

Spatial Technologies in Geography – Resource List

The internet provides amazing access to spatial technologies available for use in the classroom. The following provides a list of either free downloadable viewing platforms to view and manipulate spatial data, or a list of websites that provide the interactive mapping tools on the site. The list is extensive. Using this, you could incorporate spatial technologies in all of your lessons! All you need is access to the internet.

Spatial Technology Viewing Platforms

You will need to download the following programs from the internet, and install them on either individual computers or the school network. All of these programs are freely available. Each of these programs enables the user to view and manipulate data (either spatial data through a GIS map or satellite imagery)

Download ArcExplorer Education Edition,

<http://www.esri.com/software/arcexplorer/download.html>

This site will provide the link to download ArcExplorer Education Edition. This is a freely downloadable basic GIS program that allows the user to manipulate and view ESRI shape files. A number of student activities have been written in association with this program. Details on how to download the program have been provided in this resource book.

Google Earth, <http://earth.google.com/>

A program to study the earth, from Google. You will need to download the setup file (.exe) and then upload the program on your computer. Schools are often hesitant to allow all students to access Google Earth, as it streams from the internet. You can put it onto the teacher computer, and show the students using a data projector. Google Earth now has a number of alternative applications and add-ons to other sites, including flickr, that allow for greater use of the program. It is advisable that you access the Google Earth Lesson Ideas site listed below, to find out what you can do with Google Earth in the classroom.

International Water Management Institute, World Water and Climate Atlas,

<http://www.iwmi.cgiar.org/WAtlas/>

This site provides a link to download a software called 'Synthesiser' that will enable the user to view and use world water and climate data from the IWMI. The program will allow the user to view, manage and analyze geographic information. It contains common GIS components, along with enhanced tools for working with time series point data. There are links to any of the Aquastat data available on the FAO site. Specifications and system requirements for downloading the program are available from the site.

Microsoft Virtual Earth, <http://www.microsoft.com/virtualearth/>

This site allows you to download Microsoft's Virtual Earth. This is Microsoft's version of Google Earth. It allows for the creation of online maps and provides detailed city

models in 3D. For an overview of Virtual Earth, go to http://www.ted.com/index.php/talks/stephen_lawler_tours_microsoft_virtual_earth.html

World Wind, <http://worldwind.arc.nasa.gov>

This free to download NASA 3D engine enables users to zoom from satellite altitude into any place on earth, and with LandSat images students can view their city and neighbourhood. As well as demonstrating hurricane dynamics it also produces daily data on floods, fires, storms and volcanic activity. Country borders can be superimposed and lines of latitude and longitude can be toggled on and off.

World Wide Telescope, <http://www.worldwidetelescope.org/>

This free download “is a Web 2.0 visualization software environment that enables your computer to function as a virtual telescope—bringing together imagery from the best ground and space-based telescopes in the world for a seamless exploration of the universe” - as explained by Microsoft. For an overview and demonstration of World Wide Telescope by its creator, Curtis Wong, go to http://www.ted.com/index.php/talks/roy_gould_and_curtis_wong_preview_the_worldwide_telescope.html

Interactive Mapping Sites on the Internet

The following are interactive mapping sites that allow the user to view and manipulate spatial data on the internet site. There are many more sites available. In particular, have a look at your local city council website as many councils are moving towards local online mapping applications.

Geoscience Australia, Mapconnect, <http://www.ga.gov.au/mapconnect/>

This section of the Geoscience website allows the user to construct your own topographic map of any specific area, using basic interactive mapping skills. You can add whatever data that you desire.

Google Maps, <http://maps.google.com>

This site is a general mapping site that allows users to access 2D maps for the globe. By zooming into a particular area, more detail is provided. The maps can be viewed as basic, as a satellite image, a plain map, terrain or hybrid (mixture).

Land Victoria, <http://services.land.vic.gov.au/maps/interactive.jsp>

This site provides mapping data and an application to build your own maps for all regions of Victoria. You are able to add layers of data including sections of the Melways, as well as contours, property boundaries, major roads and rivers. You are able to use basic GIS mapping skills to build these maps.

MapTube, <http://www.maptube.org/home.aspx>

MapTube is a free resource for viewing, sharing, mixing and mashing maps online. Created by UCL’s Centre for Advanced Spatial Analysis, users can select any number of maps to overlay and view. The site uses Google maps to view maps.

National Geographic Map Machine, <http://ngm.nationalgeographic.com/map-machine#theme=Street&c=0|0&sf=187648892.534865>

This site provides general world and US maps. Using very basic interactive mapping tools, users can view road maps, satellite imagery and physical maps. Themed maps on weather, natural hazards, climate, populations etc are also available.

Office of Economic and Statistical Research - <http://www.oesr.qld.gov.au/>

This is an excellent site that provides downloadable excel files of data on any demographic data you are looking for. This site is a great companion with the ABS site, as it breaks down ABS data for specific Queensland topics and regions. The excel files you download can be easily transformed into Arcview shapefiles. Interactive mapping opportunities are also available, so you don't need a GIS program to map the data provided.

Ordnance Survey - Britain's National Mapping Agency -

<http://www.ordnancesurvey.co.uk/oswebsite/>

This site provides links to a number of community interactive maps in the United Kingdom. The site is up-dated frequently with examples of how GIS has been used to support the community, such as the management and mitigation of flooding. This site is an excellent model for providing electronic spatial information to the public.

Whereis.com, <http://www.whereis.com>

The Whereis website should be familiar to most teachers. It can be used to introduce the basic concepts of GIS to your students (or staff) and even perform some elementary analysis and decision-making exercises.

Worldmapper, <http://www.worldmapper.org/>

This site provides a collection of world maps, where territories are re-sized on each map according to subject of interest. There are now 600 maps available. Maps 1 to 366 are also available as a downloadable pdf poster. A search engine is provided on the site so the user can search for specific topics. Examples of maps include Map 332 – Ecological Footprint, Map 335 – Internet Users and Map 337 – Computer Users.

Up My Street.com, <http://www.upmystreet.com/>

Up My Street.com is a clever British website, which, given a postcode, can tell you about house prices, crime rates, schools, tradesmen, public transport and government services. The layering of information needed provides an excellent introduction to basic GIS mapping and how it is used in the wider community.

Remote Sensing and Satellite Imagery

The following sites provide access to remote sensing or satellite imagery. These sites either allow the user to create the images that you want to download, or have specific maps of specific events. The satellites used to create the imagery are often mentioned.

Aerial Photography Library, National Library of Australia,

<http://www.nla.gov.au/map/aerialphoto.html>

The National Library of Australia has a collection of approximately 800 000 black and white aerial photographs in the Map Reading Room. These were taken between 1928 and 1987 by the Royal Australian Air force, Division of National Mapping, Bureau of Mineral Resources and the Australian Surveying and Land Information Group (AUSLIG). Information is provided on how to search the catalogue, as well as links to other aerial imagery sites for each state and territory.

Centre for Remote Imaging, Sensing and Processing (CRISP), National University of Singapore,

<http://www.crisp.nus.edu.sg/>

CRISP aims to developed advanced capabilities in remote sensing. This site provides up-to-date satellite imagery of the South East Asian region, including natural disasters. An example of this is the extensive imagery provided of the impacts of Tropical Cyclone Nargis in Myanmar.

Earth As Art, US Geological Survey,

<http://earthasart.gsfc.nasa.gov/index.htm>

This site combines satellite imagery with art to provide fantastic images of the earth's surface. You are able to view and download high resolution images, taken by the Landsat 7 satellite and the Terra Satellites Advanced Spaceborne Thermal Emission and Reflection (ASTER). Environmental Graffiti, an online journal, produced an article on the '30 Most Incredible Abstract Satellite Images of the Earth' (<http://www.environmentalgraffiti.com/ecology/30-most-incredible-abstract-satellite-images-of-earth/1324/3>), most of which came from Earth As Art.

EduSpace,

<http://www.eduspace.esa.int/eduspace/main.asp?ulang=en>

This website provides access to spatial technology data, particularly remote sensing and satellite imagery data. You are able to register your school, and create data for your school using this site. <http://www.eduspace.esa.int/> the European Space Agency's Earth Observation site for schools, connects to spatial information and lessons including remote sensing. The site links to careers information for students and other opportunities.

FlashEarth,

<http://www.flashearth.com/>

Explore satellite and aerial imagery of the Earth from multiple sources including NASA and Microsoft. This is a flash based interface that is similar to Google Earth, but runs from the web. It is also less powerful and does not have any applications. The one advantage is that you can view the satellite imagery as a full screen, which is good for screen snapshots.

Globe At Night,

<http://www.globe.gov/GaN/>

You will need to click on 'map' to view the data. This amazing website allows you to either view the collected data, or download it to suit your GIS software.

Global Land Cover Facility,

<http://glcf.umiacs.umd.edu/index.shtml>

The GLCF is a centre for land cover science with a focus on research using remote sensing data. The site provides earth science data and products to help everyone

better understand global environmental systems. In particular, it develops and distributes remotely sensed satellite data. All data from this site is available for free. To view and download the data, you will need to access it via the ESDI (Earth Science Data Interface), a web application for searching, browsing and downloading the data. The site also provides clear explanation of the role of different satellites and the types of data they collect. When on the site, have a look at the special collections. These include imagery from the 2008 China Quakes, Hurricane Katrina and Rita and the 2004 Tsunami.

Heavens Above, <http://www.heavens-above.com>

If you're interested in satellites or astronomy, then this is the site to look at. The aim of the site is to provide information needed to observe satellites such as the International Space Station and the Space Shuttle, spectacular events such as the dazzlingly bright flares from Iridium satellites as well as a wealth of other spaceflight and astronomical information. The user is also able to monitor the location of satellites. An example of the information provided is the 'Spacecraft Leaving the Solar System', which shows the current position and other interesting data of five spacecraft leaving the solar system.

Jason Hawkes Aerial Photography, <http://www.jasonhawkes.com/>

Jason Hawkes has specialized in aerial photography since 1991 and has produced photography for a number of advertising agencies and products. This is not a specific 'Geography site', but does display the alternative uses and importance of aerial photography. The user is able to search photos, however you do need to register on the site and therefore downloading the images may cost.

MSNBC.com, Technology and Science – Space Slideshows,

<http://www.msnbc.msn.com/id/6955261/>

This site provides a list of new and archived space slideshows by MSNBC. Many of these are more astronomy based, but search through the list as there are also some great satellite image collections of earth.

NASA Earth Observatory, <http://earthobservatory.nasa.gov>

This site provides access to an enormous number of satellite images. The site provides featured images each day, as well as breaking news articles that feature satellite imagery. Current topical stories are also provided, with satellite imagery. Topics include climate change, natural disasters, deforestation, pollution etc. Three other tools are also available on this site. These include:

- *Visible Earth*, <http://visibleearth.nasa.gov/>
 - A catalog of NASA Images and animations of the planet.
- *Blue Marble: Next Generation*,
<http://earthobservatory.nasa.gov/Newsroom/BlueMarble/>
 - Provides a detailed look through the use of high resolution satellite imagery, at an entire year (2004) of the life of our planet. The images were taken monthly.
- *Nasa Earth Observation (NEO)*, <http://neo.sci.gsfc.nasa.gov/Search.html>
 - A tool to search and view NASA imagery, before downloading.

Satellite Composite Images, Space Science and Engineering Centre, University of Wisconsin-Madison, <http://www.ssec.wisc.edu/data/composites.html>

This site provides access to composite satellite images. The best images are the global montage and global movie, each updated every six hours. These can be downloaded as movie files.

Virtual Field Trip Sites

The following sites allow the user to visit the site without actually being there. Google Earth is also an excellent tool to create your own 'virtual field trips'.

Rising from Ruin, MSNBC.com, <http://risingfromruin.msnbc.com/stories.html>

This site is an excellent example of the effectiveness of a virtual field trip. Put together by MSNBC, it is an ongoing report chronicling two coastal Mississippi towns as they rebuild after Hurricane Katrina. It uses basic GIS mapping tools, and locates videos, photos and audio slide shows on a map of the area.

Woophy.com, <http://www.woophy.com/map/index.php>

This site is a global field trip waiting to be explored. It allows the user to interact with the site by choosing any city in the world, and look at photos taken at the site. You can even add your own photos to a point. The site incorporates the 'Hotlinking' aspect of GIS.

Specific Mapping and Data Sources

The Natural Environment and Sustainability

Australian Antarctic Data Centre, <http://aadc-maps.aad.gov.au/aadc/portal/>

An amazing site that provides interactive mapping opportunities, as well as GIS Data from the Australian Antarctic Division. In particular, it provides maps, charts and geographic information, as well as online mapping tools. You will need to register as a user, as well as create a username and password to access the data.

Catchment Condition Online Map, Bureau of Rural Sciences,

<http://www.brs.gov.au/mapserv/catchment/>

This site provides access to the Catchment Condition Online Map. You can choose to view the map through the Java or HTML version. The site uses basic GIS skills to provide layers of data on the relative catchment condition of all catchments in Australia. The layers of data include water condition, land condition and biota condition, and include sub-layers within this. By selecting the 'Metadata' button, a description of each of the layers and sub-layers is provided. The interactive tools are quite slow and difficult to use, but once it starts working the data is great.

Earthwatch Project Sites, United Nations Environment Programme, <http://bure.unep-wcmc.org/imaps/Earthwatch/viewer.htm>

This site uses basic GIS mapping tools to provide an interactive map on global conservation areas. It has 9 differing layers of information, including Earth Watch Project sites, world heritage sites, population density and elevation.

Geoscience Australia, Sunrise and Sunset Times,

<http://www.ga.gov.au/geodesy/astro/>

This section of the Geoscience website provides astronomical information and data, including sunrise and sunset, moonrise and moonset, sun and moon azimuth and elevation, moon phases and planet data for major cities.

Globalis: An Interactive World Map, Grid Arendal United Nations Environment Programme, <http://globalis.gvu.unu.edu/>

This is an interactive world atlas with country statistics related to sustainable development. Globalis aims to create an understanding for similarities and differences in human societies, as well as how we influence the planet. A number of map layers are provided. Globalis also allows the user to display a number of thematic and statistical maps according to indicators. A written description appears beneath each map, explaining what it shows. To view this map you need Internet Explorer 6 or Firefox 1.

Wildlife Disease Information Node, Global Wildlife Disease Map Version 2.0,

<http://wildlifedisease.nbi.gov/wdinNewsDigestMap.jsp>

This map uses Google maps to provide a view of wildlife diseases. The site uses news sources, RSS feeds, scientific sites and blogs as well as articles that appear in Wildlife Disease News Digest to up-date the WDIN database, which then up-dates the map. The map can be layered according to map filters including wildlife topic, disease type, species, country and date. There is also a link available to view any of this data on Google Earth.

World Atlas of Biodiversity, United Nations Environment Programme, <http://bure.unep-wcmc.org/imaps/gb2002/book/viewer.htm>

This is a very detailed interactive map showing all areas of global biodiversity. The site uses interactive GIS mapping skills allowing the user to zoom in, out, identify, query and view hotlinked information. There are an extensive number of layers (over 80) including information on critically endangered animals, bird extension, population density, reef hot spots, protected areas, elevation and endangered plant species. There is also the facility to print or email the maps that are created. A glossary and overview of information about the layers and biodiversity is also provided.

World Heritage Sites, United Nations Environment Programme, http://deben.unep-wcmc.org/imaps/W_Heritage/viewer.htm

This site provides an interactive map of world heritage areas. Using interactive GIS mapping skills, various layers are available including world heritage sites in danger, cultural sites, mixed sites, infrastructure, sensitive areas and species. The site also has the hotlink tool, linking specific sites to images and relevant websites.

WWF WildFinder, <http://www.worldwildlife.org/wildfinder/>

The WildFinder is an online database of species that also displays the distribution of each species across the planet. Searches can be done for individual species or across a particular spatial extent. Links are provided to further information on each species' habitat and images of the species.

Coastal Environments

Coral Disease Mapping Tool, <http://www.unep-wcmc.org/GIS/coraldis/>

This website, put together by the United Nations Environment Program, is the collation of the global distribution of coral diseases. By selecting the mapping option, the user has access to basic GIS skills including pan to point, identify, zoom in and zoom out and the layering of information to create their own map using the coral disease databases. The user can choose the location, types of diseases and years prevalent. A world view is available and the user can email an image file of the map to themselves.

Great Barrier Reef Marine Park Authority Deep Blue Mapping Tool,

http://www.gbrmpa.gov.au/corp_site/management/zoning/zoning_maps.html/interactive_maps2

This interactive mapping site allows you to explore built up areas, rivers, catchments, reefs and zones of the Great Barrier Reef regions.

OzCoasts and OzEstuaries, <http://www.ozcoasts.org.au/>

OzCoast and OzEstuaries provide comprehensive information about Australia's coast, including its estuaries and coastal waterways. This information helps to generate a better understanding of coastal environments, the complex processes that occur in them, the potential environmental health issues and how to recognise and deal with these issues. OzCoast and OzEstuaries represent the collaborative efforts of more than 100 coastal scientists from a range of government agencies and universities. The site includes specific GIS mapping capabilities including:-

- Smartline Map - The 'Smartline' is a nationally-consistent coastal GIS map in the form of a segmented line. Each line segment includes multiple attribute fields that describe important aspects of the geomorphology of the coast. This data enables an assessment of the sensitivity of the coast to the potential impacts of climate change and sea level rise, including shoreline erosion.
- Mapping Tools - The data search page now contains a comprehensive selection of map layers that can be customised and printed to capture estuary data and information. Some examples include topography, geomorphic habitats and Landsat images.
- 3D Visualisations - Digital 3D Representations of Selected Coastal Environments
- Coastal Monitoring – Provides links to Bureau of Meteorology, providing tidal predictions, real-time wave monitoring, coastal waters and high sea forecasts, weather forecasts and cyclone warning centre.
- Conceptual Models - This module contains comprehensive conceptual models of the biophysical processes that operate in a wide range of Australian estuaries and coastal waterways. There is also a new facility to build your own conceptual model of pressures and stressors affecting your estuary

Reefbase, <http://www.reefbase.org/main.aspx>

An online GIS map focusing on the world's reefs and associated problems. Data is available for download, including the extent of coral bleaching, reef and mangrove distribution and data relating to the health of our reefs. Once you have accessed the home page of the site, go to ReefGIS online map for the mapping display.

Natural Hazards

Flood Maps, <http://flood.firetree.net/>

This site is a quite simple but interesting site to simulate sea level rise around the world. Select the part of the world you wish to see the impact of sea level change and then select the sea level rise in metres. The site uses Google maps as a platform, therefore satellite, terrain or hybrid imagery can also be selected. Check out the satellite image of Brisbane with a 14 metre rise in sea level!

Geoscience Australia, Recent Earthquakes: Online Mapping,

<http://www.ga.gov.au/bin/listQuakes>

This section of the Geoscience Australia website draws maps (large or small) of all earthquakes in the Australia Pacific region in the last month. You are able to select differing months, or search the Earthquake database.

Geoscience Australia, Sentinel Bushfire Hotspots,

<http://sentinel2.ga.gov.au/acres/sentinel/index.shtml>

Sentinel is a national bushfire monitoring system that provides timely information about hotspots to emergency services managers across Australia. The mapping system allows users to identify fire locations with a potential risk to communities and properties.

Global Volcanism Program, Smithsonian Institution, <http://www.volcano.si.edu/>

The Global Volcanism Program seeks better understanding of all volcanoes through documentation of their eruptions. The site includes names and photos of volcanoes, as well as weekly and monthly activity reports. The interactive map can be found on the left hand side of the home page, by clicking on 'The Dynamic Planet Interactive Map' then selecting 'Interactive Map'. The map uses basic GIS tools to show various layers of data including types of plate boundaries, volcanoes and earthquakes according to magnitude.

Hazards Map, FEMA, <https://hazards.fema.gov/femaportal/wps/portal>

This site uses basic GIS tools and satellite imagery to show the areas at risk of floods in the US. From the home page, you will need to click on the 'Map Viewer' at the top of the page.

Pacific Disaster Centre, Natural Hazards and Vulnerabilities Atlas: Asia Pacific Edition,

<http://www.pdc.org/iweb/pdchome.html;jsessionid=A93BA8A6E81248003B86F4CC25A42313>

This site is the best interactive hazard mapping site currently available. Focusing on the Pacific Ocean, it provides an amazing amount of data on all natural hazards in the region. From the home page, you will need to click on the large map in the middle of your screen. This will take you to the Atlas. The atlas has an array of GIS tools including zoom in and out, measure, identify and most importantly the query tool, allowing you to query data and find relationships. The data provided is also extensive and includes earthquakes, volcanoes, tropical storms paths, historical hazards, risk and vulnerability, demographic data, infrastructure, country boundaries, imagery and elevation.

United States Geological Survey (USGS), Earthquake Hazards Program,

<http://earthquake.usgs.gov/>

This site provides up-to-date data on global earthquakes, including magnitude and location. The site provides links to Google Earth, as well as allowing you to download historical and current earthquake data for the whole world. This needs to be saved as a delimited text and can be added to Arcview. Maps can also be created on the website, on topics such as the 'World's most deadly earthquakes since 1900'. Also, have a look at 'Shakemap'. This provides near-real-time maps of ground motion and shaking intensity, which is used by disaster managers for earthquake preparations and modeling.

Global Development, Population and Disease

BBC News, Travel Health Disease Map,

http://news.bbc.co.uk/2/shared/spl/hi/health/03/travel_health/jab_map/html/default.stm

This site provides a very brief overview of global diseases. By clicking on the region, a brief overview of the diseases that are present, as well as the vaccinations that are required for people interested in travelling there.

Drought Monitoring and Early Warning: Food Assessment by Satellite Technology (FAST), http://www.earlywarning.nl/ew_index.htm

This site is very simple and provides an analysis of remote sensing imagery to determine and monitor possible areas of serious food shortage. The imagery provides data on radiation, rainfall, evapotranspiration, drought and desertification indices and crop yield forecasts). The site explains how the remote sensing data is collected and can be downloaded. Data is only provided for Africa and Europe.

Gapminder, <http://www.gapminder.org/>

This site is not your typical spatial technologies mapping site. However, it is amazing and can be used in conjunction with the creation of interactive maps. The site is based on all data collected in the Human Development Reports. Using flash, interactive graphs and spatial data is combined in an animated display. The user can use and change data as they choose. An amazing site and essential for any geography teacher. Gapcasts (downloadable videos) on featured topics, such as maternal mortality, are also explained in detail.

Global Health Atlas, World Health Organisation, <http://www.who.int/globalatlas/>

The Global Health Atlas is the location for standardized data and statistics for infectious diseases at country, regional, and global levels. Select the 'Interactive Map' option at the bottom of the page. This map provides a user-friendly mapping interface that allows users to select geographic areas of interest and create maps of diseases, the location of health facilities, schools, roads, geographic features.

Health Map:Global Disease Alert Map, <http://www.healthmap.org/en>

This site uses Google maps as the viewing platform to provide spatial information on the world's diseases. The site uses various RSS news feeds from medical data bases and news sites, including Google News and the World Health Organisation. Using this data, the site maps reported cases of diseases in the last 30 days. The viewer can zoom to specific countries and continents, as well as specific alerts by country. The site uses GIS layering of the differing disease, so these layers can be turned on or off.

ReliefWeb, United Nations Office for the Coordination of Humanitarian Affairs,

<http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm>

ReliefWeb serves the needs of the humanitarian community by providing a global hub of time-critical humanitarian information on complex emergencies and natural disasters. On the home page, select 'Map Centre' and search maps by date, or by country and emergency. Each map provides an explanation of the humanitarian issue and satellite imagery.

RESPOND, <http://www.respond-int.org/respondlive/>

Respond is an alliance of European and International organizations working with the humanitarian community to improve access to maps, satellite imagery and geographical information. The site provides access to a library of imagery on recent and past humanitarian emergencies. The maps are not interactive, but can be downloaded. File downloads for Google Earth layers are also available.

The Population Reference Bureau, <http://www.prb.org>

This is a US based site that provides statistical information about global population, health and the environment. The home page is very easy to navigate, and the user can browse by topic. By selecting the 'Datafinder' tab, the user can browse by geographical location or topic. This data is then presented as rankings, bar graphs or choropleth maps. The 'Educator' tab provides more than 30 lesson plans and other teaching tools, tailored to subject-area teaching standards. Some of these resources are at cost and all are written for US schools.

UNOSAT, Satellite Solutions for All, Maps ETC,

http://unosat.web.cern.ch/unosat/asp/prod_free.asp?id=66

This is a wonderful site that provides maps useful for the humanitarian community. This is not an interactive mapping site, but does provide static high resolution downloadable satellite imagery. This imagery is taken from various satellites (Ikonos, SPOT, LANDSAT, ENVISAT) to provide detailed maps of human issues. A detailed explanation of each of the maps is also provided.

Sokwanele, Mapping the Election Conditions in Zimbabwe,

http://www.sokwanele.com/map/all_breaches

This site uses Google maps as an interface, allowing the viewer to look at the relationship between certain political factors in the recent Zimbabwean elections (March 2008). Using layers, the user can look at food supplies, voter registration, unlawful detention etc.

Who is Sick?, <http://whoissick.org/sickness/>

This is the site for current and local sickness information. This is a US based site that allows users to post information about their sickness.

Weather Data

Australian Bureau of Meteorology, www.bom.gov.au

This is the best site for up-to-date weather information in Australia. The latest addition of the Doppler Radar, as well as animations for the last 10 minutes, 1 hour and 24 hours is great for class. GIS data and satellite imagery can also be downloaded from the site. Look specifically at the tabs on the left hand side of the site. This includes 'Water and Land Management' (specific data for people involved in primary production, natural resource management and industry), 'Water Information' (a new part of the BOM site providing a comprehensive overview of water data) and 'Climate Data Online' (provides climate maps or specific climate data).

Interactive Sea Surface Temperature Map of Australia, CSIRO Marine Research,

http://www.marine.csiro.au/~lband/web_point/

This map provides up-to-date sea surface temperature data for Australia for all areas. Clicking on any spot on the map will provide the latitude, longitude and the sea surface temperature.

Unisys Weather, <http://weather.unisys.com/>

This is a US based site that provides a complete source of geographical weather information for the country. No global data is provided, however it does provide detailed explanations of satellite imagery, enhanced IR satellite imagery, radar summaries and forecasts. The best feature of the site is the explanation of weather forecast modeling using remote sensing imagery.

Weatherzone, Stormtracker, <http://www.weatherzone.com.au/stormtracker.jsp>

This site allows you to view different elements of current weather patterns, particularly storm weather in Australia. You can view the country as a whole, or zoom in to particular states and territories. The site uses basic GIS tools to allow differing layers of information to be shown, including the weather radar, weather observations and satellite imagery. A detailed glossary and legend is also provided, to explain the differing symbols. Links are also available to other websites.

Spatial Technologies but Left of Centre

Australian Government Department of Health and Aging, The National Public Toilet Map, <http://www.toiletmap.gov.au/>

This funny but very important site allows the user to browse and find public toilets in Australia. It also enables the user to plan a trip, or by registering, save trips, destinations and favourite public toilets. Users can also suggest a toilet.

BuzzTracker, <http://buzztracker.org/>

This site has combined spatial software with news broadcasting. To show the interconnectedness of today's world, it combines spatial technology with the media to provide a spatial overview of the frequencies of locations appearing in global news coverage. This is an excellent tool for introducing any geography topic, as well as useful in English and media studies. One disadvantage is that it only tracks English language news sources.

Maps of War: Visual History, <http://www.mapsofwar.com/index.html>

This site provides animated maps and explanations on various historical topics. Some of the topics include History of Religion, March of Democracy, Terrorism and World War II. You are able to link, download or embed the animation.

Newsmap, <http://www.marumushi.com/apps/newsmap/newsmap.cfm>

This application is similar to Buzztracker, but rather than locating headlines, it visually represents the world or national news according to category and prominence. The application visually reflects the constantly changing landscape of world and national news. Using Google news, the larger the headline the more that headline features in the media. News headlines are also categorized.

National Trust Surname Search, <http://www.nationaltrustnames.org.uk/>

Do you know where your surname comes from, or how many people you share it with? Welcome to the National Trust Names. The website presents the findings of a project based at University College London (UCL) that is investigating the distribution of surnames in Great Britain, both current and historic. It allows users to search the databases that we have created, and to trace the geography and history of their family names. The National Trust is also currently developing a Worldwide Surname Search, so keep this link for up-dates!

Downloadable GIS Data

Australian Bureau of Statistics, <http://www.abs.gov.au>

You will need to access the 'Education' section of the site at <http://www.abs.gov.au/websitedbs/cashome.nsf/Home/Entry%20Page.es>. Information is divided into teacher and student areas.

Geography Network, <http://www.geographynetwork.com/>

A wealth of data from vegetation, to cities, populations, climates etc for the world. This data can be viewed using AEJEE or ArcMap. Look at the 'What's New' and 'Featured Content' sections for further information.

Geoscience Australia, <http://www.ga.gov.au/>

Specifically <http://www.ga.gov.au/oracle/index.jsp> online mapping and databases provides access to all of the freely available Geoscience data. You will need to register and explain your uses for the data. You will then be sent an access key to access the data that you have asked for. You will need to have access to a program that will unzip these files.

Geospatial Engine, National Imagery and Mapping Agency (NIMA), http://earth-info.nga.mil/geospatial/digital_products.htm

This site provides access to imagery of the Earth, maps and other geospatial information produced by the National Imagery and Mapping Agency (US based). You will need to use the Geospatial Engine to view these datasets. Understanding and accessing the data is quite complex, so I strongly suggest using the 'Additional Support' provided in the 'Help' section at the bottom of the home page.

Global Environment Outlook GEO Data Portal, United Nations Environment Programme, <http://geodata.grid.unep.ch/>

The GEO Data Portal is an authoritative source of data sets used by UNEP and its partners in the Global Environment Outlook Report and other integrated environmental assessments. The online database holds more than 450 different variables, as national, subregional, regional and global statistics or as geospatial data sets (maps), covering themes like Freshwater, Population, Forests, Emissions, Climate, Disasters, Health and GDP. These can be displayed as maps, graphs or data tables, or the data can be downloaded. The site also provides tips and tutorials for getting started and advanced search settings for data.

Office of Economic and Statistical Research, <http://www.oesr.qld.gov.au/>

This is an excellent site that provides downloadable excel files of data on any demographic data you are looking for. This site is a great companion with the ABS site, as it breaks down ABS data for specific Queensland topics and regions. The excel files you download can be easily transformed into Arcview shapefiles. Interactive mapping opportunities are also available, so you don't need a GIS program to map the data provided.

General Information on Spatial Technologies for Teachers

About.Com: Geography, Geographic Technology,

http://geography.about.com/od/geographictechnology/Geographic_Technology.htm

This site provides an overview and links for users on spatial technologies.

Australia's Spatial Industry Portal,

http://www.xyz.au.com/public/general_info/listings.cfm?category_id=15&sub_category_id=114

This site provides access to a number of lessons and applications of GIS in the classroom. There is an introduction lesson, with applications for teachers. Following

this, the site provides beginner, intermediate and advanced GIS based lessons on a number of topics. The lessons are written for both ArcView and MapInfo.

Create-A-Scape, <http://www.createascape.org.uk/>

A media scape is a virtual field trip created by recording noises and sounds at certain GPS points, and playing these over a PDA or handheld device, when the person reaches that point. It includes free downloadable (for schools) **mscape toolkit** software and enables the creation of an exciting learning adventure using various images, audio and instructions through a range of technologies. An example of a student learning experience can be found at http://www.createascape.org.uk/scrapbook/teachers/case_01.html

Degree Confluence Project, <http://confluence.org/>

The goal of the project is to visit each of the latitude and longitude integer degree intersections in the world, and to take pictures at each location. The pictures, and stories about the visits, will then be posted here. Viewers are invited to post any of the existing confluence. Also, have a look at the antipodes, points on opposing sides of the world.

Digital Geography – <http://www.digitalgeography.co.uk/>

This is a blog site set up by teachers in the UK. It is great as there are a number of activities and ideas to incorporate digital mapping into the Geography classroom. The other interesting aspect is that other teachers are commenting on each of the sites and activities posted.

Discover Handhelds, <http://eduscapes.com/sessions/handhelds/>

Explore a variety of handheld devices PDAs, GPS, and cameras. Learn about practical ways to integrate these devices into the classroom.

Discovery Education, Lesson Plans Library, Reading Satellite Images,
<http://school.discoveryeducation.com/lessonplans/programs/satelliteimages/>

This site is a section of the Discovery Channel's Lesson Plan Library on 'Reading Satellite Images'. All handouts, homework activities and images are provided as pdfs. Extension activities are also outlined. This is aimed at lower secondary students and is US based.

Earthcache, <http://www.earthcache.org/>

EarthCache site is a special place that people can visit to learn about a unique geoscience feature or aspect of our Earth. This website provides access to the world's earthcache sites, as well as enables user to upload their own sites. There is also a section for teachers that provides a guide on how to introduce EarthCacheing to your students. Lesson plans of some of the existing sites are also provided.

ESRI, ArcLessons, <http://gis.esri.com/industries/education/arclessons/arclessons.cfm>

ArcLessons is a resource for teachers to share lessons for using GIS in the classroom. You can browse a list of lessons by category or use the search tools to find lessons in your area of interest. If you do not have access to GIS software, search according to

AEJEE (the free downloadable software). This will provide a number of lessons that you can use.

ESRI Australia GIS in Schools Program, <http://www.esriaustralia.com.au/esri/962.html>
ESRI Australia GIS in Schools Program is now in its 10th year and has supported over 500 schools and many more teachers to introduce GIS in their classrooms. The site provides links to sections that explain what GIS is and how it can be used in the classroom. The site also provides information on how to purchase GIS software.

Garmin, What is GPS?, <http://www8.garmin.com/aboutGPS/>

A downloadable pdf that explains, in lay mans terms, how GPS works. It also provides detailed information on how to use a GPS (garmin).

Geocaching Australia, <http://geocaching.com.au/>

Geocaching Australia provides statistics and tools to analyse Australian and New Zealand Geocaches and Geocachers using details from several cache listing sites as well as providing a place for listing geocaches directly in any country around the world.

GIS Lounge, <http://gislounge.com/>

Provides extensive information on GIS, GPS and how these technologies are used everyday.

Google Earth Resources for Geography Teachers,
<http://www.geographypages.co.uk/googleearth.htm>

A multitude of resources for Geography teachers on how to use Google Earth in the classroom. This site was established and maintained by a UK Geography teacher.

Google Earth Hacks, <http://www.gearthhacks.com/>

This site provides links to interesting content found or created by users like you and gives you quick access to check things out in Google Earth. You can also submit your own files to the site.

Google Sketch Up, <http://sketchup.google.com/tutorials.html>

Got a couple of minutes? Want to get started with 3D modeling? These quick video tutorials will teach you how to model in SketchUp and placing your work in Google Earth. For best performance, please make sure your browser is up-to-date.

JuicyGeography, <http://www.juicygeography.co.uk/>

This is an excellent internet site developed in the UK. It is really interesting to look at and provides some great step by step activities to incorporate geographical skills in the classroom. In particular, there are a number of activities using GPS, GIS skills and Google Earth. To access these, go to the 'Resource List' tab and search by topic.

MapCruzin.Com, <http://www.mapcruzin.com/>

What is MapCruzin? Simply put, our mission is to provide the information, tools, resources and expertise to enhance personal growth and knowledge and empower

you in your efforts towards improving environmental and social conditions. The site provides tutorials, free GIS data and discussion blogs on GIS data. Maps and data are up-dated frequently and included topics such as climate change, wireless connection in the US, and maps of the Arctic.

MapZone – GIS Zone, <http://mapzone.ordnancesurvey.co.uk/giszone/english/>

This website, developed by the UK's Ordnance Survey, provides a lot of information on GIS; from GIS theory to professions in GIS as well as providing access to GIS 'missions' which allow the user to interact with a GIS in a real-life situation. These GIS games are a really easy way to demonstrate the power and relevance of GIS in our society.

National Geospatial Intelligence Agency Children's Site,

<http://www.nima.mil/ngakids/index.html>

The National Geospatial Agency is a US based organization. They aim to promote awareness of spatial technologies and have created this site that includes games and information aimed at both children and teenagers, to do this. This site has great information about remote sensing. You will need Flash to view this site.

Space Place, NASA, <http://spaceplace.jpl.nasa.gov/en/kids/>

NASA's kids website provides a fun, interactive way for students to learn about topics such as space, the weather, the greenhouse effect, geography and energy. It features game, projects and animations. This site is aimed at primary schools students.

STEM: Geospatial Technology Curriculum Resource, National Centre for Rural Science, Technology, Engineering and Maths Education Outreach, James Maddison University,

<http://www.isat.jmu.edu/stem/curriculum.html>

This site provides access to 11 step-by-step GIS activities written for both AEJEE (free version) and Arcmap. Topics include world demographics, disasters, energy use and drinking water. The site also has podcasts that you can use to review different GIS techniques.

US Department of Homeland Security, Navigation Centre, General Information on GPS, <http://www.navcen.uscg.gov/gps/default.htm>

This site provides very detailed and specific information about the GPS systems and how they work.