

# Learning in the Digital Age at Beacon Hill School

As foundational ICT skills penetrate throughout our society, students will be expected to apply the basics in authentic, integrated ways to solve problems, complete projects, and creatively extend their abilities.

*"What students should know and be able to do to learn effectively **and** live productively in an increasingly digital world ..."*

(International Society for Technology in Education)



October 2009

The following is based on the National Educational Technology Standards for students as documented by 'The International Society for Technology in Education'.

Included are the profiles for ICT literate students from the age of 4 – 11 – these may be a useful overview for teachers.

It is intended to guide teachers in planning for and teaching technology in Beacon Hill School.

The standards are grouped into six categories:

1. **Creativity and Innovation**
2. **Communication and Collaboration**
3. **Research and Information Fluency**
4. **Critical Thinking, Problem Solving, and Decision Making**
5. **Digital Citizenship**
6. **Technology Operations and Concepts**

Within each of these there are three phases which correspond approximately to students from Year 1 through to Year 6.

Some examples and suggestions are included to guide and prompt, but due to the rapid development of web based resources and the changing skills and needs of our students, specific skills are not listed. However it is expected that children in Years 1 and 2 would have regular specific ICT sessions where basic skills are introduced, such as mouse and keyboard skills, logging on to the school network. As students become older certain skills will be taught 'just in time' to integrate with units of inquiry – therefore teachers need to include technology in planning.

This is a first version, introduced to staff in October 2009 and will be reviewed in June 2010.

## 1. Creativity and Innovation

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

	Phase 1	Phase 2	Phase 3
<b>1.a. Apply existing knowledge to generate new ideas, products, or processes</b>	<p>Describe what they already know and need to know about a challenge/problem selected by the teacher to elicit creative thinking (e.g., cyberbullying, waste/pollution, endangered/overpopulated species, resolving an issue in the school environment).</p> <p>Brainstorm ideas that might contribute to a new solution to the problem or issue, use technology to gather and organize ideas and information (e.g., a concept map).</p> <p>Propose one or more new possible solutions.</p>	<p>Identify local or global problems that need creative solutions.</p> <p>In small groups, engage in divergent thinking to explore options for solutions.</p> <p>Use technology (e.g., graphs, wikis, other group authoring tools) to capture and share promising strategies with the whole group.</p> <p>Select and describe specific ideas or create products or processes that could provide new solutions.</p>	<p>Identify a real-world problem that would benefit from an improved solution.</p> <p>Generate multiple possible ways of solving the problem.</p> <p>Consider the parameters that must be met to achieve a workable solution.</p> <p>Select the best solution from among the possible alternatives.</p> <p>Describe or create the new products (e.g., movies, public service announcements, websites) or processes that could be used to provide innovative solutions in the real world.</p>
<b>1.b. Create original works as a means of personal or group expression</b>	<p>Create an original presentation based on an age-appropriate story, activity, or event including text and visual formats using digital tools and resources.</p>	<p>Use technology resources to modify or create digital works.</p> <p>Produce a media-rich digital story, individually or collaboratively.</p> <p>Document a reflection of the processes and results (e.g., story based on a first-person interview or historical research).</p>	<p>Create original animations or videos about a topic of personal interest or in response to a learning activity.</p> <p>Document a reflection on the quality of the production (e.g., work illustrating reactions to communicating with students in other cultures about some global issue).</p>

## 1. Creativity and Innovation

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

	Phase 1	Phase 2	Phase 3
<b>1.c. Use models and simulations to explore complex systems and issues apply models and simulations to explore cause and effect relationships</b>	<p>Use digital tools and resources to find and organize data.</p> <p>With the help of the teacher, create a visual model or use a simulation (e.g., graph or concept map of the life cycle of plants and animals, weather cycles, school- days activities, or how community workers contribute to the community).</p>	<p>Apply models and simulations to explore cause and effect relationships based on changes in elements, patterns, or sequence.</p> <p>Explain or illustrate results.</p>	<p>Describe and illustrate a complex content-related concept or process using a model, simulation, or concept-mapping software.</p>
<b>1.d. Identify trends and forecast possibilities</b>	<p>Use graphic organizers and simulations to identify key variables.</p> <p>Identify patterns.</p> <p>Predict outcomes in everyday events and relationships.</p>	<p>Collect and electronically store data based on observations of changes in one or more variables.</p> <p>Use graphs to identify trends.</p> <p>Make a data-driven prediction about future outcomes.</p>	<p>Design and implement a strategy for gathering and manipulating data needed to make a data-driven prediction or to forecast possibilities.</p>

### Examples could include:

- My World 3
- My Modelling Toolkit
- BBC Cbeebies website (<http://www.bbc.co.uk/cbeebies/drilldown/fun/3/1/1/>)
- storytelling – using digital cameras / photos
- Kidpix
- Textease
- Photostory
- Online activities (<http://puzzling.caret.cam.ac.uk/game.php?game=parachute;> <http://puzzling.caret.cam.ac.uk/game.php?game=foodchain%20;> <http://www.epa.gov/recyclecity/gameintro.htm>)
- Picasa – digital art
- 2Simple (graphing; data handling)
- Podcasting ([http://www.clickcaster.com/;](http://www.clickcaster.com/) <http://audacity.sourceforge.net/>)
- Recording / composing music
- <http://museumbox.e2bn.org/> ( build up an argument or description of an event, person or historical period by placing items in a virtual box)

## 2. Communication and Collaboration

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:

	Phase 1	Phase 2	Phase 3
<b><i>2a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media</i></b>	Collaborate in pairs using age-appropriate digital media to learn about, develop, and share information and works with students, teachers, parents, and family members (e.g., collaborate with a partner to illustrate and present a nursery rhyme or story using concept mapping, collaborative graphic organizer, or story-building software).	Collaborate in pairs or groups to develop technology-based presentations or products for content-related topics using digital audio, photos, images, video, or charts (e.g., interact via e-mail, videoconferencing, or blogging with young adult authors/musicians/artists/scientists to collaborate on a multimedia product).	Use digital media tools (e.g., blogs, wikis, video-conferencing, etc.) for synchronous and asynchronous collaboration with peers/experts/global partners to plan, design, and publish a content-specific product.  Present and/or post results online.
<b><i>2.b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats</i></b>	Share curriculum-related concepts with their classmates, families, and others using developmentally appropriate online curriculum-based resources (e.g., online songs, stories, games, puzzles, clip art, presentations, templates and web pages).	Create and edit products in a variety of media environments (e.g., presentation, newsletter, video, annotated calendar, wiki) to effectively communicate individual and group curriculum activities, ideas, or results to multiple audiences.	Individually or in collaborative groups, identify and evaluate information from a variety of online sources for accuracy, bias, and comprehensiveness.  Summarize and distribute results to multiple audiences using a variety of communications media and formats (e.g., presentation, webpage, wiki, blog, online collaborative writing tools).

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	Phase 1	Phase 2	Phase 3
<b>2.c. Develop cultural understanding and global awareness by engaging with learners of other cultures</b>	Use technology tools to exchange—classroom to classroom—stories, artifacts, and information about their lives, communities, and cultures.	Use technology communications tools to interact with students or experts from other cultures, communities, or countries on a collaborative, content-specific activity or project.	Identify a topic of global concern and use a variety of digital tools to collaborate with learners from another culture to better understand the topic from different perspectives.  Identify potential solutions or create products that help others understand the issues and perspectives.
<b>2.d. Contribute to project teams to produce original works or solve problems</b>	Share with a partner or team steps for using age-appropriate technology tools to illustrate a song, rhyme, or story; to create a product; or to solve a problem.	Using appropriate digital tools, work in pairs or small groups with assigned roles to explore, illustrate, and present specific subject-related concepts or content.	Identify an appropriate project or problem associated with a specific content area;  Identify and assign roles for project team members;  Select appropriate digital tools for supporting investigation and/or experimentation related to the project/problem;  Work collaboratively to arrive at identifying and testing possible solution(s);  Present and disseminate results to a broad audience.

**Examples could include:**

- Video communication – Skype
- Presentations (Prezi - <http://prezi.com>; MS Powerpoint; <http://prezentit.com/>)
- Researching to develop awareness of other cultures and global issues
- Wikis ([www.wikispaces.com](http://www.wikispaces.com))
- Use of 'The Beacon' (VLE) – Blogging; collaborating; peer assessment; forums
- Podcasting (<http://www.clickcaster.com/>; <http://audacity.sourceforge.net/>)

### 3. Research and Information Fluency

Students apply digital tools to gather, evaluate, and use information. Students:

	Phase 1	Phase 2	Phase 3
<b>3.a. Plan strategies to guide inquiry</b>	With the teacher's help and using age-appropriate technology, make a chart of the steps involved in planning a project (such as investigating weather patterns) including what they already know, what else they want to know, how they can find answers, and how to organize information found, and how to share it with others.	Individually, in pairs, or in small groups, develop and refine questions for investigating a learning-related topic.  List possible sources of the information needed and appropriate information gathering tools.  Outline the steps in the investigation using digital planning tools.	Create a concept map describing the aspects of a research topic.  Select key topics for exploration.  Determine data- collection and search needs and strategies.  Use project-management software to lay out inquiry processes and procedures.
<b>3.b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media</b>	With the help of teacher, locate and gather information from preselected digital sources, choose relevant information and identify new questions.  Use age-appropriate tools to organize and share what they learned.	Use digital tools to locate and organize relevant and reliable information from a variety of digital sources.  Analyze and synthesize results to answer a question or clarify an issue.  Document sources appropriately.	Independently develop and apply effective search strategies (including Boolean logic) for locating credible resources in multiple digital databases;  Categorize and classify information to support analysis;  Synthesize results, and report conclusions.
<b>3.c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks</b>	Describe the purpose of a variety of age-appropriate digital tools and select tools or resources from those available to effectively accomplish a variety of tasks.	Compare and contrast the effectiveness of two or more digital tool and information resources used to accomplish an assigned task.	Select and apply appropriate tools and digital resources to accomplish a variety of tasks and justify their use based on efficiency and effectiveness for completing the projects.

### 3. Research and Information Fluency

Students apply digital tools to gather, evaluate, and use information. Students:

	Phase 1	Phase 2	Phase 3
<b>3.d. Process data and report results</b>	Collect data about a learning area (e.g., weather, current events, personal interests) and use digital tools and resources to create ordered lists, demonstrate patterns, and display results in text and/or graphic formats.	Develop a strategy for gathering and analyzing data.  Use digital tools (e.g., spreadsheets, graphs, visualization, individual response systems) to process data and display meaningful patterns.  Present a report using appropriate visual formats.	Use data-analysis tools (e.g., databases, visualization tools, statistical programs) to analyze data collections.  Create projections and models to inform decision-making.  Effectively use multimedia formats to report results.

**Examples could include:**

- Evaluating different websites – use of Firefox add-on such as ‘Scrapbook’ for online highlightinh, using stickies)
- Datahandling (<http://chartgizmo.com/#>; Excel; 2Graph)
- Presentations ([www.prezi.com](http://www.prezi.com); Powerpoint; <http://prezentit.com/>)
- Internet research (use of Britannica Online – school subscription)
- <http://www.dmoz.org/>; <http://kids.discovery.com/>; <http://kids.yahoo.com/>; <http://kids.nationalgeographic.com/>; <http://www.factmonster.com>

## 4. Critical Thinking, Problem Solving, and Decision Making

Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. Students:

	Phase 1	Phase 2	Phase 3
<b>4.a. Identify and define authentic problems and significant questions for investigation</b>	<p>Identify ways technology can help them explore and understand everyday problems (e.g., how to dress for the day's weather, important aspects of taking care of a pet, which community helper might help in a given situation).</p> <p>Record questions and capture answers and additional questions</p>	<p>Use print and online resources to identify significant issues for their school, community, or beyond (e.g., making their school more energy efficient, cyber bullying and reducing school litter).</p> <p>Record the results of their investigations along with relevant questions for each.</p> <p>Analyze results to clarify and focus the issue or problem.</p>	<p>Explore a content-related issue or problem (e.g., historical or present-day issues or problems informed by authentic resources from government, media, and other expert advisors).</p> <p>Apply research strategies to obtain information and data related to the identified problem.</p> <p>Use statistical and/or graphed data to organize and present the problem and possible solutions in digital format.</p>
<b>4.b. Plan and manage activities to develop a solution or complete a project</b>	<p>Identify and apply strategies with teacher support to select information and digital resources to complete an activity or solve a particular problem.</p>	<p>Conceptualize, guide, and manage individual or group activities using digital planning tools for completing a project or solving a problem.</p>	<p>Plan an argument or viewpoint related to a problem and independently select and use the appropriate digital tools, resources, and computational strategies to solve the problem.</p>
<b>4.c. Collect and analyze data to identify solutions and/or make informed decisions</b>	<p>Collect data on an everyday problem or issue.</p> <p>Record results using digital resources.</p> <p>Identify patterns and propose a developmentally appropriate decision or solution.</p>	<p>Select and apply digital tools to collect, organize, and analyze data for evaluating theories and testing hypotheses.</p> <p>Document possible bias reflected in sources used.</p>	<p>Select and use data-collection technology (e.g., probes, handhelds, geographic mapping systems) to gather and view data, examine patterns, analyze potential solutions, and report conclusions for content-related problems.</p>

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Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. Students:

	Phase 1	Phase 2	Phase 3
<b>4.d. Use multiple processes and diverse perspectives to explore alternative solutions</b>	Compare problem-solving processes and solutions (captured using charts, concept maps, timelines) with others and discuss similarities and differences.	Apply digital tools and resources to explore a topic from the perspective of multiple stakeholders and propose more than one possible solution.	Use electronic data collection and collaborative authoring tools to explore and document points of view based on location, environment, or culture and to evaluate solutions from a variety of perspectives.

**Examples could include:**

- Email an expert (parent?)
- Use of forums (within a wiki; on 'The Beacon' (VLE)
- Analysing a variety of resources to verify the information
- Use of data-logging equipment
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## 5. Digital Citizenship

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behaviour. Students:

	Phase 1	Phase 2	Phase 3
<b>5.a. Advocate and practice safe, legal, and responsible use of information and technology</b>	Demonstrate an understanding of age-appropriate issues related to safe, healthy, and acceptable computer use and describe personal consequences of inappropriate use.	Research, discuss, and apply safe, responsible, and legal use of technology (e.g., privacy, security, copyright, file-sharing, accessibility, plagiarism).  Use technology resources to convey the relevance of these issues to other students and the public at large.	Analyze the consequences resulting from lack of access to technology resources on various populations, including underprivileged and those with physical disabilities.  Advocate acquisition of technology resources for all learners.
<b>5.b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity</b>	Articulate and demonstrate ongoing cooperative and collaborative use of technology to contribute to an effective learning environment (e.g., work productively with a partner or in a small group on a technology-based activity and discuss or reflect on the benefits of working with a partner to complete the task).	Select and apply technology resources and describe how these tools improve their ability to communicate, collaborate, be productive, and achieve goals.	Evaluate benefits, limitations, and optimal conditions for use of new technology resources to support communication, collaboration, product development, and academic goals.
<b>5.c. Demonstrate personal responsibility for lifelong learning</b>	Recognize and use technology as a way to communicate with others and access information for formal and informal learning.	Describe how they select and use technology resources to pursue their personal and academic learning projects outside of the classroom.	Identify and use personal and academic learning communities or resources to support lifelong interests, learning, and academic success.
<b>5.d. Exhibit leadership for digital citizenship</b>	Follow technology use, sharing, and safety rules and encourage their peers to follow accepted guidelines.	Identify and discuss the effects of existing and emerging technology on individuals, society, and the global community.	Use collaborative electronic communications, video, and/or authoring tools to explore, share, and publish aspects of digital citizenship with other learners around the world.

**Examples could include:**

- <http://www.cybersmart.gov.au/> (Hector's World; 'Kids' section)
- Broadband Detectives – on school server (Y4-6)
- Awareness and understanding of school AUP
- Understanding of copyright issues
- Cybersafety CD – on school server

## 6. Technology Operations and Concepts

Students demonstrate a sound understanding of technology concepts, systems, and operations. Students:

	Phase 1	Phase 2	Phase 3
<b>6.a. Understand and use technology systems</b>	<p>Communicate about technology using developmentally appropriate and accurate terminology.</p> <p>Perform basic hardware and software operations.</p> <p>Demonstrate the ability to navigate in virtual environments (e.g., electronic books, simulations, digital presentation software, and websites) with assistance as needed.</p>	<p>Demonstrate an understanding of the basic features of computer and network interfaces and use them efficiently without assistance.</p> <p>Explore and apply a variety of technology systems and resources (e.g., calculators, digital cameras, probes, e-books, white boards) to complete learning tasks.</p> <p>Apply basic technology-based thinking strategies (e.g., automated search methods, storage and retrieval techniques) to a variety of problems.</p>	<p>Use a variety of technology interfaces and operating systems (e.g., computer, printer, Internet-connected mobile devices) and demonstrate an understanding of how they interact with local and wide area networks.</p> <p>Apply technology systems and resources (e.g., electronic microscope, simulations, digital recorders and editors, generic productivity tools) to complete learning activities.</p> <p>Use multiple file types and their related software applications.</p>
<b>6.b. Select and use applications effectively and productively</b>	<p>Select from a teacher-approved list and independently apply age-appropriate applications and resources to address content-related tasks and problems.</p>	<p>Apply criteria for selecting an appropriate technology application for use with a learning activity.</p> <p>Use the application proficiently to complete the task.</p> <p>Discuss its efficiency and effectiveness.</p>	<p>Independently develop and apply criteria for selecting a digital application to accomplish a specific real-world task.</p> <p>Compare and contrast the efficiency and effectiveness of several applications.</p> <p>Justify the appropriateness of an application.</p>

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	Phase 1	Phase 2	Phase 3
<b>6.c. Troubleshoot systems and applications</b>	Identify and solve common problems that occur during everyday use (e.g., raise / lower volume, navigate to desired page, brighten screen, restart computer, undo/redo).	Determine the source of common operational and network problems (e.g., loss of connectivity, frozen screen, printing problems, reloading)	Demonstrate the ability to locate and use documentation and online resources to help solve hardware and software problems.
<b>6.d. Transfer current knowledge to learning of new technologies</b>	Recognize common terminology, icons, and symbols related to basic functions of technology and apply that knowledge to new technologies.	Apply basic concepts and functions (e.g., multiple windows, editing functions, navigational tools, help assistance) from previous learning to new technologies and situations.	Develop and apply strategies for systematically learning new technologies and advanced features of current technologies.

**Examples could include:**

- Logging on / off system
- Using digital and video cameras
- Locating and opening appropriate programs
- Word processing
- Mouse control Saving work in appropriate places