INTRODUCTION

The world has undergone many changes in recent years. The adoption of technology into everyday life has changed the way we do many of our everyday tasks. 21st century learners are required to have a very different skill set as compared to learners of the past. These changes are forcing schools to evaluate the way they currently support students’ learning and this evaluation is bringing rise to many questions. What do learners in the 21st century need to know? What skills do they need to have? How do we ensure that students are equipped with the appropriate knowledge and skills to function productively in this information laden, highly technological society?

In her book *Guided Inquiry: Learning in the 21st Century*, Carol C. Kuhlthau suggests that questions such as these are the basis for school reform in the 21st century and that many teachers are turning to inquiry learning to meet the challenge of preparing students for a life of constant change and constant learning.

Inquiry is an approach to learning whereby students find and use a variety of sources of information and ideas to increase their understanding of a problem, topic or issue. It requires more of them than simply answering questions or getting a right answer. It espouses investigation, exploration, search, quest, research, pursuit, and study. Inquiry does not stand alone; it engages, interests, and challenges students to connect their world with the curriculum. Although it is often thought of as an individual pursuit, it is enhanced by involvement with a community of learners, each learning from the other in social interaction. However, without some guidance it can be daunting. (Kuhlthau, Maniotes, & Caspari, 2007)

Although teachers and teacher-librarians have always included opportunities for students to conduct research and create reports based on their research, inquiry based learning goes beyond the research process. Students must be able to do more than research a topic and report back on their findings. They need to be effective planners, think critically, evaluate and assess their work, navigate the digital world, create new information and share their findings with the others. Inquiry-based learning provides opportunities for students to:

- develop skills they will need all their lives
- learn to cope with problems that may not have clear solutions
- deal with changes and challenges to understandings
- shape their search for solutions, now and in the future.

(Focus on Inquiry: A Teacher's Guide to Implementing Inquiry Based Learning, 2004)
What are the skills that students will need all their lives? Bernie Trilling and Charles Fidel write that the three sets of skills most in demand in the 21st Century include:

- Learning and innovation skills
- Information, media, and technology skills
- Life and career skills (Trilling & Fadel, 2009)

If schools are to prepare students for learning in the 21st century, the skills listed by Trilling and Fadel must be central to what students are doing in schools. Inquiry based learning enables teachers to address these skills in a meaningful way with real world application for students.

**PURPOSE**

This resource is intended to provide curriculum specialists with a framework for making the inquiry process an integral component of their curriculum documentation.

The model for inquiry-based learning presented in this document is one that can be used in all programs of study at the secondary level. Although each specific curriculum area uses different terminology and process, this document presents inquiry as a cross-curricular model that can be adapted to work within each specific curriculum area.

This document is also intended to serve as a practical guide to the implementation of the inquiry process for all PEI Educators.
Problem-based learning - begins with an open-ended, real-world problem with more than one possible solution. The emphasis is on gaining the content knowledge that is needed to solve the problem. The problem may have as its focus a dilemma to be confronted, a decision to be made, an issue to be resolved, a policy to be debated or a new product or service to be developed. (Focus on Inquiry: A Teacher's Guide to Implementing Inquiry Based Learning, 2004)

Project-based learning a systematic teaching method that engages students in learning essential knowledge and life-enhancing skills through an extended, student-influenced inquiry process structured around complex, authentic questions and carefully designed products and tasks. (Buck Institute for Education, 2005)

Resource-based learning actively involves students in the meaningful use of a wide range of appropriate print, nonprint, digital and human. (Focus on Inquiry: A Teacher's Guide to Implementing Inquiry Based Learning, 2004)

Information literacy involves the ability to access, evaluate and use information from a variety of resources; to recognize when information is needed; and to know how to learn (Presidential Committee on Information Literacy: Final Report, 1989)

Although all of these models of learning differ somewhat, one commonality is the concept of inquiry.

Inquiry is an investigative process that engages students in answering questions, solving real-world problems, confronting issues, or exploring personal interests. (Pappas & Tepe, 2002) Through inquiry based learning students build new understandings, meanings and knowledge. This new knowledge may be used to answer a question, develop a solution or support a position or point of view and is usually presented to others and may result in some sort of action.
Common Principles of Inquiry:

- Inquiry requires critical and creative thinking.
- Inquiry should guide learners into thinking about their prior knowledge related to the topic of interest.
- Inquiry is an active process.
- Inquiry should go beyond simply finding an answer to engage learners in questioning, reflection, thinking about how and what they learned, and, ultimately, the next step in the investigative process.
- Inquiry should relate to the real world and have applications to the life experiences of learners.
- Inquiry is a social experience and should engage learners in collaborative learning.
- Inquiry engages learners in constructing their own new understandings, developing solutions to the problems they have explored and creating new innovations to share with others.

(Adapted from Pappas, Inquiry and 21st Century Learning, 2009)

21st Century Learners

- Inquire, think critically and gain knowledge;
- Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge;
- Share knowledge and participate ethically and productively as members of our democratic society;
- Pursue personal and aesthetic growth (Standards for the 21st Century Learner, 2007)

Skill Set of 21st Century Learners

- Learning and innovation
  - Critical thinking and problem solving
  - Communication and collaboration
  - Creativity and innovation
- Digital Literacy Skills
  - Information literacy
  - Media Literacy
  - ICT literacy
- Career and life skills
  - Flexibility and adaptability
  - Initiative and self-direction
  - Social and cross-cultural interaction
  - Productivity and accountability
  - Leadership and accountability (Trilling & Fadel, 2009)
CHARACTERISTICS
Classrooms/Libraries where teachers/teacher librarians emphasize inquiry-based learning have the following characters (Drayton & Falk, 2001)

• Inquiry arises from authentic (real-life) problems within the context of the curriculum and/or community.

• The inquiry capitalizes on student curiosity.
  (Focus on Inquiry: A Teacher's Guide to Implementing Inquiry Based Learning, 2004)
• Data and information are actively used, interpreted, refined, digested and discussed.

• Teachers, students and teacher-librarian collaborate.

• Community and society are connected with the inquiry.

• The teacher/teacher librarian models the behaviours of inquirer.

• The teacher/teacher librarian uses the language of inquiry on an ongoing basis.

• Students take ownership of their learning.

• The teacher/teacher librarian facilitates the process of gathering and presenting information.

• The teacher/teacher librarian and students use technology to advance inquiry.

• The teacher/teacher librarian embraces inquiry as both content and pedagogy.

• The teacher/teacher librarian and students interact more frequently and more actively than during traditional teaching.

• There is an identifiable time for inquiry-based learning.

A systematic approach ensures that students have the opportunity to engage in inquiry, to learn an overall process and to understand that this general inquiry process can be transferred to other inquiry situations.
An instructional model, such as the Inquiry Model, supports the work of teachers and students and can be used in a variety of ways including:

- **A scaffold for instruction** that outlines the skills and strategies that need to be taught explicitly in each phase of the process.

- **A gauge for feelings** which reassures students that they will feel various feelings throughout the model (enthusiasm, apprehension, frustration and excitement and that these feelings are a normal part of the inquiry process.

- **A common language** for teachers and students helps students to internalize the model, to talk about the learning processes involved and to increase effective communication among all inquirers in a school.

- **A guide for students** in using an analytical approach that includes all phases in the inquiry process. Without learning an inquiry process, students often develop a very limited and narrow view of inquiry.

- **A guide for monitoring** where teachers assess how effectively students have engaged in the inquiry process, how deeply they understand it, and how effectively the process has been sequenced across grades.
PHASES
The Phases of the Inquiry Model

Reflecting on the process is integral to all phases in the Inquiry Model—Planning, Retrieving, Processing, Creating, Sharing and Evaluation—and includes both the affective and cognitive domains associated with metacognition.

Planning Phase (the most important phase)
Inquirers should understand that the underlying purpose of inquiry-based learning projects is to develop their “learning to learn” skills. Inquiry-based learning begins with the inquirers’ interest in or curiosity about a topic.

Retrieving Phase
The inquirers next think about the information they have and the information they want. Inquirers may need to spend considerable time exploring and thinking about the information they have found before they come to a “focus” for their inquiry.

Processing Phase
This phase begins when the inquirer has found a “focus” for the inquiry. A focus is the aspect of the topic area that the inquirer decides to investigate.

Creating Phase
Organizing the information, putting the information into one’s own words and creating a presentation format are the next tasks in the process.

Sharing Phase
If students have been given enough supports throughout the inquiry process, they are proud of their product and eager to share it, regardless of the format or audience.

Evaluation Phase
In order to assess their true learning, students need to evaluate the process at every stage of the inquiry model as well as evaluate the final product.
REFERENCES


Reflecting
Reflecting on the Process is the core component of the Inquiry Model and part of every phase.

Students will learn to:

- understand that inquiry is a personal learning process
- understand that the inquiry process is transferable to other learning situations
- develop their metacognitive skills—thinking about their thinking and thinking about their feelings
- develop strategies for monitoring and enhancing their thinking and feelings.

Tips for Teachers: Reflecting on the Process at any Phase

- Teach students that inquiry involves the unexpected for teachers and students.
- Teach students to self-check: “Is this information even remotely connected to my question?”
- Share the “high point of the day” and the “frustration of the day.”
- Teach students to self-check: “What did I learn? How well did I achieve my goal? What changes did I have to make to meet my goal? What changes will I make the next time I do this? Where else can I use these strategies?”

In the context of classroom activities or an inquiry-based learning activity, the teacher provides students with opportunities to:

- submit their journals/logs on an ongoing basis and at the end of the inquiry process
- write/talk about new learnings as a result of reflecting on the process
- give examples of other situations where the inquiry process could be or is used
- compare and contrast their learning process with that of others in the class
- write/talk about strategies that they can use to cope with the frustrations of doing inquiry
- write/talk about their own inquiry process and compare it with the process of others in the class
- write/talk about the strategies that they can use to support their learning in each of the phases of the inquiry process.

The core purpose of the Reflecting on the Process component in the Inquiry Model is to involve students in their own learning by developing their metacognitive skills. This component is key in each and every phase of the inquiry process, is integral to the success of inquiry-based learning activities, and is actively practiced throughout the inquiry process. Students are taught reflection skills and strategies so that inquiry becomes a natural process.

Inquiry work with students is an active interchange between students and teachers of ideas, information, learnings, experiences, activities and feelings, through which meaning is constructed. This interchange is supportive, discursive, adaptive, interactive and reflective. Teachers suggest how students can move forward, see things from new perspectives, make connections between previous and new knowledge, and see the patterns of their learning.
Planning Phase
Skills and Strategies
- Identify a topic area for inquiry
- Identify possible information sources
- Identify audience and presentation format
- Establish evaluation criteria
- Outline a plan for inquiry

| K-3 | By the end of grade 3, when engaged in inquiry-based learning, students will be able to:
|     | · activate prior knowledge specific to a topic
|     | · ask questions related to a topic
|     | · identify an issue worthy of investigation
|     | · respond to new ideas using a variety of strategies and tools

| 4-6 | Students will continue to develop skills (K-3, above) and, by grade 6, be able to:
|     | · predict and hypothesize
|     | · ask focus questions related to aspects of the topic or issue
|     | · ask a question that will generate meaningful inquiry and that is interesting and worth answering

| 7-12 | Students will continue to develop all skills (K-6, above) to mastery level

Tools and Strategies to Use with Planning
Instructional strategies: brainstorming, mind-mapping, concept-mapping, webbing, KWL(KWHL) charts, logs, anticipation charts, visual organizers, guided imagery, prior knowledge, peer questioning, question stems, think-pair-share, booktalks, illustrating, small group discussions, whole-class discussions

Assessment strategies: learning logs or journals, rubrics, portfolios, charts

Technological tools:
Software available on school network – Inspiration
Web Tools – blogs (ex. Wordpress), wikis (ex. PBworks), Google Drive, youtube, bubbl.us, Webex, Collaborate

- The teacher must facilitate careful and thoughtful work to ensure that topics and research questions require higher level thinking skills, that they will challenge students and that they will engage student interest and curiosity. Students feel more positive toward investigative activities when they are involved in choosing or developing research topics. Contrary to expectations, students in the senior grades often have less involvement in topic and question generation than do younger students (Gross, 1997).
**Retrieving Phase**

**Skills and Strategies**
- Develop an information retrieval plan
- Locate and collect resources
- Select relevant information
- Evaluate information
- Review and revise the plan for inquiry

<table>
<thead>
<tr>
<th>K-3</th>
<th>By the end of grade 3, when engaged in inquiry-based learning, students will be able to:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>· select information for a purpose</td>
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<td></td>
<td>· use effective search strategies</td>
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<tr>
<td></td>
<td>· gather and record information using a variety of resources and tools</td>
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<td></td>
<td>· use experts and institutions in the community or online as resources</td>
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<tr>
<td></td>
<td>· use text features of books or website to locate information efficiently</td>
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<td>· use the internet safely and responsibly</td>
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<table>
<thead>
<tr>
<th>4-6</th>
<th>Students will continue to develop skills (K-3, above) and, by grade 6, be able to:</th>
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<tbody>
<tr>
<td></td>
<td>· identify the types of information required</td>
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<td></td>
<td>· develop appropriate, efficient, and effective search strategies</td>
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<td></td>
<td>· choose the best resources for the task</td>
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<td></td>
<td>· use the school library and the electronic catalogue to find information</td>
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<tr>
<td></td>
<td>· use other libraries to search for information</td>
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<tr>
<td></td>
<td>· understand what primary and secondary sources are and when to use each one</td>
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<td></td>
<td>· evaluate resources for usefulness</td>
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<tr>
<th>7-9</th>
<th>Students will continue to develop all skills (K-6, above) to mastery level and be able to:</th>
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<tbody>
<tr>
<td></td>
<td>· evaluate resources and information critically for perspective, purpose, currency,</td>
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<tr>
<td></td>
<td>authority, relevance, coverage, and quality</td>
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<tr>
<td></td>
<td>· check for reliability and credibility of a source</td>
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<td></td>
<td>· understand the differences between various tools and resources for searching, and use each appropriately</td>
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<td></td>
<td>· prioritize resources by usefulness</td>
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<td></td>
<td>· use different kinds of resources to expand and verify information</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>10-12</th>
<th>Students will continue to develop all skills (K-9, above) to mastery level and, by graduation, be able to:</th>
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<tbody>
<tr>
<td></td>
<td>· access government documents as sources of information</td>
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<tr>
<td></td>
<td>· understand the differences between search engines, search directories, and metasearch engines, and use each appropriately</td>
</tr>
<tr>
<td></td>
<td>· use Works Cited and bibliographies as resources to find additional information</td>
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</tbody>
</table>

**Tools and Strategies to Use with Retrieving**

Instructional Strategies: group work; evaluation of sources; vocabulary development; school library orientation; effective keyword and other search strategies; journaling

Assessment Strategies: visual organizers, observations, interviews, conferences, portfolios, checklists, charts, rubrics

Technological Tools:
Web Tools: Ebsco, Nettrekker, Google, Google Drive, Wikis (ex. PBworks), Survey Monkey, Pageflakes, Diigo
## Processing Phase

### Skills and Strategies
- Establish a focus for inquiry
- Choose pertinent information
- Record information
- Make connections and inferences
- Review and revise the plan for inquiry

### K-3
By the end of grade 3, when engaged in inquiry-based learning, students will be able to:
- differentiate main ideas from supporting details
- record information in note format
- interpret meaning from images
- review and revise the plan for inquiry
- work with others in gathering and recording information

### 4-6
Students will continue to develop skills (K-3, above) and, by grade 6, be able to:
- use reference sources appropriately
- use graphic organizers to record and organize information
- take notes using key words and phrases
- determine when more information is needed
- verify findings using additional sources
- develop a structure to organize and store information
- sort information by topic and sub-topics and by criteria such as time, importance, cause and effect
- keep a record of resources used

### 7-9
Students will continue to develop all skills (K-6, above) to mastery level and be able to:
- interpret information from graphic representations, statistics, and media sources
- develop graphic organizers to record and organize information
- use information responsibly
- report sources in a Works Cited format
- recognize the differences between implicit and explicit messages

### 10-12
Students will continue to develop all skills (K-9, above) to mastery level and, by graduation, be able to:
- evaluate strengths and weaknesses of various types of sources
- understand the difference in purpose and style of a variety of newspapers, journals, and magazines

## Tools and Strategies to Use with Processing

### Instructional Strategies:
- Note-taking (point-form, two-column, keyword, visual or graphic organizers);
- group work;
- evaluation of information;
- vocabulary development;
- journaling

### Assessment Strategies:
- visual organizers, observations, interviews, conferences, portfolios, checklists, charts, rubrics

### Technological Tools:
- Software available on school network: Word processor (ex. Microsoft Word)
- Web Tools: Ebsco, Nettrekker, Google, Google Drive, Wikis (ex. PBworks), Survey Monkey, Pageflakes, Diigo, Evernote, BibMe, Noodle Tools
## Creating Phase
### Skills and Strategies
- Organize information
- Create a product
- Think about the audience
- Revise and edit
- Review and revise the plan for inquiry

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
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</table>
| K-3   | By the end of grade 3, when engaged in inquiry-based learning, students will be able to:  
  - organize information into a variety of appropriate formats and products  
  - sequence information alphabetically, numerically, chronologically; by category |
| 4-6   | Students will continue to develop skills (K-3, above) and, by grade 6, be able to:  
  - use supporting details to expand key ideas  
  - merge information from a variety of sources  
  - use point-form notes to develop sentences in own words  
  - demonstrate responsible use of information  
  - integrate the work of all group members  
  - sequence information by cause-and-effect, importance, priority |
| 7-12  | Students will continue to develop all skills (K-6, above) to mastery level and be able, by graduation, to:  
  - adapt an inquiry plan to own learning style  
  - find and use newly available online tools to create  
  - write a précis; write a clear thesis statement  
  - develop a working plan or outline that supports the main idea and organizes the subtopics or supporting details logically  
  - use a variety of note-taking strategies to develop paragraphs in own words  
  - consider and select an appropriate product for presentation |

## Tools and Strategies to Use with Creating
### Instructional Strategies:
- Idea diagrams, storyboards, and other visual and design skills to arrange, display, and organize information; writing strategies to clarify ideas, like quick writes, paraphrasing, précis, journaling; plagiarism; group strategies to edit, prepare, and practice product for presentation; various “product” formats; planning and outlining; multimedia and/or traditional formats for presentation; Works Cited; essay-writing; criteria for “publishing” (making public) presentations; task assignment and timeline development

### Assessment Strategies:
anecdotal observations, conferences, checklists, exemplars, rating scales, rubrics

### Technological Tools:
- Software available on the school network: Microsoft Word, Microsoft Power Point, Windows Movie Maker
- Web Tools: blogs (ex. Wordpress), wikis (ex. PBworks), Google Drive, youtube, BibMe; Noodle Tools; Bitstrips, Animoto, Prezi, Glogster,
**Sharing Phase**
Skills and Strategies
Communicate with the audience
Present new understandings
Demonstrate appropriate audience behavior

<table>
<thead>
<tr>
<th>K-3</th>
<th>By the end of grade 3, when engaged in inquiry-based learning, students will be able to:</th>
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<tbody>
<tr>
<td></td>
<td>· choose an effective medium for sharing</td>
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<td></td>
<td>· use a variety of formats for sharing</td>
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<td></td>
<td>· understand a simple concept of ownership of ideas and information</td>
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<td></td>
<td>· communicate using a variety of expressive formats (software and technology tools, music, art and drama, writing)</td>
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<tr>
<th>4-6</th>
<th>Students will continue to develop skills (K-3, above) and, by grade 6, be able to:</th>
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<tbody>
<tr>
<td></td>
<td>· apply models, rubrics, and/or criteria for exemplary presentation</td>
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<td></td>
<td>· present information in a variety of media and formats</td>
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<td>· demonstrate respect for intellectual property by understanding copyright and plagiarism</td>
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<thead>
<tr>
<th>7-12</th>
<th>Students will continue to develop all skills (K-6, above) to mastery level and be able, by graduation, to:</th>
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<tbody>
<tr>
<td></td>
<td>· integrate various formats of communication</td>
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<td></td>
<td>· act as an expert and teacher in presenting information</td>
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<tr>
<td></td>
<td>· know the consequences of plagiarism</td>
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<td></td>
<td>· understand the impact of design on visual presentations</td>
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**Tools and Strategies to Use with Sharing**
Instructional Strategies: guidelines for presentation, peer- and self-assessment, audience response; group discussion and/or consensus for rubric development; plagiarism; principles of design; media formats

Assessment Strategies: group-developed rubric; exemplars; portfolios; checklists, rating scales; charts; peer- and self-assessment

Technological Tools:
Software available on the school network: Microsoft Word, Microsoft Power Point, Windows Movie Maker, Audacity (podcasts)
Web Tools: blogs (ex. Wordpress), wikis (ex. PBworks), Google Drive, youtube, BibMe; Noodle Tools; Bitstrips, Animoto, Prezi, Glogster
Evaluating Phase
Skills and Strategies
Evaluate the product
Evaluate the inquiry process and inquiry plan
Review and revise personal inquiry model
Transfer learning to new situations/beyond school

| K-3 | By the end of grade 3, when engaged in inquiry-based learning, students will be able to:
|     | · reflect on what worked or did not work during the inquiry process
|     | · articulate new learning
|     | · apply what worked to future inquiry |

| 4-6 | Students will continue to develop skills (K-3, above) and, by grade 6, be able to:
|     | · understand how new knowledge influences prior knowledge and hypotheses
|     | · use self-, peer-, and teacher-generated criteria to assess the representation of learning
|     | · consider constructive criticism from peers and teachers in reflection
|     | · assess the inquiry process and adjust for future inquiry |

| 7-12 | Students will continue to develop all skills (K-6, above) to mastery level and be able, by graduation, to:
|      | · reflect upon personal change of ideas and perspectives
|      | · apply constructive criticism and comments from peers and instructors to future inquiry
|      | · assess how new skills, strategies, tools, and resources influence learning |

Tools and Strategies to Use When Evaluating
Instructional Strategies: journaling, learning log

Assessment Strategies: age-appropriate rubrics; small-group and whole-class feedback; interviews (formative and summative); exit slip

Technological Tools: Survey Monkey, RubiStar

Need more Learning Tools? Try Jane Hart’s Top 100 Tools for Learning 2012 at the Centre for Learning & Performance Technologies (C4LPT):
http://c4lpt.co.uk/top100tools/

Looking for great websites for teaching and learning? Try the AASL’s Top 25 Websites for Teaching and Learning:
http://www.ala.org/aasl/guidelinesandstandards/bestlist/bestwebsitestop25
Exemplars

Students of the January 2012 class of Education 572: Information Literacy and the School Library (under the direction of Judy Davies) have graciously agreed to allow their inquiry projects to be part of this document. The students were expected to follow one of the inquiry models available to them from other provincial organizations. Since our own (PEITLA) inquiry document was not updated and available, most students chose either the BCTLA Points of Inquiry or The Alberta Focus on Inquiry. The projects are all in digital format; therefore, it is not possible to include them in the print version of this document. When this document is posted online, direct links to the projects will be made so that school instructional staff can view the excellent exemplars created by the Ed 572 students.