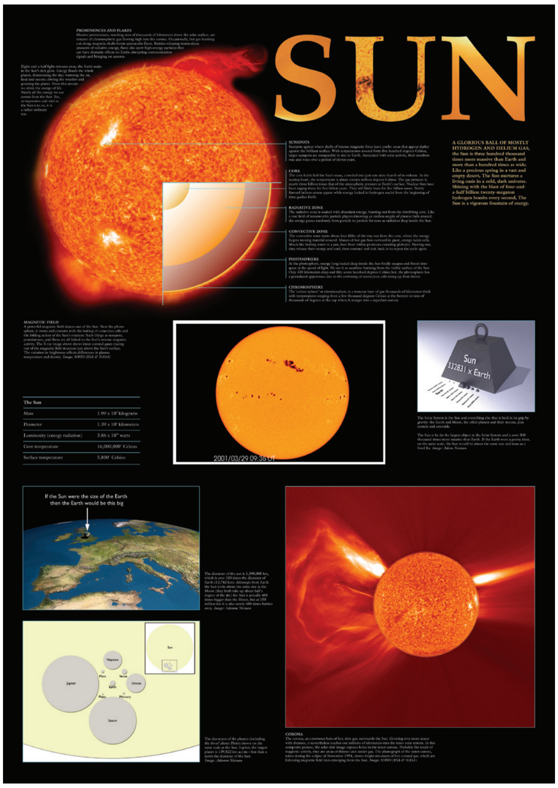
It is currently very difficult for students to engage with cutting-edge science initiatives such as The Human Genome Project, The Large Hadron Collider and space missions such as Cassini-Huygens. Posters are the traditional medium scientists use to explain their work to each other, but in schools they lack impact and immediacy. A Digi-Poster is not an 'experiment' in its own right but it can play a vital role in allowing interactive experiments to meet modern expectations of science education. Therefore Digi-Posters enable a strong synergy between print and dynamic digital displays backed up with an informed and engaged online community.



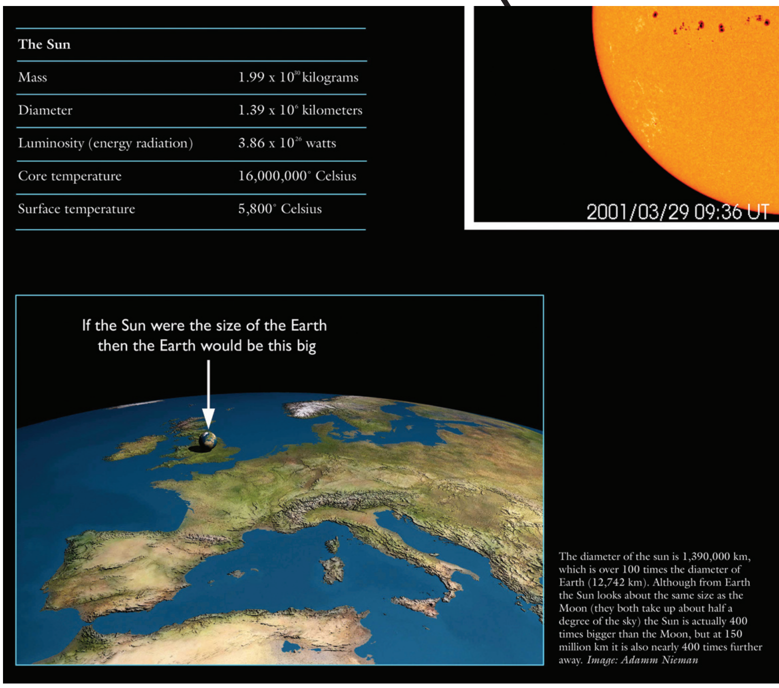
Digi-Posters: Description

Simply put, a Digi-Poster is a printed poster that incorporates a digital screen (a large one or a small one). The value of Digi-Posters comes from the combination of digital and printed content – enhancing the strengths of each medium. Printed material can display a far higher density of information than a screen at much less cost. (For an LCD screen to carry as much information as an A1 poster it would have to have pixel dimensions of 9,600 x 7,200 pixels, which would give it physical dimensions of 3.4 metres x 2.5 metres.) Unlike ordinary posters, Digi-Posters are always current – displaying the latest results and live images.

However, they go further than a screen by itself would because they put the current results into context. The advantage Digi-Posters have over websites is that they do not require students to go looking for them – students can 'opt-in' whenever the content catches their eye. In several areas of the curriculum that teachers have identified as problematic, teaching can be supported by this combination of live content and contextual information including space, environmental chemistry, ecological relationships, and nuclear physics. There is scope for Digi-Posters to make a range of different contributions to science education.



Near real-time images and movies displayed on the screen supported by graphics and text



Proof of concept

Stellar and solar physics is a topic that teachers have told us is difficult to teach, because it seems abstract to students and removed from their lives. The proof of concept prototype takes as its starting point a commercially available educational poster about the Sun. It is a well designed resource but, as with all posters, learners' engagement with it will begin to wane soon after their first glance. Also it does not help to make solar physics 'immediate' or relevant.

Near real-time images and movies from the Solar and Heliospheric Observatory (a spacecraft that observes the Sun from a special orbit) have the immediacy that the poster lacks – they show what is happening on the Sun 'right now' – but learners would need to go in search of them and would not always understand the significance of what they were looking at if and when they found them.

The Digi-Poster version shows how combining digital content with printed information adds value to each. Because they are almost 'part of the furniture', real-time images of the Sun do not require special research from the student – they are always available. This gives learners a chance to develop an awareness of the Sun and follow its changing behaviour without any effort. The explanation of solar physics on the poster provides a context for the images and movies, which makes the learners' gaze richer and more informed. Students are motivated to read the text and understand the diagrams because they have real phenomena going on in front of their eyes that require explanation. The graphic representations of the Sun's scale helps students to see what a remarkable thing a star is.

The construction of the poster itself is described in the appendix (Design Notes).

Using Digi-Posters

Though not 'experiments' in their own right, Digi-Posters can play an important role in interactive experiments by simultaneously placing them in context and displaying results. Posters are one of the most important forms of communication in science (along side journal articles and research seminars) and have far more potential in school science than has been realised to date. We see them being used in a number of ways. In particular they would be useful in links to live research (including students' own experiments); providing visual examples that help explain difficult topics such as waves and chemical bonding; and as a way of displaying student work.

- **Sun Live:** Poster about the Sun that displays near real-time images (supplied by the Solar and Heliospheric Observatory) of the Sun at various wavelengths.

- **Cassini Live**: (In collaboration with the Science and Technology Facilities Council) a poster about the Cassini Mission to Saturn with the very latest images (and captions) displayed as they become available each day.

- **Atmospheric Chemistry and Remote Sensing:** A poster about the atmosphere with the very latest satellite images from the Earth Observation Programme including Total Ozone, Global Temperature, etc.

- **Our School Now**: Live and accumulated data (including, for example, data related to energy consumption, CO2 emissions, etc.) with explanations of what the various numbers represent.

- **Vibrations and Waves**: A poster that explains key concepts in vibrations and waves (a difficult topic) with animations.

- **Seismology**: A poster that explains plate tectonics, maps the motion of the plates in great detail and also provides live information about recent earthquakes.

- **What goes on in a real lab?** The digital content is a webcam image of a working lab in the Royal Institution, a local university, or another friendly institution. The printed content describes the equipment being used and the layout of the lab and the kinds of activities being pursued.

- **Ecological Relationships**: Using webcams and RSS to display images and data collected remotely. The printed content describes the species involved.

- **Today at CERN**: A live link to CERN with the latest results from the Large Hadron Collider (or, rather, from the education outreach team there). The printed content would provide all the background needed to understand the illustrations and press releases.

- **Student experiments**: A class conducts a series of experiments, films them and writes them up. The details and results are presented on a poster, just as they would be in professional scientific contexts. They are either laid-out in Microsoft Publisher (or similarly accessible program) or they are glued directly to an A1 template. The video of the experiments runs on the screen.

Development

The availability of low-cost networked displays aimed at consumers means that the production of Digi-Posters in small numbers is feasible. However, there are other routes that developers should consider. Some design solutions simplify the distribution of media for Digi-Posters and can remove any need for configuration of the device itself. An easy to use web page could give a teacher control of all the Digi-Posters in the school. Any content on the web could be directed to any of the screens. (We would expect access to this configuration page to be limited to prevent anyone directing inappropriate material to the screens.)

The Digi-Poster network would be driven by a small device (a low cost Linux server) which itself would require no configuration. Unlike the concept prototype, the screens would simple and would not need to contain memory or any of the other components required by consumer devices. Instead, they would have a small networked box that would do nothing but act as a target to which the server would direct media.

In addition to simplifying configuration, there are other advantages of having a network of Digi-Posters rather than merely having Digi-Posters on a network. It could also simplify the distribution of posters and support the sharing of resources between schools. Both teachers and learners would have an opportunity to share their work and build on the work of others. There are good exemplars of community focused sites where users of a web-service determine what is produced. In other domains examples include the business card service www.moo.com and community t-shirt site www.threadless.com.

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