Inquiry-based Learning

(This section is condensed and adapted from Alberta Learning, *Focus on Inquiry: A Teacher's Guide to Implementing Inquiry-based Learning* [Edmonton, AB: Alberta Learning, 2004]).

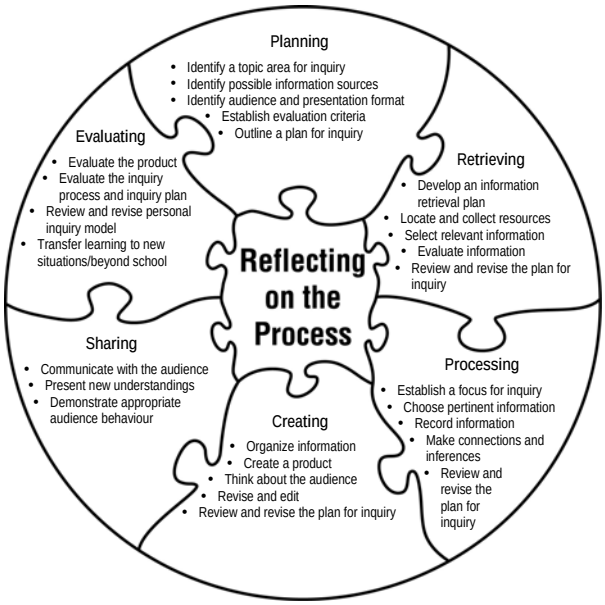
Benefits of Inquiry-based Learning

Research suggests that using inquiry-based learning with students can help them become more creative, more positive and more independent.[1] 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.

The Inquiry Model

Using an inquiry model helps students to internalize a process for inquiry that is transferable to everyday life situations. The model presented here uses a puzzle metaphor to help students relate inquiry-based learning to their lives outside school.



1. Kühne (1995).

Phases of the Inquiry Model

Reflecting on the Process
Reflecting on the process is integral to all phases in the Inquiry Model—Planning, Retrieving, Processing, Creating, Sharing and Evaluating. Reflection should address both the affective and cognitive elements associated with metacognition.

Planning
Planning is the most important phase of the whole process. Students 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—the puzzle that needs to be solved. At this phase of the inquiry process students often experience a sense of optimism about the tasks ahead.

Retrieving
In this phase, students think about the information they have and the information they want. They may need to spend considerable time exploring and thinking about the information they find before they come to a "focus" for their inquiry. This pre-focus phase is at first enjoyable for students, as they actively search for information related to their topic. But as the number of resources they find increases, students may have difficulty finding data specific to their inquiry or handling the irrelevant data they find. Since many students are set in what they want to find out, they may "tune out," stop searching or become frustrated at this point in the process.

Teachers can help students through this phase by emphasizing that feelings of frustration are normal, and by teaching them skills and strategies for selecting relevant information and for adjusting and modifying inquiries.

Processing
This phase begins when the student has found a focus for the inquiry—an aspect of the topic area that the student decides to investigate. Coming to a focus can be very difficult for students, as it involves more than just narrowing the topic; it involves coming to an authentic question, a personal perspective or a compelling thesis statement.

Students usually experience a sense of relief and elation when they have established a focus for their inquiry. Even so, choosing pertinent information from resources is often a difficult task: there may be too little information or too much information, or the information may be too superficial or too in-depth for the students. Often students will find information that is confusing or contradictory, and may feel overwhelmed.

Creating
The creating phase involves organizing the information, putting it into one's own words and creating a presentation format. Students often feel more confident at this phase and may want to include all of their new learning in their product, resulting in too much information. Teachers should help students to stay focused in their presentation.

Sharing
If students have been given enough support throughout the inquiry process, they are usually proud of their product and eager to share it, regardless of the format or audience. They may feel a bit nervous about presenting something in which they take such ownership, and they may feel anxious that others may not understand or appreciate their efforts. Nevertheless, they generally feel that they have done well on this assignment.

Evaluating
When a research project is complete, students generally feel relieved, happy and excited about their new skills and understandings. In order to make sense of the inquiry process, they need to evaluate their inquiry process and product, understand and question the assessment criteria their teacher has used, reflect on teacher feedback, and share their feelings about the process.

Students should be able to articulate the importance of this kind of work for developing their "learning to learn" skills, and to see the connections between their inquiry work done in school and work or activities done outside of school. They should also be able to reflect on how their experience has influenced their personal inquiry model and on what they have learned about themselves as inquirers.

Inquiry Across the Curriculum

Alberta programs of study present a variety of inquiry models. While terms and processes may vary, the basic concepts of inquiry-based learning emphasized in this document are included in all programs of study. This document emphasizes common aspects or elements in order to support an integrated, cross-disciplinary approach to inquiry; however, teachers need to use the latest version of curriculum documents to ensure that they have the fullest and most current information in relation to the inquiry-based outcomes for each program of studies.

Facilitating Inquiry-based Learning

Teachers and administrators may have a variety of questions as they consider how to implement inquiry-based learning. For example:

- When is inquiry-based learning worth doing?
- Will inquiry-based learning help me meet curriculum standards?
- Will inquiry-based learning increase my students' ability to read, write and reason?
- Will inquiry-based learning improve my students' test scores?
- If I provide time for students to spend on inquiry-based learning, what do I remove from my program? How do I make time?
- How do I manage an inquiry-based learning activity by myself?
- Which strategies are the most effective in teaching inquiry-based learning?
- What are some obstacles I may need to overcome to implement inquiry-based learning?

Consider the following sample strategies for facilitating effective inquiry-based learning. Note that some of these tasks may also be performed by a teacher–librarian.

- Focus on real-life problems in the context of the curriculum or community. For teacher-directed projects, provide students with a choice of topics that are likely to be of personal interest. For student-directed projects, provide curriculum-related themes and allow students to generate their own topic questions.
- Approach inquiry with enthusiasm and excitement.
- Admit that inquiry involves the unexpected for you and for students.
- Establish a collaborative relationship with students and teacher–librarian. Interact with students frequently and actively.
- Model the behaviours and language of the inquiry process in your instruction.
- Post the Inquiry Model in your classroom and the school library.
- Set a specific time for inquiry-based learning.
- Provide students with time during class to plan and reflect on the steps required to complete their inquiries.
- Individualize teaching. Students with special needs and students who lack inquiry-related skills may need extra assistance or adaptations at various stages of the process.
- Provide information and background to motivate students.

- Facilitate the process by discussing, clarifying, supporting and monitoring as students gather and present information. Motivate students to locate, analyze and use information; and assist students to clarify thinking through questioning, paraphrasing and talking through tasks.
- Facilitate and model questioning behaviours (e.g., providing opportunities for students to develop and ask questions).
- Use technology to advance inquiry by doing what would otherwise be impossible.
- Help students understand that the information they find, whether in a library book, in a newspaper or on an Internet site, was created by people with particular beliefs and purposes and that information is not just objective facts.
- Teach students how to compare, contrast and synthesize data, as well as skills and strategies for focusing their project.
- Teach students audience appreciation skills and strategies.
- Reflect on and modify the process as necessary to make it really count.
- Assess students' progress in content and process areas. Seek students' input in developing assessment criteria for the research product and process.

Designing Inquiry Activities

Students learn inquiry skills, strategies and processes more readily when inquiry-based learning activities are:

- integrated with curriculum
- taught with a focus on developing lifelong learners and critical thinkers
- viewed by students as relevant to their needs
- related to students' past experiences
- shared through cooperative learning.

Well-designed inquiry-based learning projects are a means by which many curricular outcomes can be accomplished by students each year. Planning is the key to success for teachers who develop the lesson plans for the inquiry activity, as well as for students who are involved in the inquiry. Planning successful inquiry-based learning activities requires taking time to think through the process.

Inquiry-based learning requires many skills and strategies and a wide range of resources from beyond the school library and classroom. It is important that teachers select a curriculum theme that is worthy of the time and effort involved and that will be interesting to students for more than a short-term period. Early selection of a theme and inquiry activity will give teachers the time to build the students' background knowledge, to develop the inquiry skills and strategies that students will need, and to acquire or add to the required resources. Consider the following process for developing inquiry-based learning activities.

Step 1: Begin planning
If there is a school-wide plan for integrating inquiry-based learning activities, consult this plan first. School plans vary the content areas from year to year, and ensure that students are learning, practising and improving their inquiry skills as they progress through the grades. If your school has not yet developed a school-wide plan, begin with the programs of study, which all have inquiry-based outcomes, and select an area that will interest both you and your students.

Step 2: Work with others
The ideal situation for developing an inquiry unit occurs when team teaching or cooperative planning occurs between a teacher–librarian and teacher or between two or more teachers (Alberta Education, 1990, pp. 28–29).

The following are some possibilities for teams:

- Work with another teacher or all teachers in a particular grade to develop and team teach the inquiry unit. In this team-planning approach, each teacher brings special talents that can be used. The team approach also divides the labour and lightens the workload. After the unit planning is complete, each teacher adapts the unit to the needs of his or her students.
- Work with a teacher–librarian to plan inquiry-based learning units together. The teacher–librarian brings to the activity expertise in inquiry-based learning, resource selection, Web site selection and evaluation, and, most importantly, strategies for integrating information literacy skills into the inquiry.
- If no teacher–partners are available, discuss your inquiry with the library technician or assistant and ask for support to locate a variety of print and nonprint resources.

Step 3: Engage students

- Decide which unit provides the best opportunities for inquiry-based learning.
- Begin with the program of studies and your yearly plan.
- Look for entry points, as well as topics that will engage students' interests and involve a problem or issue.
- Choose a curriculum-based theme for which students bring a strong background of experience or knowledge, or for which background knowledge will be developed prior to the inquiry.
- Consider if the theme presents opportunities to engage all students in your class, including male and female students, the highly motivated and those who require a lot of encouragement.
- Consider that a complex topic may require additional guidance for students so that they realize the importance of the issue.

- Think about resources in your school and community. Keep in mind that some themes popular with students in Knowledge and Employability courses may not have resources available at the appropriate reading level.

Step 4: Determine the scope

- Decide on the scope and end product of the inquiry activity.
- If teaching inquiry-based learning for the first time, limit the scope of the project in terms of time, topic selection and end product. Focus on ensuring student success.
- Consider how many product formats you are willing to teach or accept.
- Plan for students to share information in a way that is simple or familiar to them.

Step 5: Identify resources

- Select appropriate resources and plan for their use. The inquiry activity may have to be redefined at this point to take into account available resources.
- Choose resources in different formats (e.g., print, nonprint, digital, multimedia) and at different reading and literacy levels.
- Use a station approach in the classroom or library if resources are very limited.
- Arrange or confirm access to resources.
- Schedule time for students to browse through resources in the school library or classroom before the inquiry begins so that they become comfortable with resources other than textbooks.

Step 6: Create a timeline

- Determine the order in which the unit and inquiry activity will be taught.
- Plan the inquiry project for the mid-point to the end of a unit, once students have learned background knowledge on the theme and had a chance to think about questions of particular interest to them.
- Let students know in advance when they will start an inquiry activity—this allows students to think about topics, talk to friends and family about the topic, and gather resources in advance. It may also help with choosing and narrowing the topic, and in identifying any controversial issues (Alberta Learning, 2004, pp. 82–83).

Step 7: Select inquiry and ICT skills

- Determine which inquiry and ICT skills (if appropriate) will be stressed throughout the inquiry and which will be taught prior to the inquiry activity.
- Assess students' competencies in a variety of inquiry skills. Students can help identify what skills they know and what skills require instruction.

- Analyze what inquiry skills will be required by a project and what to teach in advance.
- Limit the number of skills taught within an inquiry activity.

Step 8: Plan monitoring and assessment

- Plan in advance for the monitoring and assessment of the inquiry process and the final product. Planning for assessment provides the foundation for thinking about what students already know, what they need to know, what instructional emphases will be given and what students will be expected to learn through the inquiry activity.
- Determine how you will monitor and assess student progress in both content and process on an ongoing basis.
- Determine how you will make students aware of the monitoring and assessment (both formative and summative) requirements.
- Plan for student self-evaluation.
- Plan for reflecting on the process.
- Plan for evaluating and revising the assignment at the end of the process.
- Determine how you will know if the process has been successful.

Step 9: Begin the inquiry

- Introduce the inquiry activity to the class as an integral part of classroom studies.
- Keep a list of questions, issues and problems that arise during the unit for further investigation.
- Spread the inquiry activity throughout the unit so that students have time to think about a topic of interest, talk to parents and other family members, and find a focus.

Step 10: Determine what worked

During and after the inquiry activity, record those strategies that were most and least effective.

Assessing Inquiry

Teachers need to plan for diagnostic, formative and summative assessment when designing inquiry activities.

- Diagnostic assessment is used to find out which inquiry skills and strategies students know and can use, and then to build on these strengths during the inquiry. Areas of difficulty can be targeted for planned instruction during the inquiry activity. Diagnostic assessment also helps teachers recognize how to differentiate instruction for individual students in a class.

- Formative assessment is critical in inquiry activities. Ongoing, formative assessment helps teachers to identify and monitor students' development of skills and strategies for planning, retrieving, processing, creating and reflecting during the inquiry activity. This ongoing assessment allows teachers to modify instruction, adapt the inquiry activity and support students with special instructional needs.

- Summative assessment is carried out at the end of the inquiry activity to provide information to students and parents about progress and achievement on the inquiry activity. Summative assessment assesses both the content and the process of the inquiry, and helps the teacher and the students plan for further inquiries.

Planning for assessment requires that teachers consider the purposes for assessment in the inquiry activity, and then choose appropriate strategies for each of the three types of assessment. See Assessment for possible strategies.

Differentiating Instruction for Inquiry-based Learning Activities

The developmental level and individual abilities of the students will have an impact on the nature of an inquiry-based learning activity, the end product and how it is shared. Consider the following strategies for students with limited, moderate and advanced experience with inquiry-based learning. For all students, appropriate positive feedback and support is necessary.

	For students with limited inquiry experience	**For students with more inquiry experience**	**For students who are advanced inquirers**
Topic	Provide concrete, pre-selected topics for students to choose from; or allow students to select specific topics, with guidance, within a general curriculum theme selected by the teacher.	Allow students to select, with guidance, issues-based topics (and perspectives on the topics) within a general curriculum theme selected by the teacher.	Allow students to select specific topics (e.g., issues-based, cultural, historical, comparative, informative, biographical) within parameters set by the teacher. Have students support a position for thesis-based inquiry.
	Provide background knowledge for students to work from, or encourage students to work their own experiences, to build basic understandings of the theme.	Provide opportunities for students to build on their general background understandings of the theme.	Provide opportunities for students to build on their general background understandings of their topic.
Working with Others	Allow students to talk to others, using appropriate protocol, to gather information about their topic.	Allow students to work with others to compare understandings of and sensitivities to the topic.	Allow students to work with others to compare understandings of and sensitivities to the topic.
Sources	Provide carefully selected resources, including Internet sites, for students. Encourage and support additional student research.	Help students develop and implement a plan for finding and evaluating information.	Help students develop and implement a plan for finding and evaluating information from a variety of sources.
	Teach basic skills for locating information through methods such as online library catalogues, subject directories, keyword searches, tables of contents and indexes. Provide specific strategies for using Internet search engines.	Reinforce and expand skills for locating information through methods such as online library catalogues, subject directories, keyword searches, tables of contents and indexes. Provide guided instruction for using Internet for research.	Review skills for locating information through methods such as online library catalogues, subject directories, keyword searches, tables of contents and indexes, as necessary. Provide guided instruction for using Internet for research.
		Teach interviewing skills that consider the appropriate protocol for each situation.	Reinforce and expand skills for conducting interviews in an appropriate and ethical manner (e.g., consideration of privacy and confidentiality).

	For students with limited inquiry experience	For students with more inquiry experience	For students who are advanced inquirers
Information	Teach skills for reading simple informational texts.	Teach specific skills for reading more complex informational texts.	Teach specific skills for reading and evaluating complex informational texts, as needed.
	Teach note-taking skills and provide a graphic organizer for recording information.	Teach note-taking skills, including highlighting techniques, and provide a choice of graphic organizers or other formats for students to record information.	Help students to select the most appropriate note-taking strategies for recording information in particular situations.
Report	Provide specific guidelines for students to create a basic report or presentation.	Provide specific guidelines for students to create a basic report or presentation, but encourage students to be creative in their product.	Students create a report or presentation based on guidelines developed in the planning phase and in response to the needs and interests of the intended audience.
	Encourage students to begin using technology to locate, organize and create presentations.	Encourage students to use technology appropriately to enhance their presentations and reports.	Encourage students to use technology appropriately and creatively to enhance their presentations and reports.
	Have students share their final report/project with small groups within the classroom and/or with family.	Have students share their final report/project with small groups, other classes and/or family.	Have students share their final report/project with larger groups, other classes, family and/or the community.
Evaluation	Identify and share evaluation criteria for the process and the product, and ensure that students understand this criteria.	Identify and share evaluation criteria for the process and the product, and ensure that students understand this criteria.	Identify and share evaluation criteria for the process and the product, and ensure that students understand this criteria.
	Involve students in setting evaluation criteria for the process and the product.	Involve students in setting evaluation criteria for the process and the product.	Involve students in setting evaluation criteria for the process and the product.
	Teach and provide opportunities to practise appropriate peer-evaluation skills.	Teach and provide opportunities to practise appropriate self-evaluation and peer-evaluation skills.	Provide opportunities to practise self-evaluation and peer-evaluation of the final product and the inquiry process.
Monitoring	Monitor progress at the end of each class.	Monitor progress at the end of each class.	Monitor progress at the end of each class.
	Create time for students to talk about their feelings and progress each class.	Teach specific strategies to help students monitor and adapt their own inquiry skills and strategies during the process.	Teach specific strategies to help students monitor and adapt their own inquiry skills and strategies during the process.