# connections

# Collaboration: The virtual and the real world
# What the muggles don't know

*Have you heard of geocaching, letterboxing, the bookcrossing or the Degree Confluence Project? Ordinary people spend their time on treasure hunts that combine high technology such as the Internet and GPS (Global Positioning Systems) with doing puzzles, reading books and clambering into hideaway places. The possibilities of these activities in our schools are only as limited as our imagination. This article will introduce some of these activities.*

Geocaching, letterboxing and the bookcrossing are strange terms: portmanteau words that try to convey a marriage of the real and the virtual. They are ways that 'real' people (not just kids) combine the collegiality of the web with real world activities. All are variations of old children's games of treasure hunts. Maybe some enterprising teachers and students could get involved, as they all have incredible possibilities for 'real' involvement with the world around us, and with other people who are not necessarily involved in education. It is often refreshing for students to realise there is a world outside school where people learn and try things just for fun.

## Letterboxing

Letterboxing is an old English sport that combined orienteering, hiking and treasure hunts. Originally on Dartmoor in 1854 a walker placed a glass jar in a remote location for other hikers to find and place their visitor's cards in, as explained in *The History of Letterboxing* (Dartmoor Letterboxing, 2005). Later, boxes containing postcards to mail and a visitors' book were marked on maps for energetic walkers to find. Now, boxes of all kinds (often handmade and beautiful) containing a rubber stamp (also often handmade) and a guest book are hidden in out-of-the-way places that ordinary people will not see.

Many letterboxing locations are established throughout the world. Clues are conveyed through clubs, word of mouth and on the web. Sometimes finding the box and using or copying the stamp is enough; sometimes there are all manner of cryptic clues to decipher! Letterboxing has a high-tech variation called geocaching.

## Geocaching

Geocaching is an activity where individuals place (or hide) articles in all kinds of places around the world for others to find using GPS. This is then reported on various websites. It is a free high-tech treasure hunt where you use your GPS receiver to find caches hidden by other players (Geocaching Australia, 2005). All you need to take part is a GPS receiver, access to the Internet and a sense of fun and adventure. People compete with others in groups or as individuals.

Many use articles that provide pieces of a puzzle, which can be put together to find the 'treasure'. The treasure can be as small as a film canister or as large as public sculpture! On the various websites there is often advice on terrain and crowds, other helpful hints, additional codes to decipher and logs about how individuals found the cache. The term 'muggles' is now often used to identify those who are not in the know. Just to confuse things, items are often moved a little or replaced with other objects. The idea is that you may take the object in the cache as long as you replace it with an object of the same or larger value. Often people add extra 'treasure' to make life interesting. Many treasure hunts rely on particular knowledge eg about films, books or art.

There are variations such as in geodashing, where the items are only in place for a month. Players use GPS receivers on a playing field that covers the entire planet *Geodashing* (GPSgames, 2005). Other variations are Podcaching, using mp3 players (*Podcacher*, 2005) or EarthCache (Geological Society of America, 2005) a specific

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# Collaboration: The virtual and the real world (cont.)

educational variation where each cache has geological information.

One very interesting co-operative variation is the *Degree Confluence Project* (2005). 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. People from all over the world have already submitted thousands of photographs. Have a look at the hundreds of photos taken already in Australia. Maybe you can add one or two on your travels!

These activities certainly have potential to let outdoor education, geology and geography students hone their navigation skills, and let society and environment students develop their awareness of history or urban development. Other students can use these activities to hone their skills in almost any subject area depending on the clues placed and answers required.

## Bookcrossing

*Bookcrossing* (Hornbaker, 2005) can be seen as a variation of these activities. This 'game' encourages readers to read, register, and 'release' books for others to enjoy. Precise details of the location are not always required, as sometimes the 'release' is to give a book to someone. Books are registered, given an ID then tracked as people find them, read them and log their location in the journal on one of the bookcrossing websites. The aim is to share books you have loved rather than put them back on your own bookshelf! The activity does not restrict sales of books as many people buy copies of books they read from being released. Many people buy two copies of great books, one to read and one to set free! There are many places all over the world where you can look for a 'free' book, for example *Go hunting in Perth* (Hornbaker, 2005).

While it might seem an individual activity confined to web conversations, there are also people in groups all over the world who get together to talk about books they have read – books they have captured and released. The *Bookcrossing Meetup Groups* site helps locate groups, as does *Bookcrossing Australia!*

This activity seems ready-made to encourage children to read and share books in a local area and further afield. Certainly, reading the inspired journals of many ordinary people all over the world can only encourage our students.

You can read more about these activities at this collection of links: *Collaboration: The Virtual and the Real World* (Horton, 2005). Of course collaboration on the internet is not confined to these activities. Students and teachers have many specific projects that link them together worldwide, ranging from email projects to videoconferencing, for example, *Collaborative Projects: Co-operation across the World by E-mail and Video* (Horton, 2005). And there are also ways you can use the web to get to a place when it is too expensive or dangerous to get there in reality, for example, *Virtual Experiences, Experiments, Exhibitions, Tours and Quests* (Horton, 2005).

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# How does Google collect and rank results?

*One of the most common questions we hear from librarians is 'How does Google decide what result goes at the top of the list?' Quality Engineer Matt Cutts provides a quick primer on how they crawl and index the web and then rank search results. Matt also suggests exercises school librarians can do to help students.*

## Crawling and Indexing

A lot of things have to happen before you see a web page containing your Google search results. Our first step is to crawl and index the billions of pages of the World Wide Web. This job is performed by Googlebot, our 'spider', which connects to web servers around the world to fetch documents. The crawling program doesn't really roam the web; it instead asks a web server to return a specified web page, then scans that web page for hyperlinks, which provide new documents that are fetched the same way. Our spider gives each retrieved page a number so it can refer to the pages it fetched.

Our crawl has produced an enormous set of documents, but these documents aren't searchable yet. Without an index, if you wanted to find a term like *civil war*, our servers would have to read the complete text of every document every time you searched.

So the next step is to build an index. To do this, we 'invert' the crawl data; instead of having to scan for each word in every document, we juggle our data in order to list every document that contains a certain word. For example, the word 'civil' might occur in documents 3, 8, 22, 56, 68 and 92 while the word 'war' might occur in documents 2, 8, 15, 22, 68 and 77.

Once we've built our index, we're ready to rank documents and determine how relevant they are. Suppose someone comes to Google and types in *civil war*. In order to present and score the results, we need to do two things:

- Find the set of pages that contain the user's query somewhere
- Rank the matching pages in order of relevance

We've developed an interesting trick that speeds up the first step: instead of storing the entire index on one very powerful computer, Google uses hundreds of computers to do the job. Because the task is divided among many machines, the answer can be found much faster. To illustrate, let's suppose an index for a book was 30 pages long. If one person had to search for several pieces of information in the index, it would take at least several seconds for each search. But what if you gave each page of the index to a different person? Thirty people could search their portions of the index much more quickly than one person could search the entire index alone. Similarly, Google splits its data between many machines to find matching documents faster.

How do we find pages that contain the user's query? Let's return to our *civil war* example. The word 'civil' was in documents 3, 8, 22, 56, 68, and 92; the word 'war' was in documents 2, 8, 15, 22, 68, and 77. Let's write the documents across the page and look for those with both words.

| | | | | | | |
|---|---|---|---|---|---|---|
| civil: | 3 | 8 | | 22 | 56 | 68 | 92 |
| war: | 2 | 8 | 15 | 22 | | 68 | 77 |
| both words: | | 8 | | 22 | | 68 | |

Arranging the documents this way makes clear that the words 'civil' and 'war' appear in three documents (8, 22, and 68). The list of documents that contain a word is called a 'posting list', and looking for documents with both words is called 'intersecting a posting list'. (A fast way to intersect two posting lists is to walk down both at the same time. If one list skips from 22 to 68, you can skip ahead to document 68 on the other list as well.)

## An exercise for students

Once you see how to intersect two words in an index, it's not hard to do it for three or more words as well. Here's a fun exercise: try to find all the documents below that contain the words 'civil' and 'war' and 'reconstruction'.

civil: 1 9 15 19 22 35 38 48 53 55 65 68 73 78 82 88 91 99

war: 15 18 25 29 31 35 37 40 42 46 48 65 75 85 91 96

reconstruction: 35 42 48 64 73 91 95

The answer is at the end of the article.

## Ranking Results

Now we have the set of pages that contain the user's query somewhere, and it's time to rank them in terms of relevance. Google uses many factors in ranking. Of these, the PageRank algorithm might be the best known. PageRank evaluates two things: how many links there are to a web page from other pages, and the quality of the linking sites. With PageRank, five or six high-quality links from websites such as http://www.cnn.com and http://www.nytimes.com would be valued much more highly than twice as many links from less reputable or established sites.

But we use many factors besides PageRank. For example, if a document contains the words 'civil' and 'war' right next to each other, it might be more relevant than a document discussing the Revolutionary War that happens to use the word 'civil' somewhere else on the page. Also, if a page includes the words 'civil war' in its title, that's a hint that it might be more relevant than a document with the title '*19th Century American Clothing*'. In the same way, if the words 'civil war' appear several times throughout the page, that page is more likely to be about the civil war than if the words only appear once.

## An exercise for students

Pretend that you're a search engine. Pick a query like 'civil war' or 'recycling' or whatever you want. Search for the phrase on Google, pick three or four pages from the results, and print them out. On each printout, find the individual words from your query (such as 'civil' and 'war') and use a highlighter to mark each word with colour. Do that for each of the documents that you print out. Now tape those documents on a wall, step back a few feet, and squint your eyes. If you didn't know what the rest of a page said, and could only judge by the coloured words, which document do you think would be most relevant? Is there anything that would make a document look more relevant to you? Is it better to have the words in a large heading or for them to occur several times in a smaller font? Do you prefer it if the words are at the top or the bottom of the page? How often do the words need to appear? See if you can come up with two or three things you would look for to see if a document matched a query well. This can help students learn to evaluate website relevance the way a search engine would evaluate it so that they can better understand why a search engine returns certain results over others.

# How does Google collect and rank results? (cont.)

As a rule, Google tries to find pages that are both reputable and relevant. If two pages appear to have roughly the same amount of information matching a given query, we will usually try to pick the page that more trusted websites have chosen to link to. Still, we'll often elevate a page with fewer links or lower PageRank if other signals suggest that the page is more relevant. For example, a web page dedicated entirely to the civil war is often more useful than an article that mentions the civil war in passing, even if the article is part of a reputable site such as http://www.time.com.

Once we have made a list of documents and their scores, we take the documents with the highest scores as the best matches. Google does a little bit of extra work to try to show snippets – a few sentences – from each document that highlight the words that a user typed. Then we return the ranked URLs and the snippets to the user as results pages.

As you can see, running a search engine takes a lot of computing resources. For each search that someone types in, over 500 computers may work together to find the best documents – and it all happens in under half a second.

[Answer: Only documents 35, 48, and 91 contain all three words 'civil' and 'war' and 'reconstruction'.]

*Matt Cutts*
*Software Engineer*
*Google*

*Matt spends his days trying to help good sites rank where they should and developing techniques that keep deceptive or spammy sites from showing up in Google's search. He also has a web log at http://www.mattcutts.com/ blog/ that often discusses webmaster issues.*

## *Connections*

*Connections* is a quarterly newsletter produced by the Schools Catalogue Information Service (SCIS), a business unit of Curriculum Corporation. SCIS is committed to publishing informative and useful material for the benefit of library staff in schools. Our focus is helping library professionals keep up to date with the latest in information services and information technology relevant to school libraries.

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# Science literacy and the school librarian

***Peter Macinnis outlines his views on science literacy and what librarians can do to improve the scientific literacy of students.***

I am an old science teacher who now writes full-time, mainly about science. In a varied career as teacher, administrator, museum educator and writer, my highest aim has always been to develop the understanding of science, both at a public level and a school level.

I am concerned by all sorts of culture, and the values of science and science literacy are right up there in my cultural pantheon. According to the OECD:

> *'Scientific literacy is the capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity.'*

That fits with what I understand. It agrees with what science education says, but how useful is it? I suspect that it is like saying 'there's Mount Olympus – go climb it!' when we should be handing out climbing boots and showing people how to tie the laces, before explaining what a crampon is. As in so many things, we need to walk before we run.

We also need to have a clear idea of the route we will follow up that mountain, to choose the key places along the way and to know what alternatives are available. To scientists, scientific literacy involves possessing a scientific vocabulary, understanding how the processes of scientific enquiry take place, and having a grasp of the basic concepts and principles. It need not be our aim to get everybody to the summit, but they should get to a decent altitude, and have the chance to go on up, should they wish.

Adopted by practising and practical teachers, scientific literacy is often about getting students to read, understand and view critically something written about science. It may also involve writing about science, which then develops their vocabulary, processes and concepts.

## Vocabulary
Some years ago, I did some work for a dictionary project. I identified around 5,000 words of technical science that students need to know but may not recognise. Consider the number of dinosaur names known to a 7-year-old, or footballers' names known to a 12-year-old. We just need the right packaging, and maybe a few word attack skills, showing them how to identify Greek and Latin roots.

This is always a problem area – when I was a lad, I was told that 'boys who do physics don't do Latin', but luckily I had acquired enough by then. Most science teachers lack training in the classics, and teachers of English would be unaware of the range of words science students need to know, though a look at the indexes of a couple of textbooks will make the problem clearer.

## Processes
Processes of science are a challenge, because the textbooks all refer to 'the scientific method'. Some years back, when I started looking at how scientists work, I found seven modes of enquiry: controlled experiments, interpretation, fraud, fiddling, speculation, polemic and pseudo-science. Not all of those are legitimate, but they are things scientists and alleged scientists really do.

When students are brought up on the hypothesis/crucial experiment model of science, they miss a great deal. Under fiddling, for example, I include data snooping; where you assemble the data, look for a pattern, then try to see if there is any logical reason why there should be a pattern. If there is, then the scientist may be onto something.

## Concepts
Concepts and principles, the big ideas of science, are probably the hardest part. Scientists rarely stop to think about just what assumptions they are making, because it is second nature to them that energy is neither created nor destroyed, that pressure is transmitted equally in all directions and that matter must be made up with atoms. They forget that much of science is profoundly counter-intuitive – at least to their students who view things in a certain physical scale and a certain time frame.

Ask students why rockets move forward and they will probably relate it to a swimmer pushing off from the end of a pool, because that is the intuitive view. In 1920, *The New York Times* published a scathing attack on professor of physics Robert Goddard, who planned to send rockets into space. They claimed that the rockets would not fly in space because there was nothing for them to push against! On July 17, 1969, when the first humans to land on the moon were almost on the surface, the paper published a retraction.

I write mainly about the history of science, because I am fascinated with the ways people have discovered things. I like to share the stories and they make science come alive. One little yarn, like the criticism of Goddard, can start a whole new train of thought, and put young people in the same sort of puzzle that Newton faced when he came up with that formula about every action brings about an equal and opposite reaction (or why you don't fire an elephant gun while standing on a skateboard). The trouble is most of that is higher-order stuff!

## SPLATS
So what are the big ideas of science? I state some in my SPLATS (Science Principles, Laws, Assumptions, Theories and Something), and there is a URL for some samples at the end of this article. I decided my SPLATs would be limited to 160 characters – that forced me to keep them simple, but I allow myself to write cascades that follow on in a logical way. My original idea was that teachers could put them on bits of cardboard and splat them on the lab walls, but there are other uses as well – I just don't have the right packaging, yet, but I am working on it. Look at the models and filch them or write your own.

If science literacy is supposed to bring about people with a command of science, what can librarians do about it, and should they do anything at all? The modern curricula are entirely inappropriate for the majority of student teachers, but I believe I acquired 90% of the science I now know after I had graduated and started teaching. Science teachers are often overloaded with safety, assessment and other administrative requirements.

The Web is there to help, so I posed a question to several email lists, asking what you understand by 'science literacy'. The responses ▶

# Science literacy and the school librarian (cont.)

were varied. One respondent referred me to a list of 21st century skills that includes basic, scientific, economic, technological and visual literacies, and it struck me that we scientists may be narrowing in a little too much. There are a lot of literacies out there, and most of them come back to being able to think critically in an informed way. Even multicultural literacy is on the list, and my favourite, economic literacy, which I define as the ability to recognise that economic rationalism is the opposite of rational economics.

One strand of responses referred to advertisements for miracle water with amazing curative and restorative powers that quacks have always sold to the gullible. A good proportion of my correspondents believe that being able to see through such claims should come from scientific literacy. A society falling for such blandishments cannot be scientifically literate.

A scientifically literate person will not try to reconcile religious views with evolution. One friend tells me this is like trying to reconcile apples and William of Orange. Sadly, all too many supposedly scientifically literate people are unable to put their finger on the flaw in creationism, especially when it is served up in the guise of intelligent design.

Others raised the popularity of astrology, even today, but then one writer introduced a more interesting note: the question of metalanguage, where scientists use words like mass and velocity in special ways, as well as a variety of special notations (chemical symbols and measurement units and their abbreviations among them).

## Science Publications

One simplistic response from the library might be to provide more books that cover scientific topics. Dan Brown's *Angels and Demons* has an appalling assertion about the force of gravity at 60,000 feet being 30% less than on the ground (try 0.3%!), and he has no idea of the forces involved in parachuting. Most exciting fiction is only exciting because it refuses to be bound by the harsh realities of science – see Matthew Reilly or most films.

That leaves a few options – popular science books that provide a good grounding and popular science journals – but each of these has drawbacks. There is a severe lack of good

science material that both entertains and illuminates, and we are especially short of material that inspires students to go out and enquire, emulating David Attenborough and his camera people who capture fascinating footage.

Where are today's versions of J. B. S. Haldane, Lewis Thomas, George Gamow, Isaac Asimov, Peter Medawar, Stephen Jay Gould, Jared Diamond and Primo Levi? Who can draw our young people into science by informing them and sending them outside to discover for themselves? I think one or two of those authors are still alive, but there are few replacements rising.

That leaves us with the science journals. Among scientists, you will find many references to *New Scientist* and *Scientific American*, usually in the context that being able to read these is the sign of a mature scientific literacy. You will find many practising scientists who use these journals, especially *Scientific American*, to stay abreast of other fields. This is the real challenge of scientific literacy, that nobody can truly be said to stay abreast of it all any more.

*New Scientist* is probably the best for general information, and it makes a good reference set to keep. Senior students may appreciate having access to the past 19 years worth of magazines online. There is still a problem: how do you get students to visit magazines and sites like this?

Heinemann's *sciencemax* magazine was designed to be sold and used in classes; however, they stopped publishing it in 2004. I suspect there isn't a big enough market for that sort of publication. *Newton* ceased publication, and while some of the same people are bringing out *Cosmos*, I find it slick and not inspiring to students. *Australasian Science is* a useful adjunct to learning. *Scientriffic* and *The Helix*, both part of the CSIRO's education operation, are very good.

There is no agreement on what scientific literacy is, probably because you need to stop and ask 'in whom?' first. It is a crowd of related traits, not a single item.

It is appropriate to speak in terms of an ability to spot the flaws in the babble of pseudo-science, but when we work with children we are trying to help them move along a continuum. Just as some beginner readers struggle yet may

one day emulate Marcel Proust, so some of our school science students may one day emulate the chemist, Joseph Louis Proust. Right now, we don't know which ones are which, or which may be both.

I have a mantra that says education, teaching, training, wisdom, knowledge, learning, understanding and erudition are not the same thing. If we target these with joy, enthusiasm and culture, we will have done a good thing.

*Peter Macinnis*

For more on how Peter sees literacy in the non-science sense, look at: http://members.ozemail.com.au/~macinnis/literacy.htm

His take on the seven types of science is at: http://www.abc.net.au/science/slab/macinnis/story.htm

The OECD definition (and more): http://tinyurl.com/fasfs

The main consulted lists: http://abc.net.au/science/play/lists.htm

The 21st century skills: http://www.ncrel.org/engauge/skills/agelit.htm

The CSIRO magazines: http://www.csiro.au/sydcsirosec/helix/index.html

For more on the SPLATs: http://members.

**Peter Macinnis lists among his hobbies chatting to telemarketers in Latin, walking up small mountains slowly, and sitting on top of small mountains, wondering how to get down again.**

**His recent books include:**

*Bittersweet: the story of sugar*, 2002, SCIS No: 1105234

*Rockets: Sulfur, Sputnik and Scramjets*, 2003, SCIS No: 1145285

*The Killer Bean of Calabar and Other Stories: poisons and poisoners*, 2004, SCIS No: 1188673 (*Killer Bean* is being translated into five other languages.)

*It's True! You Eat Poison Every Day*, 2006, SCIS No: 1248363.

# Internetting corner

### 3 Doors to InfoLiteracy

http://infolit.unitecnology.ac.nz/3doors/
After extensive research, Dr Gwen Gawith developed a trademarked information literacy learning model and programme. Based on twenty learning actions grouped into three categories, the site includes sections on: Learner's Role, Teacher's Role, Using 3 Doors, Curriculum Cases and Using 3 Doors for Research.
SCIS No: 1256874

### Actionbioscience.org

http://www.actionbioscience.org/
Initiated with the aim of promoting bioscience literacy, this resource offers science students and teachers an array of information centred around seven bioscience challenges: environment, genome, biodiversity biotechnology, evolution, new frontiers and education.
SCIS No: 1253052

### Government Education Portal – Australia

http://www.education.gov.au/
Focusing on the educational programs, policies, events, publications and resources of the Australian Government, this portal also contains links to educational sites within state and territory governments. The intended audience includes educators, students, employers and parents from all education sectors.
SCIS No: 1192389

### Intel Education: The Journey Inside (SM) Cover

http://www.intel.com/education/journey/
Intel has created a series of interactive, online lessons that encourages students to gain a greater insight into the world of technology. Topics covered include microprocessors, computers, the Internet and digital information.
SCIS No: 1234951

### Internet Anagram Server/I, Rearrangement Servant: anagram, anagrams, anagram

http://www.wordsmith.org/anagram/
By simply typing a word or phrase users can get the server to list possible anagrams. Advanced features allow users to specify minimum and maximum number of letters per word and to generate anagrams in several other languages.
SCIS No: 1256946

### The Koori History Project

http://www.kooriweb.org/foley/
Designed and operated by Gary Foley of the Centre for Indigenous Education, University of Melbourne, this comprehensive indigenous history archive and education resource offers over 3500 pages of information, essays, images, cartoons, film archives and links.
SCIS No: 1115044

### The Lab – Australian Broadcasting Corporation's Gateway to Science

http://www.abc.net.au/science/
Containing colourful graphics and a crisp, clear layout, this portal offers users a variety of contemporary and innovative science websites. Aimed at a youthful audience, content includes: Dr Karl, podcasts, TV and radio program information, science news and an archive of previous features.
SCIS No: 1109320

### Lemelson Center Presents Invention at Play

http://www.inventionatplay.org/index.html
Developed by the Lemelson Center for the Study of Invention and Innovation, this resource focuses on the interaction of toys and play in the inventions of historic and contemporary inventors. Teachers can access appropriate classroom resources and activities.
SCIS No: 1218781

### Picturing Books: A Website About Picture Books

http://picturingbooks.imaginarylands.org/
Although not visually stunning itself, this guide to using picture books contains a wealth of information. Features include the anatomy of picture books, evaluating picture books, links to authors and illustrators, publishing, artistic style and media, and a glossary.
SCIS No: 1128767

### Poetry.com.au

http://www.poetry.com.au/
Housing an impressive array of poetry, this searchable archive is divided into three groups: Classics, Original Works and Indie Poets. A useful feature is the link to additional poetry websites.
SCIS No: 1257006

### Relativity: Einstein's Theory of Relativity in Animations and Film Clips. Einstein Light

http://www.phys.unsw.edu.au/einsteinlight/
Designed for both students and teachers of physics, this site emanates from the University of New South Wales. It features several encompassing multimedia modules to help simplify the complex topic of Einstein's Theory of Relativity.
SCIS No: 1257003

### Science for Schools

http://www.csiro.au/csiro/channel/pchaq,,.html
Details of the scientific education projects operated by the CSIRO are outlined on this resource. The site houses information regarding awards, competitions, CSIRO Science Education Centres, the Double Helix Science Club and research projects for teachers and students.
SCIS No: 1256999

### Snowy Hydro Homepage

http://www.snowyhydro.com.au/
Major aspects of the Snowy Mountains Scheme are outlined on this official website, which is suitable for case studies involving water, energy, engineering, the environment and tourism. Clearly organised features include: a picture library; maps; snow level and lake depth calculators; educational kits and programs; and associated links.
SCIS No: 1215358

### Waterwatch Victoria

http://www.vic.waterwatch.org.au/
A community engagement program, Waterwatch Victoria connects local communities with sustainable water management and river health issues. The information, links, educational resources and online activities are suitable for many aspects of environmental education.
SCIS No: 1038055

*Reviewed by Nigel Paull*
*Teacher-Librarian*
*South Grafton Primary School*
*n.paull@bigpond.com*

> The Internet sites abstracted in *Internetting Corner* are often of a professional nature and should be initially viewed by teachers and library staff to determine suitability for students. The links, content and addresses of sites reviewed may not be permanent.
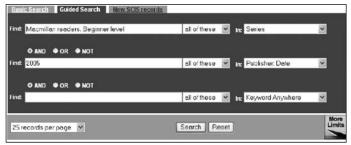
# ☑ SCISWeb handy hints

## Using SCIS OPAC to create an orders file

If you require a list of websites by subject or have a whole set of books, eg readers or a series, a list created in SCIS OPAC can be transferred into *Create orders*.

1  To perform your search, open *SCIS OPAC.*

2  Select *Guided Search*.

3  Enter search terms in the *Find* box.
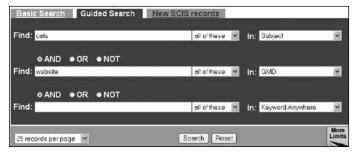   Here are two examples: For a *Series* and *Publisher: Date*

   **Example 1:** Finding Macmillan readers at beginners level published in 2005



*SCIS OPAC screen dump © Endeavor Information Systems Incorporated.*

For a *Subject* and *GMD* (General Material Designation)

**Example 2:** Finding websites about cats



*SCIS OPAC screen dump © Endeavor Information Systems Incorporated.*

4  Select title/s from the results list.
   Either – Select all titles from the results list by choosing the radio button *All on page* in the *Save Options* box.
   Or – Select individual titles from the results list by individually ticking the check boxes to the left of each title and choosing the radio button *Selected on page* in the *Save Options* box.



*SCIS OPAC screen dump © Endeavor Information Systems Incorporated.*

5  Select *SCIS No.* from the *Select Format* drop down list in the *Save Options* box. Click on the *Save/Print* button. A web page containing SCIS numbers and equal signs is created.

6  Copy all the web page data (To select all: press CTRL and A keys. To copy: press CTRL and C keys).

7  Hit the *Back* browser button on the top of the screen. This will take you back to the *SCIS OPAC* search results page.

8  Exit *SCIS OPAC*.

9  Open *Create orders*. Place cursor in the *Enter orders here* box and paste list (To paste: press CTRL and V keys). The lines and spaces will be ignored in processing.

10 Click on *Process order* button. An order file will appear in the *Orders table*.

11 The marc.dat file can now be saved to your computer and is ready to load into your library management system (LMS), according to the instructions from the LMS vendor.

# New and revised subject headings

Headings marked with an asterisk in the following list are existing allowed headings that have been updated with changes to references or notes. New headings are marked as N. Headings that were USE references in *SCIS Subject Headings* Fifth Edition but are now headings in their own right are marked as A. Previously allowed headings that have become USE references are marked as U. Deleted headings are marked as D.

Maintenance to some other headings has also been done to ensure that all headings are consistent with instructions in *SCIS Subject Headings* and with their usage in the SCIS database. These are not listed below, but full details of all new and revised headings are available on the SCIS website at http://www.curriculum.edu.au/scis/productinfo/supplists.htm. A cumulative list of all new and revised subject headings approved since publication of *SCIS Subject Headings* Fifth Edition is also available at this site.

\* Abstract algebra
\* Academic degrees
\* Aerial photography
A Architecture, Baroque
\* Australia – Antiquities
A Boolean algebra
N Bosnian language
D Church – History
\* Civil rights
A Croatian language
\* Dried food
\* Economic botany
\* Economic zoology
N Flash photography
U Flashlight photography
\* Food
\* Foreign investments
N Frozen food (replaces Food, Frozen)
\* Graphic novels
N Identity cards
\* Language and languages
A Linear algebra

\* Missionaries
N Natural food (replaces Food, Natural)
\* Organic gardening
\* Passports
\* Scrapers (Tools)
A Serbian language
D Serbo-Croat language
A Serbo-Croatian language
\* Sex role
\* Sex role in education
A Smoked food
A Synthetic food
\* Tools
U War and society
\* War – Social aspects
\* Women in Australia

# SCIS news

### 1. New version of *SCISWeb*
On 7 April a new version of *SCISWeb* was implemented. The previous version used old technology. The new version includes the following features:

- Where ISBNs have been duplicated, the record most recently added to the database will be supplied.
- The ISBN entered into the orders box can contain either 10- or 13-digit ISBNs.
- You are no longer obliged to remove non-numerical data (spaces, hyphens, dots) in your SCISWeb order. The SCISWeb program will now ignore these characters or spaces.

### 2. New version of *SCIS OPAC*
SCIS recently upgraded to a new version of the software that operates *SCIS OPAC*. Two new searches have been added: *Subject keyword* and *Dewey call number*. The *Subject* search has been renamed *Subject (starts with)* to distinguish it from the *Subject keyword* search. Help text on the basic search page has been updated. More information on these and other changes will be in future *SCIS Handy Hints*.

### 3. SCIS Customer Survey 2006
During term three, SCIS will conduct an electronic survey seeking feedback from customers. This information is important for us to improve products and services. Please look for more information in 'What's new' and take a few minutes to respond.

### 4. Invoices for 2007 SCIS
The cost of a subscription to *SCISWeb, SCIS Subject Headings Online* and *SCIS Authority Files* will not increase in 2007.

In October 2006, invoices will be despatched to schools not involved in a bulk subscription. Payment is due within 30 days of receipt of the invoice. Look on our website for payment information: http://www.curriculum.edu.au/scis/productinfo/payment.htm#payment.

# CSU celebrates the 30th anniversary of its library education programs

*The School of Information Studies at Charles Sturt University (CSU) recently celebrated thirty years of teaching in the field of librarianship. Present and former staff gathered to reflect on the growth of the school, which is now the largest school of library and information management studies in Australia.*

The planning for the first course commenced in 1974, with the first students being enrolled in 1975. Its aims, as expressed in the 1975 *Handbook*, were to:

- promote attitudes that will encourage students to view their work professionally as a service to individuals and to society
- equip students with professional and interdisciplinary knowledge needed to make valid judgements
- demonstrate to students the techniques already evolved by the profession and to explain the reasons for them
- give students the opportunity to begin to acquire skills under supervision.

These remain much the same today, although a much larger percentage of CSU's current students are already working in the field, which provides a good foundation for their studies.

From a staff of two and student numbers in their tens, CSU has now grown to be the biggest school of library and information management studies in Australia, with around 1,400 students currently enrolled. A few years after the general librarianship course got underway a specialist teacher librarianship course was established.

The growth in distance education as a mode of study, together with the rapid increase in online delivery and availability, has seen students from around the world taking on the variety of courses now on offer. Currently, CSU has students from Mauritius, the USA, Mexico, Hong Kong, the UK and many other countries undertaking courses ranging from Bachelors' to Doctoral degrees, in library science, teacher librarianship, audiovisual archiving and information architecture. Many students return to the school to tackle more advanced courses.

There are now sixteen staff members in the school, with a range of specialisations and research interests. As the profession evolves, so too does the school. As the principles of continuing professional development and evidence-based research become more firmly entrenched in the careers of librarians and teacher librarians, so will the role of tertiary education evolve to meet the demands of a new generation of students.

In November last year, the school formally celebrated the anniversary with a dinner at the University's Wagga Wagga campus. The guest of honour, and after-dinner speaker, was Professor Joyce Kirk, who was one of the team who developed the school's programs in 1974 and is currently Pro Vice-Chancellor (Students) at RMIT. The Centre for Information Studies (CIS), based in the school, will shortly be publishing online a collection of papers in *Education for library and information services: A festschrift to celebrate thirty years of library education at Charles Sturt University.*

*Drs Philip Hider & Bob Pymm
School of Information Studies
Charles Sturt University
http://www.csu.edu.au/faculty/sciagr/sis*

# Interact with, explore and learn about water

*It is important to improve the knowledge and understanding primary and secondary students have about water supply and management issues so they can participate in the important quality and supply decisions facing Australia's communities. Martin Stone takes us through some educational resources that explore this vital natural resource.*

## Water Works (website)

*Water Works* is an exciting new educational program that provides learning experiences consistent with the demands of curricula. It also supports *Global Perspectives*, a statement on global education for Australian schools, and the Australian Government's new statement for schools, *Educating for a Sustainable Future*.

## What's it all about?

This program is designed to help students interact with, explore and learn about how water is utilised and managed in urban communities.

Water is the most precious resource for any civilisation, and water management is the basis of all communal living. As history has shown, communities must develop sustainable practices for managing their water resources if they are to survive in the long term.

*Water Work*s has been designed to assist students at levels 4 and 5 to achieve the following learning outcomes:
- Clarify their ideas about water as an urban resource and the impact that it can have on people's health and on the natural environment.
- Identify, compare and appraise the different methods of providing a water supply, a sewerage system, a stormwater system and the recycling of wastewater in an urban area.
- Draw conclusions about the most appropriate ways of managing water in an urban area.
- Apply their knowledge and understanding about the management of water to design a water supply system for an urban settlement.
- Evaluate that design against best practice.
- Brainstorm investigable questions about water usage and develop research strategies that will help answer them.
- Reflect on their water usage and the implications of personal decisions on the urban water cycle.

*Water Works* is a highly flexible program that can be used at different levels in different ways. The material provided is focused on building breadth and depth of learning as a result of students taking more responsibility for their learning.

## Suggested activities and research ideas

Activities and suggestions are provided in the Teachers Guide about how you can use this program with your students, including a range of 'off-line' activities and suggestions for further investigations.

This program is designed for students to learn about how water is utilised and managed in urban communities.

There are two pathways through the program.
- Students can explore how Melbourne uses its water by selecting *Melbourne's Water Story* on the introductory screen. This pathway enables them to explore Melbourne's water supply, storm water and sewage treatment systems.
- The second pathway provides a challenge for students to plan a total water system for a town. This includes designing the water supply, storm water and sewage treatment systems. To start this challenge, select *Water Works Game* on the introductory screen.

*Water Works* confronts students and engages them with a range of issues and ideas within the area broadly termed environmental sustainability. This means that it has a two-fold purpose, for environmental sustainability is not only an important concept in itself, but it is one of the key ways of building relevant and purposeful educational experiences for students.

*Water Works* is a highly flexible program that can be used in different ways depending on the experience, maturity and temperament of your students.

Some of the questions you may need to consider when considering how to use this program include:
- Where can I use *Water Works* in my class program?
- What outcomes do I want students to achieve?
- What aspects of *Water Works* could I use?
- How much do my students already know about water and environmental sustainability?
- How independent are they as learners?
- How much structure will I need to provide for them to successfully complete the program?
- How am I going to assess them?

*Water Works* is about students researching, thinking, learning and problem solving as independent learners.

Water Works [interactive]
Melbourne: Melbourne Water, [2005–]
www.melbournewater.com.au/education - secondary - water supply
SCIS No: 1262439

## The Floods Explorer (website)

It's not only water supply and sewage treatment that are important water issues for the community.

The *Floods Explorer* program is a student-friendly computer-based interactive for middle and upper primary and lower secondary school students.

It aims to support teachers in developing programs associated not only with the topic of floods, but any with unit associated with any aspect of water.

The Teachers Notes are designed to provide classroom teachers with a selection of approaches to encourage students to work collaboratively with their peers in getting the most out of the *Floods Explorer*.

Focus Questions
- What is a flood?
- What natural and human factors cause flooding?
- Where and how often do floods occur in Australia?
- What impact does flooding have on people and the environment?
- How is flooding managed?

Students will be able to:
- demonstrate their knowledge and understanding of flooding
- demonstrate in sequential steps an understanding of the flood cycle
- demonstrate their knowledge and understanding of the factors that cause flooding

▶

## Interact with, explore and learn about water (cont.)

- collaboratively develop a presentation that highlights the impact of flooding and outlines how flooding may be managed.

Floods explorer [website].
Melbourne: Melbourne Water, 2004
http://www.education.melbournewater.com.au/content/floods_explorer/#
SCIS No: 1232912

### Water water everywhere (book)

Water-related issues have been increasingly in the consciousness of the general population in recent years. In both rural and urban areas it is the reduction of this precious resource – due to many years of sustained drought – that has often brought this to the fore.

Increased urbanisation, causing pressure on urban stormwater systems, coupled with the environmental, economic and social effects of recent large flood events have also created discussion and debate about the responsibility of governments, councils, developers and individuals in reducing the effects of these events.

*Water water everywhere* focuses on the nature and causes of flooding, its impact on people and the environment, and on the effects of living in flood plains and highly urbanised areas when a major flood event occurs. This new edition provides the opportunity to include updated information and data about recent flood events, and, more importantly, outlines the different responsibilities and strategies used to manage stormwater.

*Water water everywhere*
Author: Judy Mraz
Revised edition commissioned by Melbourne Water
Published by Curriculum Corporation for the Geography Teachers' Association of Victoria (GTAV), 2006
ISBN: 1 86366 606 0
SCIS No: 1234002

*Martin Stone*
*Executive Producer Multimedia*
*Curriculum Corporation*

## Educational Lending Right

### Top 100 Australian books in school libraries

- Who is the Australian author with the most books in Australian school libraries?
- Which Australian picture book is at the top of the list for the sixth year in a row?
- Does your library collection reflect what is popular in the majority of other school libraries around Australia?
- Which three non-fiction books made it into the top 100?

To find these answers and more see the whole list at Educational Lending Right Survey, which is available online at http://www.curriculum.edu.au/scis/partnerships/elr.htm.

The top 100 Australian books in school libraries list has been collated based on the results of the Educational Lending Right Survey (ELR) 2005–06. SCIS undertook this survey on behalf of the Department of Communications, Information Technology and the Arts (DCITA).

It is thanks to the approximately 380 Australia school libraries who responded to the survey in October 2005 that the ELR 2005–06 Survey was such a success. A copy of the Curriculum Corporation Summary Report for ELR 2005–06 can be obtained from the ELR webpage. Schools who responded to the survey will receive a complimentary poster of the top 100 Australian books in school libraries in term 2 this year.

Keep an eye out for your chance to support Australian writers and publishers. If your school has over 100 students and uses one of these library automation systems: Amlib, Athena, Bibliotech, BookMark, LibCode, Softlink Alice or OASIS you may receive a survey package in the mail during September or October this year.

**ELR – Encouraging the growth of Australian writing and publishing**

# The Le@rning Federation

## Teacher librarians... tell us your 'hot topics'?

Teacher librarians' fingers are on the pulse. Their role of searching for resources to suit particular themes or topics for teachers and students means that they know, better than most, the availability of teaching resources. The 'hot topics' – the topics in demand for which resources aren't readily available – are no secret to teacher librarians. As such, The Le@rning Federation (TLF) is asking teacher librarians to share their 'hot topics', and, in doing so, make suggestions about the content that TLF develops.

TLF has focussed on developing resources that, in line with curriculum demands, assist in the teaching and learning of difficult concepts, as well as those that engage and motivate students' learning. This focus is evident when reading about the learning objects in TLF's catalogues or on the website; but what else is needed?

In collaboration with the education systems, curriculum experts, subject matter experts and ICT specialists, teachers have direct input into the development of TLF content. As a result, there is now a pool of free, relevant digital content that supports teachers and students' learning. Continuing teacher input into what TLF develops is vital to ensure the resources remain relevant to current areas of study, continue to meet the needs of students, and are what teachers want to use.

While the collaborative approach to the design and development of TLF content is extremely valuable, and successful, TLF is interested in hearing a wider variety of views from those directly involved in using the content. The teacher librarian community, given its privileged position of being 'in the know', is in a great position to provide valuable insights.

A feedback section on the TLF website has been established so you can share your 'hot topics' for the primary years and secondary years up to, and including, Year 10. 'Hot topics' can be specific, such as, 'there's a need for resources to assist in teaching students in primary, years 3–4 about wind and solar power as alternative energy sources', to the more general, 'there needs to be more resources on financial literacy for the middle years of schooling'.

Your contribution could influence what resources TLF develops. Have your say. Visit 'hot topics': http://www.thelearningfederation.edu.au/tlf2/showMe.asp?nodeID=2

*Andrea MacLeod*
*Communications Officer*
*The Le@rning Federation*

> **Information about learning objects and digital resources is available in 'About TLF Content' on the TLF website. Catalogues, which are updated quarterly, for each curriculum area and the digital resource collection are available on the website, and can be also be downloaded.**
>
> **http://www.thelearningfederation.edu.au**

# Resources

## New Little Books of Big Ideas from Curriculum Corporation

### How to Succeed with Thinking
64 pp
Authors: Jeni Wilson and Kath Murdoch
RRP: $29.95
SCIS No: 1231637
ISBN: 1863666869

Teaching thinking has become a regularly discussed curriculum imperative because of the increased emphasis on student-centred approaches to learning.

Involving students as active learners and flexible thinkers who can and do think for themselves can be challenging. Developing a range of thinking capacities is much more than teaching a bunch of strategies. This book explores ways that teachers can promote higher-order thinking across the curriculum and develop lifelong learners who have abilities to tackle complex problems.

### How to Succeed with Making Schools Inclusive
64 pp
Author: Julianne Moss
RRP: $29.95
SCIS No: 1189819
ISBN: 1863667776

This book aims to support teachers, school leaders and community members who recognise diversity and inclusivity as key values and resources in building social capital and improving the quality of schooling.

This accessible text provides examples of how it is possible to see the plurality of many forms of knowledge as central to all classrooms, regardless of the school context or sector of schooling. For schools to be more inclusive, it is important to focus on how whole-school approaches of policy, practice and culture are connected and interrelated. This includes a close examination of the learning of teachers and students and other community members, parents, paraprofessionals and support services alike.

### How to Succeed with Learner-centred Assessment
64 pp
Author: Jeni Wilson and Kath Murdoch
RRP: $29.95
SCIS No: 1231644
ISBN: 1863666877

Strategic learner-centred assessment is primarily intended to inform students and teachers about what students need to do (as they are doing it) to improve student learning. Our selection of assessment strategies should reflect our values about what is important for students to learn and how they learn. A range of assessment types should be used to allow all students to demonstrate what they know and can do. This book includes practical suggestions for planning and managing assessment, and ways to actively involve students in the process.

## More new resources from Curriculum Corporation

### What's Hot! A way in to teaching critical literacies
128 pp
Authors: Christine Ludwig and Suzette Holm
RRP: $39.95
SCIS No: 1224059
ISBN: 1863667237

Practising critical literacies calls for an awareness that texts are not natural or neutral. This book places its emphasis on planning responsive and effective programs for students in the middle years as it responds to issues of change that most affect young adolescents – moving to new environments, expanding social horizons, and facing increased expectations and responsibilities. It does this by drawing on the roles of the literacy learner.

Students analyse *Home and Away* to reveal how appearance, shot types, framing, dialogue, voice tone, facial expressions, etc, construct characters in a particular way.

Students learn how views as portrayed in teen magazines vary among peers and community members.

Students learn that texts, such as fantasy texts or news reports, have distinctive structures to achieve particular purposes and to influence particular audiences.

Students also analyse a range of texts about food. They discuss the likely purposes – who is being invited to read the text, who is being left out and how readers and viewers are being positioned.

### Reading the Visuals in the Middle Years
104 pp
Author: Rod Quinn
RRP: $39.95
SCIS No: 1208990
ISBN: 1863667423

*Reading the Visuals in the Middle Years* provides teachers with strategies for developing students' understanding of viewing and visual texts. Many important viewing concepts and skills can be taught by asking students to think about the uses of visual language in the world around them and through the use of still images.

The book features five sections:
1  Exploring visual language – signs and symbols, logos and comics
2  Body language – facial expression, gesture and physical appearance
3  Visual language, attitudes and values – fashion, customs and stereotypes
4  Technical elements – framing, lighting and composition
5  Visual texts – film, advertising and web pages.

Each section is divided into a number of units. Each unit consists of:
- key concepts – a short summary of the key understandings that form the focus of the unit
- teaching the visuals – an explanation of concepts and skills, and suggestions for explaining these to students
- now try this – student activities and accompanying photocopiable activity sheets.

## Attention! Mini lessons in speaking and listening

96 pp
Author: Gloria Rolton
RRP: $34.95
SCIS No: 1231550
ISBN: 1863667938

Teacher and student resource • WIZARD IDEAS

Speaking and listening are basic to all learning and should be taught across the curriculum. The 24 units outlined in *Attention!* provide mini-lessons where processes and specific skills are identified, introduced and practised. The book makes use of popular literature, evoking a response, developing empathy in students, and encouraging them to use their imaginations as they listen carefully to points of view and contribute personal responses. An introductory lesson on 'Teaching Active Listening' ensures that all students develop an understanding of the difference between listening and hearing.

*Attention!* comprises listening for pleasure, listening for information and listening to and assessing argument. Group activities introduce a number of familiar strategies such as role-play, brainstorm, Plus-Minus-Interesting, Readers Theatre, Y-Charts, and writing for purpose. Everyday situations provide the opportunity to perform and practise speaking skills through class meetings, hypotheticals, school assembly, greeting and thanking visitors, interviewing and debating – these are supported with thoughtful writing worksheets to consolidate and focus the learning.

Procedures and teaching strategies are presented in an easy-to-use format so that teachers can readily adapt and employ the pedagogy underpinning the book.

## Let's Read Humour

96 pp
Author: Jane Caughey
RRP: $34.95
SCIS No: 1231543
ISBN: 1863667989

Teacher and student resource • WIZARD IDEAS

Teachers everywhere will agree that the use of humour in any learning activity is bound to engage even the most reluctant student.

Children are naturally drawn to all things funny, and when presented with literature that makes them laugh, the reading experience can be enhanced for both student and teacher.

*Let's Read Humour* includes teaching suggestions and stimulating activities based on six humorous novels written by popular children's authors:

*Totally Freaky* by Moya Simons
*The Adventures of Captain Underpants* by Dav Pilkey
*Selby's Secret* by Duncan Ball
*Sacked!* by Rachel Flynn
*My Mum the Pirate* by Jackie French
*Let's Do The Pharaoh* by Jeremy Strong

These novels are selected specifically for the middle–upper primary student, catering for a wide range of reading abilities and using humorous language that will appeal to all.

The thoughtful activity worksheets are varied and fully photocopiable. Although the activities are predominantly literacy based, additional 'multi-modal' activities are offered to cater for a variety of learning styles.

**SCIS**
SCHOOLS CATALOGUE
INFORMATION SERVICE

Forward the completed form to:
SCIS order
Curriculum Corporation
PO Box 177
Carlton South  Victoria  3053
Australia

Facsimile: 1300 780 545 (within Australia)
Facsimile: +61 3 9639 1616 (international)
ABN:18 007 342 421

# SCIS order form

**NOTE:** • SCIS subscriptions operate on a calendar year cycle (January – December).
• Customers who subscribe midway through the year are required to pay the full subscription price.
• Where applicable, each campus or library within a school must have its own subscription.

Product information located at: www.curriculum.edu.au/scis/productinfo/overview.htm
Customer Support - 1800 337 405 (free call  within Australia  outside Melbourne metropolitan  area)  or 9207 9600 (Melbourne metropolitan area)  or + 61 3 9207 9600 (International)

| SCISWeb subscription (Discounts may apply) | Number of students | | | | | | | Amount |
|---|---|---|---|---|---|---|---|---|
| | 0–50 | 51–100 | 101–400 | 401–800 | 801–1200 | 1201– 1600 | 1601+ | |
| SCISWeb (Australia)* | $121 | $242 | $363 | $605 | $847 | $1089 | Contact SCIS | |

| Other subscription products | Australian price (Includes GST) | International price | Amount |
|---|---|---|---|
| SCIS Authority Files | $85.00 | $77.00 | |
| SCIS Subject Headings Online | $44.00 | $40.00 | |

| Other SCIS products | Australian price (Includes GST) | International price | Amount |
|---|---|---|---|
| SCIS Subject Headings Fifth Edition | $120.00 | $108.00 | |
| Datalogic Touch 65 Pro fixed scanner (5 year warranty**) USB connection available for Windows XP & iMAC only Select connection required:  ☐ PS2  ☐ USB | $218.00 | $198.00 | |
| Cipherlab 1067M portable scanner (3 year warranty**) USB connection available for Windows XP & iMAC only Select connection required:  ☐ PS2  ☐ USB | $599.50 | $545.00 | |
| Opticon OPL 6845 laser scanner (3 year warranty**) USB connection available for Windows XP & iMAC only Select connection required:  ☐ PS2  ☐ USB | $499.00 | $454.00 | |
| Cipherlab 1166 CCD cordless memory distance scanner (1 year warranty**) USB connection available for Windows XP & iMAC only Select connection required:  ☐ PS2  ☐ USB | $899.00 | $810.00 | |
| Additional connection for any scanner USB connection available for Windows XP & iMAC only Select connection required:  ☐ PS2  ☐ USB | $82.50 | $75.00 | |
| Barcode scanner stand | $49.50 | $45.00 | |
| Postage and handling | $8.00 | (one item) $12.50 (two items) $20.00*** | |
| | | **Total amount $** | |

All prices in Australian dollars
* International schools – Contact SCIS
** Warranty conditions apply
*** Price on request for more than two items

## I agree to the terms and conditions of sale
www.curriculum.edu.au/scis/resources/termsconditions.doc

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| Signature: | Expiry Date:       /       / |

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C066