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Note that there are three common themes throughout this document:

- The Process of Design
- Project Management
- Safety Literacy

These are common themes throughout all of Technological Education. The strategies presented here can be used and adapted to any Technological Education subject grades 9-12.

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**Getting Ready to Read: Anticipation Guide**

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**SUBJECT: The Process of Design, Analyzing Design Briefs, Grades 9-12**

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A crucial first step in developing solutions to design challenges is to analyze the requirements of the design. These requirements are usually outlined in a *design brief* or *design statement*. A designer must correctly identify key concepts and priorities for effective solutions. The Anticipation Guide technique helps students learn to read and analyze design briefs more effectively. An Anticipation Guide is a series of questions or statements related to the topic or point of view of a particular text. Students work silently to read and then agree or disagree with each statement. In this way, students will be better prepared to analyze the text of the design brief and develop more effective solutions.

**Purpose**

- Help students to activate their prior knowledge and experience and consider more effectively the important ideas they will be reading.
- Encourage students to make a personal connection with concepts in design problem solving so that they can integrate new knowledge with their background experience and prior knowledge.
- Help students become more efficient problem solvers by focusing on important ideas and priorities at the beginning of design challenges.

**Payoff**

Students will:

- connect their knowledge and experience to an understanding of the concept of design analysis.
- become more efficient problem solvers.
- have a purpose for research and reading - related text before developing solutions to problems.
- become familiar and comfortable with the directions to take in solving design problems.

**Tips and Resources**

- While implementing a specific design challenge example, this Anticipation Guide can be used for any challenge in any grade level. Teachers should consider the important elements of the design they wish to prioritize and modify accordingly.
- The questions in this guide are designed to help students relate to the process of analyzing problems to develop efficient and effective solutions. The questions should provoke ideas on what is required by end users and customers of design solutions, and should lead to better decision-making.
- For more examples of design briefs see the Course Profiles for Technological Design, Grades 9-12, (<http://www.curriculum.org>) and the OCTE Activity Resource Management documents (ARMdocs) (<http://www.octe.on.ca>).
- For more information see *Think Literacy: Cross-Curricular Approaches, Grades 7-12, pp.20-23*.
- To connect these activities to course expectations, technological literacy benchmarks and employability and innovation skills see Teacher Resource, *Key Standards for Getting Ready to Read: Anticipation Guide*.

**Further Support**

- Put students in pairs to complete the anticipation guide if they are having trouble making connections with the theme or topic, or if they are having trouble with the language of the text.
- ESL students may benefit from pairing with a partner who speaks the same first language so they can clarify concepts in their first language.
- To provide an opportunity for struggling students to contribute in a more supportive situation, divide the class into small groups of four or five and ask them to tally and chart their responses before participating in a whole-class discussion.



**Getting Ready to Read: Anticipation Guide**

**SUBJECT: The Process of Design, Analyzing Design Briefs, Grades 9-12**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Determine reading group arrangements for students: pairs or small groups.</li> <li>• Print sufficient copies of the Design Brief and Anticipation Guide (See example Student Resource, <i>Design Scenario: Technology Information Booth</i> and Student/Teacher Resource, <i>Anticipation Guide: Designing a Technology Information Booth</i>).</li> <li>• Distribute copies of the your Anticipation Guide (see example <i>Anticipation Guide: Technology Information Booth</i>). Explain that this is not a test, but an opportunity for them to explore their own thoughts and opinions. They complete the guide first individually (or with partners or small groups) and then share their thoughts in a whole-class discussion.</li> <li>• To engage the class in a whole-class discussion, start with a simple hand count of the numbers of students who agreed or disagreed with a particular statement. Then ask the students who disagreed to share their thinking, followed by those students who agreed with the statement.</li> <li>• Record (or ask a student to record) some of the key points made during the discussion, using a “T-chart” (agree/disagree) on the board, overhead or projector.</li> </ul>	<ul style="list-style-type: none"> <li>• Working individually, (or with partners), read each statement on the anticipation guide and check off responses.</li> <li>• Contribute responses to the class discussion and explain them.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Distribute Student/Teacher Resources, (your design brief or statement; see the following resource examples). Explain how the topic of the reading assignment connects with the anticipation guide statements and previous class discussion about the process of design.</li> <li>• Ask students to keep the guide beside the text as they read it, recall the questions and consider the answers.</li> </ul>	<ul style="list-style-type: none"> <li>• Read the <i>Design Brief</i>, and jot down ideas connected with the questions in the Anticipation Guide.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Ask students to return to the statements and to make notes from what they have discovered in their reading that may confirm or change their opinions.</li> </ul>	<ul style="list-style-type: none"> <li>• Make notes from what they have discovered in their reading that confirmed or changed their opinions about the statements.</li> </ul>

Notes

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## Design Scenario: Technology Information Booth

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*(Adapted and modified from the OCTE ARMdoc for TDJ3M: Design of a Information Kiosk/Device (Unit 4 Activity 2). See the Course Profiles for Technological Design (<http://www.curriculum.org>) and the corresponding OCTE ARMdocs (<http://www.oce.on.ca>).*

The local high school requires a display to showcase the technological expertise of their students in the local mall during Education Week. Our firm has been asked by the school to produce an information display booth to provide mall goers with an opportunity to experience the technological accomplishments of the school's students. It is expected that the booth will be occupied by at least two representatives (selected students) at all times. It is anticipated that this booth will be in use for a couple of nights or a weekend, but will be stored for future uses.

Malls have unique situations to design for: they have an overload of competing information in visuals, colour, light, sound. The audience is looking for products to buy, and usually have specific goals in mind...you need to design specifically to attract their attention away from their original purpose. The solution has to be designed with this in mind; circumstances, like location and times, dictate design solutions.

### Design Statement

Design a standalone information display booth with two (2) operators for the local high school to highlight their technological achievements.

### Design Considerations

You are to consider the *SUM* of this design:

**SITUATION:** location, time, season, current practices, safety codes  
**USER:** intended audience, end user, customer  
**MESSAGE:** theme, clarity, utility, rationalization, symbolic intent

**(The following considerations need to be identified in Proposal and Engineering Design Report. Keep records of everything you do, as you will need to document the process of arriving at your solutions):**

### Client/End User requirements

- Client requirements: cost, space requirements, maintenance, durability, building codes, prefab elements, quick assembly/tear-down, storage and reuse, delivery of message to unique audience.
- End User requirements: message to receive/perceive, attractiveness, location, audience type, theme understood, demographics.
- Types of existing designs: kiosks, signs, interactive elements, temporary mall displays. Comparison of current designs, with a description on how they might be improved.

You must consider all elements noted above. Your Design Proposal must include a description or rationalization of your design decisions. Remember design is compromising...you are aiming for the optimal solution, and not all ideas work together, but you cannot ignore any element completely.

### Material Properties

- Materials: symbolic meaning, e.g., metal/video screens: high tech; wood: rustic, comfortable etc. Consider what you think of when you think: plywood, stainless steel, rusted steel, chrome, pine, oak, plastics, etc. Don't forget that materials can be duplicated to obtain the look of expensive materials through well-constructed cheaper ones.
- Shape/style: symbolism, location, size, use of colour/graphical elements, material and fastening considerations. Note that colours might have to conform to client designs, or site location parameters. There should be some element to attract people, and this does not usually mean it has to be shocking, vibrant or overtly flashy.

Student Resource

## Design Scenario: Technology Information Booth (cont.)

- Materials: ease of manufacture, assembly, strength of structure, durability, vandalism, finishes etc.
- Wood structural elements: (fir, spruce, pine, maple, oak, etc.); metals: (aluminium, steel, stainless steel, cold rolled steel, non-ferrous: brass, bronze, copper, etc.).
- Metal structural elements: sheet, tube (square, round), flat bar, castings; plastics: acrylic, Lexan, epoxy, fibreglass, vacuum formed, coatings, Coroplast (corrugated plastic sheet).
- Other: glass, rubber, concrete, stone, virtual stone.

Note: You will have to identify and comment on your comparative evaluation of each of the material properties above. You will justify your design decisions in your design proposal. Do not be overly worried that particular materials or constructs might be too expensive...there are ways to obtain the same symbolism or “feelings” in a message by creatively duplicating colour, texture, etc. with material substitutes, much like they do on movie sets (e.g., using rubber foam and paint to look to like natural rock).

### Engineering

- Fastenings: ease of assembly, installation, storage
- Maintenance, site repair
- Safety: installation and assembly safety, public safety, safety legislation

Note: Engineering is important not only for the duration of the display (safety, durability, strength), but also for the life cycle of the display, (installation, shipping, disassembly, storage, eventual disposal). All these life cycle issues must be dealt with at the beginning, as each element affects the other, and are also client issues.

### Deliverables

The first step after analyzing this design challenge is to research ideas and consider the necessary design parameters. From this your team will be developing a Design Proposal to be pitched to the company. Winning design ideas will be incorporated into a master plan and mock-up/testing will take place. From there you will be working with your team and others to fabricate the finished product.

You are expected to complete the following:

- Design Proposal: detailing your team research into client, display operators and audience requirements; symbols, colours, and themes of the school's technology; considerations of design; possible solutions.
- Sketches, Drawings, Mock-ups, Models and Completed Solutions: all as required to test and evaluate optimal solutions and construct the completed designs. Keep all sketches, models, etc. throughout the process, as you won't know what is important until the project is complete. Sometimes you go down the wrong path in design...and you will need to go back to the beginning to try the next path (and you might need these materials for the next similar job).
- Gantt Chart: You will need to complete a Gantt chart outlining the tasks at hand and all team member's duties to fully develop your project from approval stage to delivery. The Gantt chart will be a required part of your Design Proposal, and is part of the project approval process.
- Engineering Design Report: detailing design features, processes used to arrive at solutions and criteria considerations. Your job is evaluated throughout the completion of the project. The Engineering Design Report must include all your time sheets, detailing each team member's contribution to the project.

### Timeline

Your Design Proposal is due one week (5 working days) from today. It is expected that the project will be completed in three weeks from approval. Plan for 18 working days from project design to delivery.



## Anticipation Guide: Designing a Technology Information Booth

- Circle “Agree” or “Disagree” beside each statement below before you read the Design Brief.
- When you have finished, consider the statements again based on any new information you have read. Circle “Agree” or “Disagree” beside each statement and check to see whether your opinion has changed based on new evidence.

Before Reading	Statements	After Reading
1. Agree / Disagree	Location of an information booth is unimportant; a good design should fit anywhere.	Agree / Disagree
2. Agree / Disagree	The symbolic meaning of materials can be “faked”.	Agree / Disagree
3. Agree / Disagree	The needs of the client who orders the design is always the same as the end user.	Agree / Disagree
4. Agree / Disagree	The next step after reading the design brief is building the design.	Agree / Disagree
5. Agree / Disagree	To attract attention, a booth has to be flashy with bright colours.	Agree / Disagree
6. Agree / Disagree	As long as the materials in the design are cheap and affordable the client will be satisfied.	Agree / Disagree
7. Agree / Disagree	Problems like shipping and installing can be dealt with later once the design is decided.	Agree / Disagree
8. Agree / Disagree	You don’t have to work on the final Design Report until the design is fully tested and complete.	Agree / Disagree
9. Agree / Disagree	You should get rid of all rough sketches and draft notes to keep things orderly and neat.	Agree / Disagree
10. Agree / Disagree	You don’t have to develop a Gantt chart timeline until after you get approved to actually proceed on the project.	Agree / Disagree




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## Getting Ready to Read: Anticipation Guide

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SUBJECT: The Process of Design, Analyzing Design Briefs, Grades 9-12

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### Key Standards For Getting Ready to Read: Anticipation Guide

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity on developing a student's future career potential.*

#### References

The Ontario Curriculum, Grades 1-8 Science and Technology (1998).  
 International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).  
 Conference Board of Canada Employability Skills Profile 2000+ (2000).  
 Conference Board of Canada Innovation Skills Profile (2002).

#### ITEA Technological Literacy Benchmarks

##### Standard 2: The core concepts of technology

- Z: Selecting resources involves trade-offs between competing values, such as availability, cost, desirability, and waste.
- AA: Requirements involve the identification of the criteria and constraints of a product or system and the determination of how they affect the final design and development.
- BB: Optimization is an ongoing process or methodology of designing or making a product and is dependant on criteria and constraints.

##### Standard 8: The attributes of design

- K. Requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.

#### Conference Board of Canada Employability Skills

##### Manage Information

- CBC6 Locate, gather and organize information using appropriate technology and information systems.

##### Think & Solve Problems

- CBC10 Assess situations and identify problems.
- CBC11 Seek different points of view and evaluate them based on facts.

#### Conference Board of Canada Innovation Skills

##### Creativity and Continuous Improvement Skills

- IS3 Ask questions to assess situations, identify problems, and seek solutions.
- IS7 Put forward your own ideas with confidence.

##### Relationship Building Skills

- IS31 Engage others to make use of their skills, knowledge, and abilities.
- IS33 Listen and ask questions to understand what is new and different about others' points of view.

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## Getting Ready to Read: Making Notes

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SUBJECT: Project Management Research, Grades 9-12

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Notes help readers to monitor their understanding and help writers and speakers to organize information and clarify their thinking. In this activity, students are asked to research Project Management in preparation for their design projects.

### Purpose

- Encourage note-taking and organizing thoughts.
- Provide a tool for summarizing information and ideas.
- Make connections and apply strategies to specific projects.
- Provide strategies for remembering what one reads.

### Payoff

Students will:

- read project management materials, analyze content and remember important concepts.
- learn a strategy for researching when planning and managing their projects.
- be able to identify important information and details from a web site.
- analyze and evaluate information using a variety of strategies.

### Tips and Resources

This activity is recommended as the first of four relating to project management. It should be followed by the “Reading Graphical Text” strategy: *Project Management, Scheduling Flow Chart*.

To prepare for this activity:

- Create a multi-media presentation (e.g., Power Point) to model the process of making notes.
- Include activity instructions, note taking models, and charts, and “Acceptable Use Policy” regarding Internet access. This presentation can be used as an introduction to the activity.
- Make arrangements to access the appropriate equipment to help with modeling strategies.
- Book computer lab if classroom is not equipped with computers.
- Establish a list of sites for those students struggling to search for the appropriate resources.
- Prior to each lesson, check that the sites are still active.

Resources:

- Teacher/Student Resource: *Key Concepts of Project Management: Activity Instructions*.
- Student Resource: *Key Concepts Of Project Management: Graphic Organizer*.
- Student Resource: *Strategy Reflections*.
- Teacher Resource: *Key Standards For Getting Ready to Read: Making Notes*.

Web Resources:

- [www.mindtools.com/rdstratg.html](http://www.mindtools.com/rdstratg.html) - search project planning.
- [www.mapnp.org/library/plan\\_dec/project/project/.htm](http://www.mapnp.org/library/plan_dec/project/project/.htm)- project management.
- [www.wikipedia.org/wiki/Project\\_management-](http://www.wikipedia.org/wiki/Project_management-) project management.

### Further Support

- Describe skimming and scanning techniques to preview text, allowing students to read quickly to get a general sense of the text so that they can decide whether or not it contains useful information.
- Create tips as a class for future reference.
- Use sample notes to illustrate identifying important, irrelevant, or missing information, and possible ways of organizing notes. For struggling readers, provide a simple list of keywords under a heading, on a large sheet of chart paper. Model how to choose important words or details and write them down on the chart.



**Getting Ready to Read: Making Notes**

**SUBJECT: Project Management Research, Grades 9-12**

**Notes**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Refer to “Tips and Resources”.</li> <li>• Prepare activity sheet (Key Concept of Project Management)</li> <li>• Brainstorm ideas as a class to get students started on the chart.</li> <li>• Use place mat strategy to access prior knowledge (see place mat strategy activity)</li> <li>• Review board Internet policies.</li> <li>• Preview a typical web site with the class, noting features of the text and using them to form questions and responses such as:                         <ul style="list-style-type: none"> <li>○ What does this heading tell you? (Write down the title as the topic)</li> <li>○ What features of the site stand out? (colour, bold text, graphics, etc.)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Listen actively and critically to understand and learn.</li> <li>• Participate in brainstorming session.</li> <li>• Contribute responses in class discussions.</li> <li>• Visit a typical web site and note strategies used to preview text.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Continue modeling reading and making notes. Ask students to suggest key words and phrases.</li> <li>• Introduce concept mapping (optional), highlighting, marginal notes and other strategies to help organize ideas and concepts.</li> <li>• Model how to use key words and phrases to create a summary or point-form notes.</li> <li>• Model rereading sections to clarify notes or ask questions about the text such as:                         <ul style="list-style-type: none"> <li>○ What part of this section is most important?</li> <li>○ What does the author want me to know about this topic?</li> <li>○ What did I find interesting about that part?</li> <li>○ Does this remind me of anything else I have read about or seen?</li> </ul> </li> <li>• Model using the questions to generate the content for the point-form notes or summary.</li> </ul>	<ul style="list-style-type: none"> <li>• Listen and observe the teacher modeling.</li> <li>• Students will create their own notes, based on the teacher’s example.</li> <li>• Identify key words and phrases in the reading selection, and record important information.</li> <li>• Organize thoughts and key words using learned strategies.</li> <li>• Ask questions about the reading selection.</li> <li>• Complete the graphic organizer.</li> </ul>



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**KEY CONCEPTS OF PROJECT MANAGEMENT: Activity Instructions**

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**Instructions:**

Project management is an important component of any design project. In this activity, you are asked to search for information regarding Project Management.

**Step 1: Before you begin your Internet search, ask yourself the following questions:**

- What do I know about the topic?
- What do I need to know?
- What is my purpose for reading?
- What might I learn from this reading?

**Step 2: Search for information on Project Management**

- Be sure to follow your school board's "Internet use" guidelines when searching for information.

**Step 3: Read a section of your search**

- Read just enough to keep an understanding of the material. Do not take notes at this point, but rather focus on understanding the material.
- With your teacher's permission, print out your researched articles on the topic.

**As you are reading, ask yourself the following questions:**

- Do I understand what I am reading? Does it make sense?
- What will I learn about next?
- Do I "picture" in my mind what I am reading?
- What in my personal experience helps me to make sense of what I am reading?
- Do I make changes if things do not make sense?

**Step 4: Review the material**

- Locate the main ideas and concepts.
- Use a highlighter and marginal notes to identify important concepts while reading.

**Step 5: Complete the graphic organizer**

- Paraphrase the information: Putting the information in your own words forces you to become actively involved with the material.
- Do not copy information directly from the articles.
- Add only enough detail to understand.

**Step 6: Review and compare your notes with the text**

Ask yourself the following questions:

- Did I truly understand what I read?
- What did I learn that was new to me?



Student Resource

**KEY CONCEPTS OF PROJECT MANAGEMENT Graphic Organizer**

Key Concepts	Paraphrase Concepts (write in your own words)	<i>Why is the concept important?</i>
1.		
2.		
3.		
4.		
5.		
6.		



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## Strategy Reflection

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1. How did this reading strategy help you to understand the information you researched?

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2. Did you find the information useful for managing future projects?

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3. After going through this exercise, were there any surprises regarding project management?

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4. What did you like best about this strategy and why?

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5. What other subject areas can you use note-making strategies for?

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## Getting Ready to Read: Making Notes

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SUBJECT: Project Management Research, Grades 9-12

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### Key Standards for Getting Ready to Read: Making Notes

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity in developing a student's future career potential.*

#### References

The Ontario Curriculum, Grades 1-8 Science and Technology (1998).  
 The Ontario Curriculum, Grades 11 and 12 Technological Education (2000).  
 International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).  
 Conference Board of Canada Employability Skills Profile 2000+(2000).  
 Conference Board of Canada Innovation Skills Profile (2002).

#### ITEA Technological Literacy Benchmarks

*Standard 2: The core concepts of technology*

EE: Management is the process of planning, organizing, and controlling work.

*Standard 12: Use and maintain technological products and systems*

L: document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.

#### Conference Board of Canada Employability Skills

##### Communicate

CBC1 read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

CBC4 share information using a range of information and communications technologies (e.g., voice, e-mail, computers);

##### Manage Information

CBC6 locate, gather and organize information using appropriate technology and information systems.

#### Conference Board of Canada Innovation Skills

##### Creativity and Continuous Improvement Skills

IS3: ask questions to assess situations, identify problems, and seek solutions (Manage and Support Others);

IS12: question and challenge the way you operate-think beyond individual and organizational comfort zones;

IS14: be open to new ideas and different ways of doing things-commit to continuous improvement.

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## Getting Ready to Read: Reading Graphical Text

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SUBJECT : Project Management, Scheduling Flow Chart, Grade 9-12

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Graphical text forms (e.g., diagrams, photographs, drawings, sketches, graphs, schedules, maps, charts, tables, timelines, and tables) are intended to communicate information in a concise format and illustrate how one piece of information is related to another. Providing students with an approach to reading graphical text also helps them to become effective readers.

Planning and scheduling are critical components of project management, especially as it applies to timelines. Scheduling the project is best communicated through graphical text. In this activity students will become familiar with reading graphical text in preparation for creating a scheduling flow chart for their design project.

### Purpose

- Become familiar with the elements and features of graphical texts used in project management.
- Explore a process for reading graphical texts, using a range of strategies for before, during and after reading.
- Prepare students to create their own scheduling flow chart.

### Payoff

Students will:

- become more efficient at “mining” graphical texts for information and meaning;
- practise essential reading strategies and apply them to their design projects;
- become familiar with a variety of graphical text used in project management.

### Tips and Resources

- This activity is recommended as the third of four relating to project management. It should be followed by “Using Templates” strategy, *SUBJECT: Project Management Research Report*.
- It is important that students understand graphical text as it is used to provide guidelines relating to project roles and responsibilities as well as timelines.
- When students research graphical text used in time management, it is important to emphasize features of graphical texts such as:
  - print features (e.g., size of type, bullets, titles, headings, subheading, labels, and captions).
  - design features (e.g., colour, shape, line, placement, balance, and focal point).
  - organizational patterns (e.g., sequential, categorical, and explanatory).
- Resources:
  - Teacher Resource: *Reading Graphical Text Strategy*.
  - Teacher/Student Resource: *Tips For Reading Graphical Texts*.
  - Student Resource: *Strategy Reflections*.
  - Teacher Resource: *Key Standards For Getting Ready to Read: Making Notes*.
- Web Resources:
  - [www.mindtools.com/pages/article/newPPM\\_03.htm](http://www.mindtools.com/pages/article/newPPM_03.htm)
  - [www.ganttchart.com/](http://www.ganttchart.com/)
  - [www.wikipedia.org/wiki/Gantt\\_chart](http://www.wikipedia.org/wiki/Gantt_chart)
  - [www.conceptdraw.com/en/products/project/ap-gantt-charts.php](http://www.conceptdraw.com/en/products/project/ap-gantt-charts.php)

### Further Support

- Provide students with an advance organizer to guide them as they read a particular text. This might be a series of prompts to guide them through the reading task.
- Use a variety of graphical texts so they can choose the most appropriate for the task at hand.



**Getting Ready to Read: Reading Graphical Text**

**SUBJECT : Project Management, Scheduling Flow Chart, Grade 9-12**



Notes

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>Review the overall design project and help students determine a purpose for reading graphical text.</li> <li>Help students to connect to prior knowledge by asking them to recall previous experiences and classroom activities relating to planning and time management.</li> <li>Use examples such as studying for an exam. Ask probing questions such as:                             <ul style="list-style-type: none"> <li>How do you plan your time when preparing for an exam?</li> <li>Do you use a day-book, calendar or any other similar strategies?</li> </ul> </li> <li>Provide students with related experiences, discussion topics or background information to increase background knowledge.</li> <li>Identify and pre-teach unfamiliar vocabulary and concepts that appear in the graphical text.</li> </ul>	<ul style="list-style-type: none"> <li>Listen actively and critically to understand and learn.</li> <li>Recall previous experiences and participate in class discussions.</li> <li>Provide reasons for reading graphical text.</li> <li>Predict what the graph might show.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>Help students to connect the information and ideas in the graphical text to what they will be required to do for their own design project.</li> <li>Encourage students to examine parts of the text. Have them read, pause, think, and ask questions or make notes about how this information relates to their own projects.</li> <li>Demonstrate how to paraphrase the information presented. For example, use the sentence stem "This means...."</li> <li>Provide students with focus questions:                             <ul style="list-style-type: none"> <li>What information is provided?</li> <li>How is the information organized?</li> <li>Is this a useful source of information?</li> <li>Can we use this for our design project?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Listen actively and critically to understand and learn.</li> <li>Analyze a Gantt chart.</li> <li>List key components of the chart.</li> <li>Look for specific information regarding responsibilities and timelines.</li> <li>Compare different chart formats.</li> <li>If researching Gantt charts be sure to use note-taking strategies.</li> <li>Participate in class discussions.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>Help students to consolidate and extend their understanding of the content.</li> <li>Review the process that students used for reading graphical texts, including strategies for before, during and after reading.</li> </ul>	<ul style="list-style-type: none"> <li>Determine how the chart can be used for all design projects.</li> <li>Complete the reflection paper.</li> </ul>

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## Reading Graphical Text Strategy

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### 1. Prepare for the activity

*Option A: Teacher-directed approach:*

- Locate and/or create a Gantt chart. Use exemplars from previous assignments.
- You may choose different levels according to students.

*Option B: Student-directed approach:*

- Students do their own research on Gantt charts.
- Develop a list of Internet sites that students can research to save on time (see Tips and Resources).
- Be sure to check the web sites before introducing them to students.

### 2. Review Project Management Activity

- Discuss and summarize the research activity on Project Management (refer to "Making Notes" strategy activity).
- Have students recall prior knowledge.
- Have students connect prior learning to this new activity. How does learning to read graphical text help in project management?

### 3. Explain the strategy

- Using an overhead or other data projection (e.g., PowerPoint), explain how to read graphical text.
- Be sure to use several graphical text examples.

### 4. Demonstrate the strategy

- Using exemplars or samples taken from other sources, model some reading strategies.
- Use a variety of charts and encourage students to draw conclusions regarding their own design projects.
- Think aloud while modeling so that students can understand your thought process.
- This can also be an opportunity to discuss other reading strategies that may help students internalize the reading (e.g., skim and scan, make inferences, visualize, read aloud, make notes, etc.).

### 5. Class discussion

- Provide students with questions that focus on the basic elements of the graph.
- Have students explain their responses to the class.

### 6. Research/Read Articles (optional)

- Have students research Gantt charts.
- Prepare some probing questions and review note-taking strategies.
- Encourage students to make comparisons and connections and look for relationships in the data.

### 7. Create a Gantt Chart (optional)

- Have students create a Gantt chart for a small design project (e.g., building a book shelf).
- The chart can be completed as a class or individually.
- It can also be assigned as homework if class time is limited.

### 8. Student Assessment/Reflections

- Have students complete the reflection sheet to help assess their learning.
- The evaluations will also give you insight into how well students are staying on task, as well as how well they are retaining and applying the strategy.

### 9. Review, Summarize, Reflect

- As a class, discuss answers to the reflection papers.
- Lead a short discussion with students about how reading graphical text helped them to better understand project management.
- Discuss the reading strategies used throughout this activity.
- Ask students to explain why and how this helped them better understand the topic.



**Tips for Reading Graphical Text**

*Before Reviewing a Gantt chart*

- Set a purpose for reading. Ask yourself why you are reading this particular graphical text.
- Understand the basic elements of a graph. What type of graph are you reviewing (e.g. pictograph, line graph, bar graph)?
- Review what you already know about Project Management and how a scheduling flow chart applies.

*During the Review of a Gantt Chart*

- Examine the titles, headings, captions and images.
- What does the title tell you about the information on the graph?
- Read all the labels and examine how they are related to the graphic. Each label has a purpose. The most important labels may be in capital letters, bold type, or a larger font.
- Identify key components of the chart.
- Look for the use of colour or symbols to emphasize important words and information.

*After Reviewing a Gantt Chart*

- Interpret the information conveyed in any of the graphics.
- Rephrase information orally or in writing. Imagine that you are explaining the graphic to someone who has not read it.
- Create your own graphical text to represent important information.
- Determine how you can use this information to create your own scheduling flow chart for all your design projects.

**SAMPLE GANTT CHART**

Task	Team member responsibility	Week 1					Week 2					Week 3					Week 4					Week 5				
		M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F
Task 1:Plan	Student 1	■	■																							
Task 2	Student 2		■	■																						
Task 3	Student 3			■	■	■																				
Task 4: Design	Student 4	■																								
Task 5	Student 1						■	■	■	■	■															
Task 6:	Student 4		■	■	■	■																				
Task 7: Build	Student 2 & 3			■	■	■	■	■	■	■	■															
Task 8	Student 1											■	■	■	■	■	■	■	■	■	■					
Task 9:	Student 3											■	■	■	■	■										
Task 10: Report	Student 2																■	■	■	■	■					
Task 11	Student 1,2,3,4																					■	■	■	■	■



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## Strategy Reflection

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1. How did this reading strategy help you to better understand graphs?

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2. Did you find the information useful in planning future projects?

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3. Describe some graphical features that you will use in future projects?

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4. What did you like best about this strategy and why?

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5. Had you used any of these strategies in the past? Explain your answer.

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## Getting Ready to Read: Reading Graphical Text

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SUBJECT : Project Management, Scheduling Flow Chart, Grade 9-12

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### Key Standards For Getting Ready to Read: Reading Graphical Text

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity on developing a student's future career potential.*

#### References

The Ontario Curriculum, Grades 1-8 Science and Technology (1998).  
 The Ontario Curriculum, Grades 11 and 12 Technological Education (2000).  
 International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).  
 Conference Board of Canada Employability Skills Profile 2000+ (2000).  
 Conference Board of Canada Innovation Skills Profile (2002).

#### ITEA Technological Literacy Benchmarks

*Standard 2: The core concepts of technology*

EE: Management is the process of planning, organizing, and controlling work.

*Standard 12: Use and maintain technological products and systems*

L: Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.

#### Conference Board of Canada Employability Skills

##### Communicate

CBC1: read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

CBC4: share information using a range of information and communications technologies (e.g., voice, e-mail, computers);

##### Manage Information

CBC6: locate, gather and organize information using appropriate technology and information systems.

#### Conference Board of Canada Innovation Skills

##### Creativity and Continuous Improvement Skills

IS33: ask questions to assess situations, identify problems, and seek solutions (Manage and Support Others).

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**Reading Different Text Forms: Reading Informational Texts**

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**SUBJECT: Safety Literacy, Reading Informational Text, Grades 9-12**

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Technology students are continually having to deal with informational text forms (such as safety rules, instructions, magazine articles and operational descriptions) in order to gather information, and determine how to proceed safely in a technical environment. The increase in 'information pollution' has brought about the need for the skill of efficiently searching through informational text documents, in order to find specific information that the reader needs to know. These texts use vocabulary, special design elements, and organizational patterns to clarify the content, make them easier to read and to facilitate searching. Equipping students with an approach to reading informational texts helps them to become effective readers.

**Purpose**

- Become familiar with the elements and features of informational texts used in outlining safety policies and procedures.
- Explore a process for reading informational texts using a range of strategies for before, during and after reading.

**Payoff**

Students will:

- become more efficient at analyzing the content of a safety policy, determining the meanings of words used in accordance with their context, and making the connection to their own set of circumstances;
- practise essential reading strategies that can be used with other informational articles found in technological circumstances.

**Tips and Resources**

It is suggested that teachers assemble some facts about Internet abuse, instances of internet stalking, and copyright violation, for use in the discussion prior to students reading the article. The discussion will engage students in the topic, promoting their own interests in what they read, and help them to see the connection between the topic and the world in which they live. (See Student/Teacher Resource *Facts About Internet and E-mail Abuse*.) *Suggested sites:*

<http://www.ipsos-na.com/news/pressrelease.cfm?id=2594>

<http://www.sapphire.net/sapphire/dms/FF9B9AF509E07A5A7CC765E3FAE68DAE.pdf>

<http://www.dominopower.com/issuesprint/issue199812/legal.html>

<http://www.internetnews.com/stats/article.php/3349921>

- See Student/Teacher Resource, *Brainstorming Questions*.
- See *Think Literacy: Cross Curricular Approaches, Grades 7-12*, p.82 for tips for reading information text.

**Further Support**

Consider creating a word wall or vocabulary list of the terms used in the article.

Make use of the Posters for Instruction: Reading in *Think Literacy: Cross Curricular Approaches, Grades 7-12*, p.96.



**Reading Different Text Forms: Reading Informational Texts**

**SUBJECT: Safety Literacy, Reading Informational Text, Grades 9-12**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Prepare sufficient numbers of the Student Resource <i>Acceptable Use Guidelines</i>, and a projected graphic of the article.</li> <li>• Help the students to connect the topic of Internet safety with Acceptable Use Guidelines, by brainstorming consequences of Internet abuse. Alternatively, and depending on the composition of the class, students could share experiences or stories of instances of Internet crime, negative outcomes of internet abuse, and the personal dangers of Internet use.</li> <li>• Help the students to determine their purpose for reading the article, by leading them through the logic sequence of <i>vulnerability, liability, establishment of a policy, and compliance</i>.</li> <li>• Before the students begin to read the article, use the projected graphic to point out the visual elements of the article (e.g., title, sub-title, bold face type, italics). Point out the advantages/use of these.</li> <li>• Model a “think aloud” strategy for pausing and thinking about each section of the text. Review the concepts of chunking and visualization.</li> <li>• Organize students into reading pairs.</li> </ul>	<ul style="list-style-type: none"> <li>• Recall what they already know about Internet problems and the consequences of abuse; contribute these in the “brainstorming” session.</li> <li>• Listen actively to classmates’ accounts of problems caused by abuse of computers and Internet systems</li> <li>• Weigh the global impact of consequences of Internet abuse, and contrast that with the impact of personal restrictions brought about by the implementation of an Acceptable Use Policy.</li> <li>• Examine the visual elements of the assigned article, and determine its organizational structure.</li> <li>• Note the title of each section, and try to predict what each part of the article is going to address.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Encourage students to make use of visual elements to help them find meaning using the context.</li> <li>• Remind students to visualize the concepts by relating them to their own prior knowledge, and the examples discussed.</li> </ul>	<ul style="list-style-type: none"> <li>• Read each section of the article. Stop and consider (visualize) the meaning of the section. Re-read as necessary.</li> <li>• Discuss meaning, and the implication, of each section with a reading partner, and arrive at a consensus.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Help students to consolidate and extend their understanding of the various sections of the reading by having them paraphrase each.</li> <li>• Model how to <i>summarize</i> by choosing the <i>key ideas</i> of each selection, repeating them verbally, and recording them on a flip-chart or the chalkboard. Encourage students to use a highlighter to mark these key ideas in their copy of the reading.</li> </ul>	<ul style="list-style-type: none"> <li>• Share understandings with the class.</li> <li>• Listen to, and critically evaluate contributions made by classmates and compare with own findings.</li> <li>• As a means of summarizing, mark the key ideas in the reading, using a highlighter.</li> </ul>

Notes



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## Acceptable Use Guidelines

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### Brainstorming Session

#### Instructions:

Review the “Brainstorming Guidelines” below.

Instruct students: “We are going to use “brainstorming” to gather as many ideas as possible about *problems with computer and Internet systems that are caused by people.*”

Consider these from a: - personal point of view

- school point of view

- large company point of view

Time limit: *two minutes per point.*”

#### “Brainstorming” Guidelines

- Brainstorming is simply a process that helps stimulate the gathering of ideas and making connections.
- The object is to gather as many ideas as possible in a limited amount of time.
- Members of the group speak out with their ideas, and it is recorded immediately.
- There are no discussions about details, or the validity of a contribution. (That can come later).
- No matter how unusual or far-reaching an idea seems, it must be recorded.
- Everyone must contribute; this exercise works best if ideas are gathered from as many people as possible.
- Having fun is encouraged; criticism is not. (People are more creative when they are having a good time.)
- Ideas are posted where everyone can see them, and get visual reminders of what has been suggested so far.
- Record ideas quickly and clearly, so that there are no delays. Use words, symbols or illustrations.
- When the time given is up, you will have a wide variety of ideas to work with.

Student / Teacher Resource

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## Acceptable Use Guidelines

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### ***Purpose of Acceptable Use Guidelines***

Everyone using the Board's computing and information technology facilities and resources are required to know and abide by the *Acceptable Use Guidelines*. These guidelines define the responsibilities for the safe and acceptable use of the Board's computing and information technology facilities and resources.

**NOTE:** The Board makes no warranties of any kind, cannot be held responsible for accuracy or quality of information, and will not be responsible for any damages suffered through use of the Board's computer and information technology facilities and resources. Use of any information obtained from the Internet is at the user's own risk.

### ***Use of the Facility and Resources***

Use of the computer and information technology facilities and resources of the Board are governed by all relevant federal (e.g., Copyright), provincial (e.g. Education Act), Board (e.g. Policies and Procedures) and local school (e.g. School Code of Behaviour) laws and regulations. Use of the Board computing and information technology facilities and resources by either staff or students for illegal, political, or commercial purposes is strictly prohibited. Each user must ensure they know and are able and willing to comply with these laws and regulations.

### ***Personal Safety***

- Users will not post personal information about themselves or others. Personal contact information includes: full name, address, and telephone number.
- Users agree not to meet in person with someone they have met on-line.
- Users will immediately disclose to supervising teachers or other appropriate school employees, any messages they receive that are inappropriate, request personal information, or make them feel uncomfortable.

### ***Illegal Activities***

- Users will not attempt to gain unauthorized access to the school system or to any other computer system using the Board's network. Users will not log into another user's account nor will they attempt to access the personal data of others.
- Users will not deliberately attempt to disrupt the computer system performance or to destroy data by spreading computer viruses or by using other means.
- Users will not make use of the Board's equipment or network systems to engage in any illegal activities.



## ***Security***

- Users are responsible for the use of their individual accounts and should take all reasonable precautions to prevent others from being able to use their accounts. Under no conditions should a user provide his/her password to another person.
- Users will immediately notify the system administrator if they have identified a possible security problem. Users will not intentionally search out security problems or experiment with security or operating systems unless under direct supervision of the Board's system administrators.
- Users will avoid the inadvertent spread of computer viruses by using virus protection procedures when downloading files. It is recommended that all personal files be checked for viruses prior to use on the Board's computer systems.
- Intentionally harming, destroying or damaging data, software, hardware or security systems is prohibited.
- Attaching non-Board equipment (laptops, handhelds, peripheral devices) to the Board's network is prohibited without express permission of the Board's network administration or agents.

## ***Inappropriate Communications***

Restrictions against inappropriate communications apply to public messages, private messages, and materials posted on web pages.

- Users will not use obscene, profane, lewd, vulgar, rude, inflammatory, threatening or disrespectful language.
- Users will not post information that, if acted upon, could cause damage or danger of disruption to the system.
- Users will not engage in personal attacks, including prejudicial or discriminatory attacks.
- Users will not harass other persons. If a user is told by a person to stop sending them messages, they must stop immediately.
- Users will not knowingly or recklessly post false or defamatory information about a person or organization.
- Links from Board sites to non-Board sites must be periodically checked for appropriateness and adherence to the Acceptable Use Guidelines
- Guest books, message boards and other public domain methods of communications must not appear on Board sites.

## ***Respect for Privacy and Copyright***

- Users will not broadcast a message that was sent to them privately without permission of the person who sent them the message.
- Users will not post private information about another person.
- Signed release forms must be on file for any individuals identified on networked sites. Signed forms must be obtained from parents or guardians for all students under the age of majority. No individual should be identifiable without express permission of the individual or their guardians.
- All postings under Board supervision must abide by all relevant copyright laws and regulations.

## ***Consequences of Misuse***

If a user violates any of the above conditions of use, one or more of the following consequences may ensue:

- Suspension or cancellation of access privileges;
- Payments for damages and repairs;
- Discipline under other relevant Board policies; such as suspension or expulsion;
- Civil or criminal liability under other relevant laws.



Student / Teacher Resource

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## Acceptable Use Agreement Form

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### ***To Students:***

I, the undersigned, indicate by my signature that I have read and understand fully the Acceptable Use Policy and related guidelines. I agree that I will abide at all times to the rules and responsibilities as outlined in the Acceptable Use Policy and related guidelines. I also agree that I clearly understand the consequences of my failure to abide by these rules and regulations.

### ***To Parents/Guardians***

As a parent or guardian signing below, I indicate that I understand the rules, regulations and consequences of misuse governing my son or daughter's use of the Board's computer and information technology facilities and resources. I understand that all Board staff will make every attempt to ensure proper and acceptable use in line with relevant policies, laws and regulations. I hereby allow my son or daughter to access the Board's supervised facilities and resources.

**Student Name:**

**Student Signature:**

**Date:**

**Parent/Guardian Full Name:**

**Parent/Guardian Signature:**

**Date:**



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## Facts about Internet and E-mail Abuse

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(sample)

(Statistics are for U.S.A.; Canadian statistics are estimated to be similar. Source Date: Jan. 2005)

- E-mail has become one of the most widely used business tools in the world today, and is the most widely deployed desktop application by far.
  - In an office environment, users spend on average 25% of the work day using email applications.
- Approximately 31 billion e-mails sent per day
  - 980 million active email accounts around the world, 40% of which are corporate accounts.
- Viruses
  - 95% of all computer viruses are propagated via e-mail.
  - Worldwide cost of *MyDoom* virus clean-up: \$4 billion.
- SPAM (Unsolicited Bulk E-mail)
  - "SPAM will cost US businesses \$10-13 Billion dollars per year, or \$14 per employee per month".
  - In April 2004, 82% of all U.S e-mail was SPAM.
  - Less than 3% of all e-mail complies with *Controlling the Assault of Non-Solicited Pornography and Marketing (CAN-SPAM) Act*, implemented January 1.
- Misuse
  - "30-40% of all e-mail in any organization is non-business related."
  - "According to the Society for Human Resource Management (SHRM), 22% of its members responding to a random survey have received employee complaints about inappropriate or offensive email."




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## Key Standards: Reading Different Text Forms: Reading Information Text

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*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity on developing a student's future career potential.*

### References

International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).

Conference Board of Canada Employability Skills Profile 2000+ (2000).

Conference Board of Canada Innovation Skills Profile (2002).

### ITEA Technological Literacy Benchmarks

*Standard 1: The characteristics and scope of technology*

G: The development of technology is a human activity and is the result of individual or collective needs and the ability to be creative.

*Standard 2: The core concepts of technology*

N: Systems thinking involves considering how every part relates to others.

*Standard 12:*

P. Use computers and calculators to access, retrieve, organize, process, maintain, interpret, and evaluate data and information in order to communicate.

*Standard 13:*

J. Collect information and evaluate its quality.

### Conference Board of Canada Employability Skills

*Communicate*

CBC1 read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

*Manage Information*

CBC6 access, analyze and apply knowledge and skills from various disciplines (e.g., the arts, languages, science, technology, mathematics, social sciences, and the humanities);

*Work Safely*

CBC40 be aware of personal and group health and safety practices and procedures, and act in accordance with these.

### Conference Board of Canada Innovation Skills

*Risk Taking Skills*

IS20 assess risk, and manage your approach to risk-take appropriate risks when applying new approaches;

*Implementation Skills*

IS44 adapt to changing requirements.

**Generating the Ideas: *Setting the Context (What Do My Readers Want to Know?)*****SUBJECT: The Process of Design, Proposal Writing, Grades 9-12**

Good writers anticipate the information and ideas that readers may want or need to know about the subject. Imagining and considering the possible questions that the intended audience may have about the topic help to generate possible content for the writing, suggest a writing form, and provide a direction for research. In the case of writing a design proposal, the writer must consider all aspects of the client's request, the rationalization of the design decisions, and the best method to make clear the ideas and sell the client on the solutions that have been developed.

**Purpose**

- Generate possible topics and subtopics for a design proposal.
- Identify important ideas, concepts and design rationalization to include in the proposal.
- Identify and answer the client's needs, the type of audience for the proposal, and ensure that important issues have been addressed.

**Payoff**

Students will:

- clarify the task of writing a design proposal (purpose, audience, form).
- consider the audience (particularly clients' needs) and ensure that important issues are addressed properly.
- generate questions and use them to focus writing and recording during the design process.

**Tips and Resources**

While implementing a specific design challenge example, this strategy can be used for any design challenge in any grade level. Teachers should consider the important elements of the design they wish to prioritize and modify accordingly.

The design proposal is to sell solutions in response to a client's request. The proposal must be easy to understand and must clearly address all the relevant issues. It must convince the reader (client or other judges of the design decisions) that the writer has fully understood the issues at hand and has addressed them effectively. It needs to persuade the reader that the ideas within are viable solutions. It also needs to dictate the selection of content, language, and form, but leave lots of room for creativity.

- For more examples of design challenges see the Course Profiles for Technological Design, Grades 9-12, (<http://www.curriculum.org>) and the OCTE Activity Resource Management documents (ARMdocs) (<http://www.octe.on.ca>).
- For more information on this strategy see *Think Literacy: Cross-Curricular Approaches, Grades 7-12*, pp.102-103.
- To connect these activities to course expectations, technological literacy benchmarks and employability and innovation skills see Teacher Resource, *Key Standards for Generating Ideas: Setting the Context, What Do My Readers Want to Know?*

**Further Support**

When students are working in pairs, have each partner generate questions for the other's topic.

To generate ideas, ask questions about the topic from the point of view of the client, design judge or end users. Provide support for asking rich questions.

Review the 5W + H questions (who, what, when, where, why, how).



**Generating the Ideas: Setting the Context (What Do My Readers Want to Know?)**

**SUBJECT: The Process of Design, Proposal Writing, Grades 9-12**

**Notes**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Write design topics (e.g., cost, materials, safety, life-cycle, fabrication) on chart paper or the chalkboard and describe the audience for design proposals and the purpose for this writing (e.g., to sell your ideas to a client; to provide rationalization for design decisions made; to inform about relevant research).</li> <li>• Model for students the process of imagining the readers and the possible questions they would ask about the proposal, and record these questions under the topic heading.</li> <li>• Provide students with the accompanying resource: <i>Design Analysis Chart</i>. Ask students to contribute questions that they think the audience would need/want answered.</li> </ul>	<ul style="list-style-type: none"> <li>• Recall what they already know about design concepts and the particular design challenge.</li> <li>• Imagine the questions they would ask as readers of the design proposal.</li> <li>• Make connections to other students' questions, noting similarities and differences.</li> <li>• Imagine that they are the readers and generate possible questions.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Ask students to review selected topics for their design proposal, to identify purpose and audience.</li> <li>• Using the Design Analysis Chart, have students (in pairs, small groups, or individually) create possible questions that the readers may have about the topic.</li> <li>• Have students share their questions, and write possible answers on the Design Analysis Chart. Students may wish to add to or refine their list of questions.</li> </ul>	<ul style="list-style-type: none"> <li>• Contribute to the discussion.</li> <li>• Work individually or in pairs, using the <i>Design Analysis Chart</i> to record questions.</li> <li>• Pass their Charts to their team mates for recording possible answers.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Model for students how to organize the questions into a possible outline for their writing, and use the questions to focus their first draft or research.</li> <li>• Ask students to use their questions to create a writing outline.</li> <li>• Ask students to use their writing outline questions to begin writing their design proposal.</li> </ul>	<ul style="list-style-type: none"> <li>• Listen to the teacher's thinking process for organizing the questions.</li> <li>• Report on questions that the team generates.</li> <li>• Working as a team, collate and prioritize the questions and responses to the questions in order to get started on the proposal writing assignment.</li> </ul>



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## Suggestions for Design Proposal Outline

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In preparing any design proposal, there are many common questions that need to be addressed. Students can prepare their proposals more effectively when they pose relevant questions that need to be answered. In order to address a client's needs, a designer will pose these questions and then research answers to them, thereby providing a sound basis for rationalizing design decisions, and for providing directions for research. The following are common design questions that can be posed to the class or team. You may also allow students to come up with their own questions, based on the 5W's and the H.

### Who

Who needs this solution? (What occupation, what group, what demographic?) Who are the end users or consumers of the solution? Who is the client or provider of funding?

### Why

Why is there a need for a solution? (Is there a change in need, or a new need? Why does the client need this to be solved?)

### When

When do the users need this solution? (Day or night or both? Which season? Time of day, time of year?)

### Where

Where will they need this solution? (What environment, what setting?)

### What

What is required to solve the problem? What has been done previously? (Have there been other solutions before? What criteria must be met to develop an effective solution?)

### How

How can the solution be obtained? How will you proceed? (What must you know? What are some of the sources of information that will help in this case?)

Other questions may pertain to particular challenges, such as :

- What is the cost of this solution compared to others?
- What has been done recently to solve similar problems?
- Did you address issues of affordability, effectiveness, and production costs?
- What is the underlying problem? Is it a unique situation or are there other applications?

When developing and selling a solution it is valuable to consider questions related to Doug Hall's (Three Laws of Marketing Physics).<sup>1</sup> What is the **overt benefit** to the client, and have I made it clear? What **reason** does the client have to believe that I can solve the challenge, and am I making that clear? What is the **dramatic difference** in my solution and am I portraying the uniqueness of the solution?

1. Hall, Doug. Jump Start Your Business Brain. 2001. Brain Brew Books, Cincinnati, Ohio. ISBN 1-55870-607-0.




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## Design Analysis Chart

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***Design is what you do when you don't know the answer...or have the question***

- M. Scott

Every design challenge should raise important questions, which lead to important answers and possible even more important questions. When you develop a design question, you are asking for a reason for a design decision, something that somebody will ask, (possibly the client). If you don't have the answer, then perhaps you have to rethink the decision. As you consider the design challenge, ask yourself questions under the following headings, and then pass this sheet on to your team mates. You can use this as a basis for discussions as you develop your design proposal.

5W/H	Questions	Possible Answers
<b>Who</b>		
<b>Why</b>		
<b>When</b>		
<b>Where</b>		
<b>What</b>		
<b>How</b>		



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## **Generating the Ideas: *Setting the Context (What Do My Readers Want to Know?)***

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**SUBJECT: The Process of Design, Proposal Writing, Grade 9-12**

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### **Key Standards For Generating the Ideas: Setting the context**

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity in developing a student's future career potential.*

#### **References**

- The Ontario Curriculum, Grades 1-8 Science and Technology (1998).
- The Ontario Curriculum, Grades 11 and 12 Technological Education (2000).
- International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).
- Conference Board of Canada Employability Skills Profile 2000+ (2000).
- Conference Board of Canada Innovation Skills Profile (2002).

#### **ITEA Technological Literacy Benchmarks**

*Standard 10: The role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.*

- I. Research and development is a specific problem-solving approach that is used intensively in business and industry to prepare devices and systems for the marketplace.
- J. Technological problems must be researched before they can be solved. When a problem appears, it is first necessary to learn enough about it to decide the best type of problem-solving method.

*Standard 11: Apply the design process.*

- N. Identify criteria and constraints and determine how these will effect the design process.

#### **Conference Board of Canada Employability Skills**

##### *Manage Information*

CBC6 locate, gather and organize information using appropriate technology and information systems;

##### *Think & Solve Problems*

CBC10 assess situations and identify problems;

CBC14 be creative and innovative in exploring possible solutions.

#### **Conference Board of Canada Innovation Skills**

##### *Creativity and Continuous Improvement Skills*

IS3 ask questions to assess situations, identify problems, and seek solutions;

IS6 look for surprising connections - be open-minded when exploring possible solutions

##### *Relationship Building Skills*

IS33 Listen and ask questions to understand what is new and different about others points of view.



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**Developing and Organizing Ideas: *Webbing, Mapping and More***

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**SUBJECT: The Process of Design, Proposal Writing Grades 9-12**

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Effective designers use different strategies to sort the ideas and information they have gathered in order to make connections, identify relationships, and determine possible directions and forms for their writing. This strategy gives students the opportunity to reorganize, regroup, sort, categorize, classify and cluster their notes. This strategy can be used in any problem-solving activity to focus thoughts and provide directions.

**Purpose**

- Identify relationships and make connections among ideas and information.
- Select ideas and information for possible topics and subtopics.
- Provide a means to generate design ideas for further analysis.

**Payoff**

Students will:

- model critical and creative thinking strategies.
- learn a variety of strategies that can be used throughout the design process.
- reread notes, gathered information and writing that are related to a specific writing task.
- organize ideas and information to focus the writing task.

**Tips and Resources**

Strategies for webbing and mapping include:

- *Clustering* – looking for similarities among ideas, information or things, and grouping them according to characteristics.
- *Comparing* – identifying similarities among ideas, information, or things.
- *Contrasting* – identifying differences among ideas, information, or things.
- *Generalizing* – describing the overall picture based on the ideas and information presented.
- *Outlining* – organizing main ideas, information, and supporting details based on their relationship to each other.
- *Relating* – showing how events, situations, ideas and information are connected.
- *Sorting* – arranging or separating into types, kinds, sizes, etc.
- *Trend-spotting* – identifying things that generally look or behave the same.

See Student/Teacher Resource, *Webbing Ideas and Information*.

**Further Support**

Provide students with sample graphic organizers that guide them in sorting and organizing their information and notes e.g., cluster (webs), sequence (flow charts), and compare (Venn diagram).

Have students create a variety of graphic organizers that they have successfully used for different writing tasks. Create a class collection for students to refer to and use.

Have students form discussion groups. Ask students to recall what they already know about the design challenge at hand, and questions that they still have about the challenge. Taking turns, students record one idea or question on a stick-on note and place it in the middle of the table. Encourage students to build on the ideas of others. After students have contributed everything they can recall about the topic, groups sort and organize their stick-on notes into meaningful clusters on chart paper. Ask students to discuss connections and relationships, and identify possible category labels. Provide groups with markers or highlighters to make links among the stick-on notes. Display the groups' thinking.



**Developing and Organizing Ideas: Webbing, Mapping and More**

**SUBJECT: The Process of Design, Proposal Writing Grades 9-12**

**Notes**

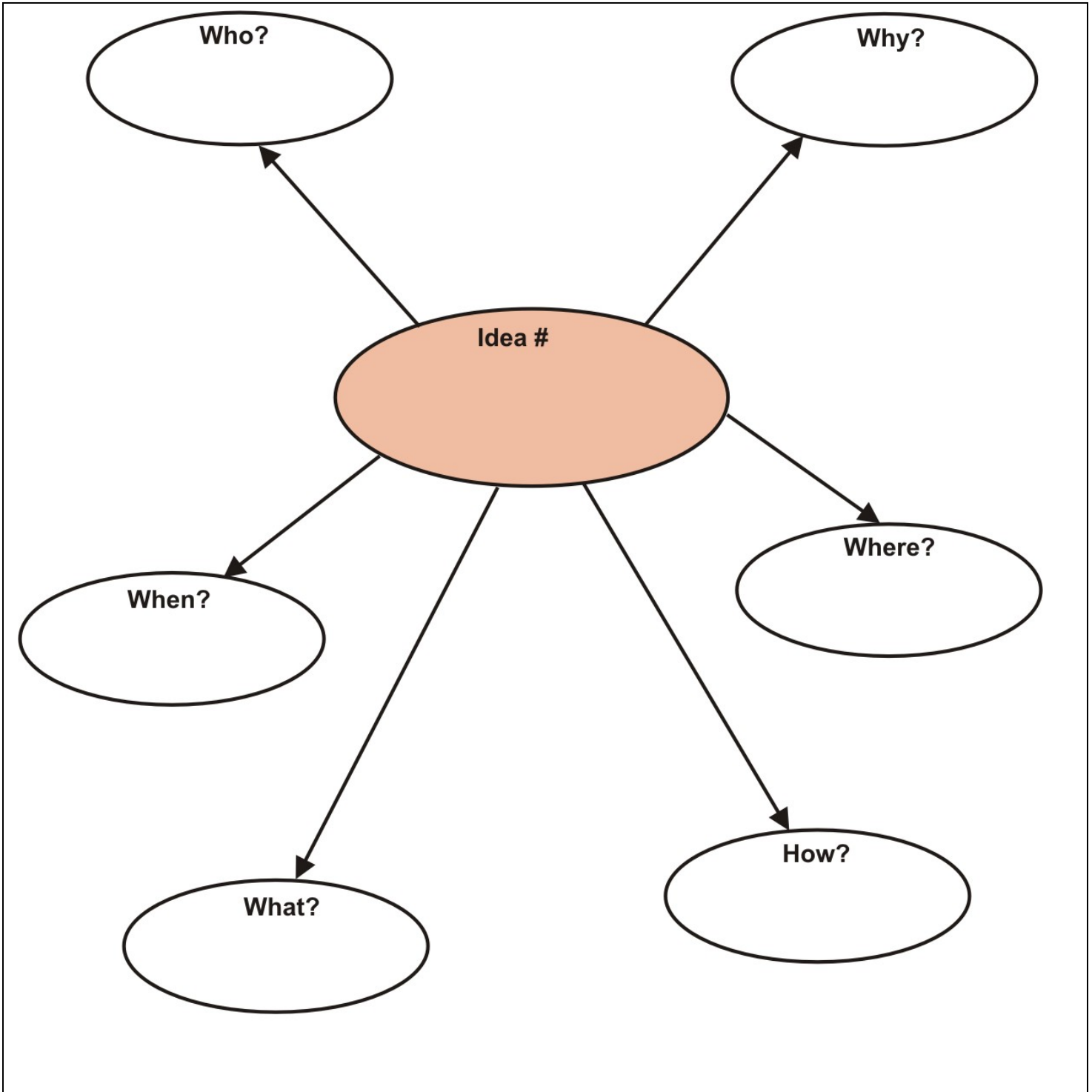
What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Prepare a sample of possible ideas and information gathered about the design challenge at hand.</li> <li>• Describe how ideas are generated by connecting information and concepts. Model for students how to make connections among the ideas and information (e.g., number, circle, colour-code, draw arrows).</li> <li>• Using a strategy such as webbing or mapping makes it easier to see connections and relationships. Hand out graphical organizers for students to fill. (See accompanying examples).</li> <li>• Use a web to demonstrate the process of rereading notes and arranging key points to show the connections and relationships. See Student/Teacher Resource, <i>Webbing Ideas and Information</i>.</li> </ul>	<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Recall what they already know about the topic and writing task.</li> <li>• Make connections to own notes.</li> <li>• Note the links and connections that the teacher makes among ideas and information. Consider the similarities and differences of their own thinking.</li> <li>• Recall past use of a webbing strategy to record or organize thinking.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Ask students to review the design challenge and identify important ideas and key information.</li> <li>• Ask students to suggest how to place the points to create a web.</li> <li>• Model for students how to use the web to create a possible outline or template for writing a first draft. Consider the generalizations and/or categories that emerge from the connections and relationships, to help identify subtopics, headings and structure.</li> <li>• Ask students to create a design web by sorting and organizing their ideas and information.</li> </ul>	<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Contribute to the discussion.</li> <li>• Note the similarities and differences in responses.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Have students refer to their notes for the writing task.</li> <li>• Have students display their web ideas around the room for discussion</li> <li>• Ask students to consider the design webs and use them to create an outline for writing the design proposal.</li> </ul>	<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Reread notes and identify important information and ideas.</li> <li>• Use the question prompts to re-phrase notes, identify key points, and group the ideas and information to create a web.</li> <li>• Share and compare webs.</li> <li>• Make the connection between the web and possible ways of organizing the information and ideas into a template for writing the design proposal.</li> </ul>



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## Design Web Chart

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### ***Mapping the Path to the Design Solution***

For each major idea, use this map to guide your design rationale. Write the main idea in the middle, and answer all questions. Use further balloons if other ideas or questions come to mind



Student Resource

Write a major design idea in the top box. List all the pros and comparative cons. For example: Pro: it would be inexpensive, Con: it would look cheap

Idea#

**PRO**

**CON**

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### Material Selection Chart

Symbolic Meaning	Material	Associated Costs/Ease of use
warm	aluminium	costly to manufacture
cool	steel	costly to join
exciting	brass	costly to assemble
subtle	iron	costly to ship
hi-tech	plywood	costly to maintain
traditional	ash	costly to store
solemn	teak	costly to finish
earthy	cedar	costly to repair
refined	pine	costly to operate
romantic	oak	
prosaic	maple	
hard	wood composite	
soft	ceramic	easy to manufacture
lasting	ABS plastic	easy to assemble
ephemeral	vinyl	easy to ship
casual	acrylic	easy to maintain
elegant	nylon	easy to store
industrial	polyethylene	easy to finish
post-industrial	melamine	easy to repair
rich	polyester	easy to operate
humble	Plexiglas	
original	plastic foam	
retro	fibreglass	
polished	concrete	ease of use by operators
rough	natural fabric	ease of use by maintenance
light-hearted	synthetic fabric	ease of use by assemblers
serious	carbon fibre	ease of use by storage
expensive	cardboard	ease of use by users
inexpensive	rubber	
	copper	
	glass	

#### Material Selection Table

1. Circle the symbolic meanings you wish to create in your design in the first column (add more for particular projects).
2. Join the circled meanings with the relevant materials in the second column (add more if needed).
3. Join the materials that most represent your symbolic meanings with the cost factors that are applicable, and then the ease of use factors that apply.

This chart may help you determine an appropriate material for your design needs. Consider what you want the material to convey in the client's or consumer's mind. This may suggest the appropriate material. The next column lists factors to consider in using these materials. Note that many materials can have more than one meaning; it may depend on how you finish it. Also note that there are ways to use materials to represent others (e.g., veneers on wood, painted and textured surfaces, composite structures). The above chart should give you directions on what you want, what you need, and what you need to consider.

Chart by Michael Scott 2005. Used with permission.




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## Developing and Organizing Ideas: **Webbing, Mapping and More**

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SUBJECT: The Process of Design, Proposal Writing Grades 9-12

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# Key Standards For Developing and Organizing Ideas: Webbing, Mapping and More

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity in developing a student's future career potential.*

### References

- The Ontario Curriculum, Grades 1-8 Science and Technology (1998).
- The Ontario Curriculum, Grades 11 and 12 Technological Education (2000).
- International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).
- Conference Board of Canada Employability Skills Profile 2000+ (2000).
- Conference Board of Canada Innovation Skills Profile (2002).

### ITEA Technological Literacy Benchmarks

*Standard 8: The attributes of design*

- K. Requirements of a design, such as criteria, constraints, and efficiency, sometimes compete with each other.

*Standard 9: Engineering Design*

- L. The process of engineering design takes into account a number of factors. (i.e. safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).

*Standard 11: Apply the design process*

- N. Identify criteria and constraints and determine how these will affect the design process.

### Conference Board of Canada Employability Skills

*Communicate*

- CBC1 read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

*Manage Information*

- CBC6 locate, gather and organize information using appropriate technology and information systems;

*Think & Solve Problems*

- CBC10 assess situations and identify problems;
- CBC14 be creative and innovative in exploring possible solutions.

### Conference Board of Canada Innovation Skills

*Creativity and Continuous Improvement Skills*

- IS3 ask questions to assess situations, identify problems, and seek solutions;
- IS6 look for surprising connections - be open-minded when exploring possible solutions;

*Relationship Building Skills*

- IS3 ask questions to assess situations, identify problems, and seek solutions;
- IS6 look for surprising connections - be open-minded when exploring possible solutions.

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**Writing for a Purpose: Using Templates, Writing a Report**

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**SUBJECT: Project Management Research Report, Grades 9-12**

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When students can get the “picture” of a form of writing in their heads, they feel more confident about creating the final product. A template or framework is a skeletal structure for a writing form that allows students to organize their thoughts and researched information in order to write a first draft. In this activity students are asked to write a report describing “project management” and how it applies to any design project. It is a culmination of the project management and scheduling flow chart activities.

**Purpose**

- Provide students with a template to scaffold their understanding of a form of writing and help them organize information.
- Encourage students to use appropriate writing strategies in completing informational type reports.

**Payoff**

Students will:

- learn the common expectations for the form and components of a particular writing assignment;
- learn the importance of planning and managing projects;
- develop strategies for recording information and organizing the writing of this information;
- take more pride in their work.

**Tips and Resources**

This activity is recommended as the third of four relating to project management. Students’ completion of prior activities is important in carrying out this activity.

Ensure that all students are prepared with their previous notes prior to starting this activity.

Report writing can take in many styles depending on content. The attached template is a recommended form for this activity. Other formats may be used.

Before having students use the template to write in a specific form, give them an example of the same kind of writing and have them use the template to identify the example’s main idea, supporting details, transitional sentences, etc. Using the template to deconstruct a piece of writing before writing their own version gives students an exemplar from which to work when they begin their own writing.

See the explanations and templates for writing in various forms in the following resources:

- Teacher Resource: *Writing a Report Strategy*.
- Student Resource: *Tips On Writing A Report Explaining Project Management*.
- Student Resource: *Template for Writing an Explanation Report*.
- Teacher Resource: *Key Standards For Getting Ready to Read: Using Templates*.

**Further Support**

The template for any individual writing assignment can be revised to make the modifications or accommodations necessary for students with special needs. For example, reduce the number of paragraphs or supporting details, or the complexity of the main idea.

To challenge students, have them create their own style and format.



**Writing for a Purpose: Using Templates, Writing a Report**

**SUBJECT: Project Management Research Report, Grades 9-12**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>Review all previous activities and literacy strategies and help students determine a purpose for this report writing.</li> <li>Help students to connect to prior knowledge by asking them to recall previous activities relating to project management.</li> <li>Prepare a report template appropriate to the writing assignment that students are expected to complete. Attached is a sample template that can be used.</li> <li>Find an example (consider using samples from the Ontario Curriculum Exemplars) of the writing form that students can deconstruct. Make photocopies, and distribute the example to the students.</li> <li>Model the method for deconstructing.</li> <li>Engage students in a whole-class discussion following their group work.</li> </ul>	<ul style="list-style-type: none"> <li>Listen actively and critically to understand and learn.</li> <li>Recall previous experiences and participate in class discussions.</li> <li>Read the example, following the teacher's oral deconstruction of the first paragraph or part of it.</li> <li>Contribute responses to the whole-class discussion.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>Distribute the template to students to help them consolidate their understanding of what happens in each part of the assigned piece of writing.</li> <li>Direct students to use this template to organize the information they have prepared/researched in past activities.</li> <li>Monitor students' work as they begin completing the template.</li> </ul>	<ul style="list-style-type: none"> <li>Complete the template by adding (in the appropriate places) the information they have researched or prepared.</li> <li>Conference with teacher to ensure proper completion of template.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>Assign a completion date for the template.</li> <li>Discuss the completed template in a subsequent class.</li> </ul>	<ul style="list-style-type: none"> <li>Listen actively and critically to understand and learn.</li> <li>Contribute responses to the whole-class discussion.</li> <li>Complete the template</li> </ul>

**Notes**



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## Writing a Report Strategy

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### Step 1: Prepare for the activity

- Prepare a report template appropriate to the writing assignment that students are expected to complete.
- Find an example (consider using samples from the Ontario Curriculum Exemplars) of the writing form that students can deconstruct. Make photocopies of the example. Ensure students have their notes from the previous activities (Project Management Research and Scheduling Flow Charts).

### Step 2: Review the activity

- Discuss and summarize the research activities on Project Management and Gantt Charts.
- Have students recall prior knowledge and connect prior learning to this new activity.
- Distribute a report exemplar to the students or project it on a screen.
- Model the method for deconstructing the piece of writing.
- Engage students in a whole-class discussion.

### Step 3: Explain and model the strategy

- Using an overhead or other data projection (e.g. PowerPoint), explain how to complete the template.
- Any part of the report-writing process can be modeled with students. From brainstorming many questions to guide research through writing and revising the report.
- This can also be an opportunity to discuss other reading strategies that may help students internalize the reading (skim and scan, inferences, visualizing, read aloud, making notes, etc.).

### Step 4: Class discussion

- Provide students with questions that focus on the basic elements of report writing.
- Have students explain their responses to the class.

### Step 5: Have students complete the template

- Guide the students in writing the report.
- Have the student(s) record only the information that pertains the template.
- Guide students in using their previous notes to complete the template.

### Step 6: Read, review and edit the report

- Students should review and refine the introduction and the paragraphs to support effective communication of the information.
- Be sure students use appropriate language to help the paragraphs flow meaningfully.
- Have students re-read and refine closing remarks.
- This process continues until the student is satisfied with his/her report.
- Conferencing with the teacher and getting response from peers can help the student refine his/her writing.
- The student should do some final editing checking for spelling, grammar, punctuation, capitalization, etc.

### Step 7: Summarize, Reflect

- Lead a short discussion with students about how reading graphical text helped them to better understand project management.
- Discuss the reading strategies used throughout this activity.
- Ask students to explain why and how this helped them better understand the topic.



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## Tips on Writing a Report Explaining Project Management

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**A report:**

- is a form of writing that provides information.
- is an official statement of facts.
- is usually based on researched facts and accurate details.
- follows a specific style or organization so when others read what you write, they can quickly locate the information that interests them most.

**Activity Introduction:**

This activity will provide you with an opportunity to organize and formalize your research notes on project management. You are asked to write a report explaining project management.

The following elements will be considered when writing your report using the provided template:

- An introduction that includes background information. In two or three sentences, give the reader a “map” of what you plan to do with the topic.
  - What is the topic?
  - Why is it of interest?
- Definition of what is being explained. Define project management. Use your paraphrased notes from your research.
  - What is project management?
- Description of the key components. Scheduling flow charts is an example of a key component.
  - What are the key points of project management?
- An explanation of the how it works.
  - How does it work and who is responsible for project management?
- Description of the application.
  - Where do you use project management?
- Comments and concluding remarks. Re-state some of your key points. Write an emphatic concluding sentence.
- Acknowledgements; Give credit to your sources by acknowledging them.
  - Where did you obtain your information?

**Points when writing the report:**

- When writing an introduction, think of who your audience is. What do they already know? What do they need to know?
- Develop each paragraph with an appropriate topic sentence.
- Make sure the paragraphs have a logical order and they flow smoothly.
- Write a conclusion that summarizes the main points you wish to make about project management.



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## Template For Writing an Explanation Report

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Introduction:

Definition:

Key Components:

How it works:

Applications:

Concluding Remarks:

Acknowledgements:




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## Writing for a Purpose: **Using Templates, Writing a Report**

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**SUBJECT: Project Management Research Report, Grades 9-12**

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### Key Standards For Getting Ready to Read: Using Templates

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity in developing a student's future career potential.*

#### References

- The Ontario Curriculum, Grades 1-8 Science and Technology (1998).
- The Ontario Curriculum, Grades 11 and 12 Technological Education (2000).
- International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).
- Conference Board of Canada Employability Skills Profile 2000+ (2000).
- Conference Board of Canada Innovation Skills Profile (2002).

#### **ITEA Technological Literacy Benchmarks**

*Standard 2: The core concepts of technology*

EE: Management is the process of planning, organizing, and controlling work.

*Standard 12: Use and maintain technological products and systems*

L: Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.

#### **Conference Board of Canada Employability Skills**

*Communicate*

CBC1 read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

CBC3 listen and ask questions to understand and appreciate the points of view of others;

#### **Conference Board of Canada Innovation Skills**

*Creativity and Continuous Improvement Skills*

IS32 respect and support the ideas, approaches, and contributions of others;

IS33 ask questions to assess situations, identify problems, and seek solutions.

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## Writing for a Purpose: **Using Templates**

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**SUBJECT: Safety Literacy, Writing a Procedure, Grade 9-12**

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In technological processes or procedures, there are many occasions when an operation needs to be explained in detail; this is very important when describing safety aspects. A template or framework is a skeletal structure for a writing form that allows students to organize their thoughts and researched information in order to write a first draft. If students can get a 'picture form' of what an instruction they are about to write will look like, they feel more confident about the final product, and are able to proceed more readily. In this strategy students will use a template to assemble the steps for a safety procedure.

### **Purpose**

- Provide students with a template with which to arrange the steps of a procedure before drafting a set of instructions.
- Help students to visualize the flow of their written work, before they begin. They will also have the opportunity to test the logic of the sequence, and reduce the amount of editing at the later stages of the writing process.

### **Payoff**

Students will:

- organize their writing and ensure that it is complete in detail, and logical in its order.
- become more aware of the importance of the correct sequence of the events in an article, and of the wording of instructions.

### **Tips and Resources**

To help students understand how to *write a set of instructions*, it is helpful for them to first *deconstruct* an example of a set of instructions. The Student / Teacher Resource *Sample Set of Instructions* and the Student Resource *Template for Writing a Procedure* are included for this purpose. Also included is the Teacher Resource *Notes for Use of the 'Sample Set of Instructions'*. This article has been written specifically for use with the *Template for Writing a Procedure*, and is not in a style or form considered to be ideal for technical instructions on this topic. It would be helpful to show students examples of other instructions, and contrast these with the sample article as a means of building their appreciation for the use of textual features (e.g., bullets, bold face type, sub-titles) and illustrations.

- It is recommended that this activity be done in pairs or in small groups, so that students can collaborate on wording, and order of sequence, or for the purposes of proofreading each other's writing.
- Peer assessment is recommended for use with this strategy.
- For more information on this strategy, see *Think Literacy: Cross Curricular Approaches, Grades 7-12* pp.140-141.
- To connect these activities to technological literacy benchmarks and employability and innovation skills see Teacher Resource, *Key Standards For Writing for a Purpose: Using a Template*.

### **Further Support**

- The sample template could be revised to make modifications or accommodations for special needs students.
- For struggling students, a shorter, or simpler set of instructions could be used for the deconstruction exercise.
- Some students may need extra time to complete the template, or may need to finish the work on their own in order to be able to concentrate. Allowing students to finish the template as homework would help students in this situation.



**Writing for a Purpose: Using Templates**

**SUBJECT: Safety Literacy, Writing a Procedure, Grade 9-12**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Provide students with copies of the accompanying <i>Sample Set of Instructions, Template for Writing a Procedure</i> and the Checklist – <i>Portable Ladders</i> article.</li> <li>• Outline the activity, making reference to the importance of well written instructions, the <i>Portable Ladders</i> safety article, and the use of the template in the writing process. Introduce the deconstructing exercise you are about to use.</li> <li>• Have students read the <i>Sample Set of Instructions</i>.</li> <li>• Engage the students in a whole-class discussion examining style, sequence, and structure of the sample. (See Teacher Resource: <i>Notes for Use of the Sample Set of Instructions</i>.)</li> <li>• Lead the students through the deconstruction of the <i>Sample Set of Instructions</i>, having them use the Student Resource <i>Template for Writing a Procedure</i>.</li> <li>• Divide the class into small groups, or pairs.</li> </ul>	<ul style="list-style-type: none"> <li>• Listen to instructions concerning the assignment; ask questions to aid in achieving an understanding of the process.</li> <li>• Contribute ideas about variations to the <i>Sample Set of Instructions</i> and speculate about the outcomes.</li>   <li>• Read the <i>Sample Set of Instructions</i>.</li>   <li>• Develop an understanding of the impact of changing the wording and sequence in a set of instructions, and gain an appreciation for suitable style and structure.</li>   <li>• Listen as the teacher begins the deconstruction of the <i>Sample Set of Instructions</i> article. Contribute ideas and suggestions about where the various components of the article fit into the <i>Template for Writing a Procedure</i> and fill in a copy of the template in accordance with the findings of the class.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Provide students with copies of the accompanying <i>Checklist – Portable Ladders</i> article, and the Student Resource <i>Using Ladders Safely</i> assignment page.</li> <li>• Ask students to carefully read the article. Monitor their understanding of the terms, and clarify any unfamiliar words.</li> <li>• Have students get together in the groups or pairs, and begin to complete the template, sharing ideas about sequence and content, and clarifying the implications of ladder safety on the scenario of the assignment.</li> </ul>	<ul style="list-style-type: none"> <li>• Read Student Resource <i>Checklist – Portable Ladders</i>.</li> <li>• Share ideas and interpretations of the article with the members of their group.</li> <li>• Discuss what would be best to include in the assigned writing, and determine the best sequence of steps.</li> <li>• Individually complete a copy of the template found on the Student Resource <i>Using Ladders Safely – Instructions for the Use of a Ladder</i>.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Organize a peer-assessment session, in which student “walk through” each others’ template and note omissions and errors.</li> </ul>	<ul style="list-style-type: none"> <li>• May complete template for homework.</li> <li>• May participate in peer assessment of the templates.</li> </ul>

Notes



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## Sample for Writing a Safety Procedure

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### Using a Soldering Iron to “Tin” a Printed Circuit Board

There is a great advantage to tinning a printed circuit board (PCB) before you begin to mount electronic components onto it. “Tinning” refers to covering a copper conductor with a thin layer of solder; one of the ingredients of solder is tin (the other is usually lead for electronic applications). This process seals out oxygen, which would combine with the surface of the copper to form a non-conductive layer of copper oxide. Tinning also makes it much easier to solder onto a printed circuit board surface.

For our method of tinning you will need a soldering iron (approximately 35W), some steel wool, some ‘resin core’ solder, and a PCB holder or clamp. You must wear safety glasses and be sure that exposed skin areas (arms, legs, feet) are covered. Put on a shop coat if available.

The first step is to completely clean the surface of the PCB of copper oxide. Use steel wool to clean the copper surfaces until they have a bright, shiny finish. Rinse the PCB with water and dry with a paper towel.

Next you will need to prepare your soldering iron to do an effective job of tinning. You must be wearing your safety glasses whenever you are using a soldering iron. Also, ensure that anyone within 3 metres of a tinning or soldering operation is wearing safety glasses as well. Preheat the soldering iron. You can test its temperature by touching solder to it; when it will melt solder, it is hot enough. Clean the tip of the soldering iron by brushing it with steel wool. Be sure that you brush towards the floor, and not towards yourself or anyone else. Molten solder is approximately 173° Celsius!

Melt a small amount of solder onto the tip of the soldering iron. Touch the surface of the PCB with the soldering iron tip, and drag it over the copper surface slowly. As you go along, the copper is heated to 173° and the solder will adhere to it. You will need to refresh the supply of solder on the tip of the soldering iron as it is used up. Essentially, it is like “painting” the surface of the copper PCB with molten solder.

There are some precautions. Move slowly enough to allow the copper to heat to 173° C. If you move too quickly the solder will form “blobs” and may not cover evenly. Do not overheat any small pieces of the copper pattern. Too much heat will soften the glue holding the copper onto the fibre-glass. If a piece of copper comes off, you will have to etch a new PCB! You need not worry about overlapping onto the exposed fibre-glass between the copper conductors on the circuit board; solder will not stick to fibre-glass. However, heating the surface of the fibre-glass with the soldering iron may contaminate the tip of the soldering iron with glue, so that solder will no longer stick to it. In that case, you would need to clean the tip of the soldering iron with steel wool again, and re-tin it.

When you have finished, the printed circuit board should be completely covered, and looking as though someone had painted it with a silver coloured paint. It will be easier to mount the components onto, and it will not corrode. The process of tinning is also used on stranded wire, to keep the strands together when installing the wire into a connector, such as those found inside extension cord plugs. Tinning is similar to the manufacturing process, of “metal plating”.



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## Notes for Use of the “Sample for Writing a Safety Procedure”

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### Discussion guide for use with the article *Using a Soldering Iron to ‘Tin’ a Printed Circuit Board*.

Note: The above set of instructions has been provided as a sample for the purposes of the literacy strategy only. If it is being considered for use as an instructional document, it should be modified in accordance with the local circumstances, the teacher’s style, and with reference to the manufacturer’s safety documentation.

Different styles of writing format are more suitable for certain applications. Instructions often need to be reviewed, sometimes during a task, and need to be written to facilitate this. Discuss with the students how these sample instructions are different from other instructions they have seen or used (e.g., many instructions are put in point form, and bulleted to make quick review easier). In order to have point form instructions, the steps in the instructions need to be summarized in a very few words. Challenge the students to generate five points or steps from the sample set of instructions (i.e., assemble the tools and make the work area safe; remove copper oxide from the PCB; prepare the soldering iron; tin the copper with a hot soldering iron; put away the equipment safely).

The opening paragraph of an article performs a very important function: it states what the article is about and the importance of what it is conveying. In literary text this captures the reader’s interest. What function does it perform in informational text? **It helps the reader determine what the article they are about to read, is about.** In searching through informational text, particularly when searching through the volume of information generated by a computer search, why is this function of the opening paragraph important? **It helps the readers determine if the information they are seeking is likely to be found in the article, and whether it is worthwhile to continue reading this particular article.**

Sequence is important. Discuss with the students what would happen if mention of copper oxide was not made until the second last paragraph (the one which starts “There are some precautions”). **Not cleaning the copper oxide off of the PCB would make the tinning process difficult, and would limit success.** Have the students identify some other examples of ‘*errors in sequence*’ that could cause problems in these instructions (e.g., **If the mention of safety glasses was not made at the right time, it could result in injury**).

Omissions can alter the outcome of a set of instructions. Ask the students to identify items which would lead to significant consequences, had they been omitted (e.g., **mention of overheating of small pieces of copper – copper falls off of circuit board; mention of precaution to cover exposed skin – burn injuries**).



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## Template for Writing a Safety Procedure

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Topic: \_\_\_\_\_

**Introduction:** *Establish the topic, indicating why this is important, and why you are writing about this.*

**Aim:** *Briefly outline what you intend to do, or what will be accomplished.*

**Materials / Equipment:** *What you are going to need to accomplish this task.*

**Procedure:** *The steps that must be followed, in the appropriate order, and including all important details.*

**Testing / Confirmation:** *How you will know if the process 'worked'? How you will know you accomplished the task?*

**Extensions / Conclusion:** *A brief statement of the value of what was accomplished, and how the concept could be of further use.*



Student Resource

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## Using Ladders Safely – Instructions for Use of a Ladder

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You are to write a set of instructions for using a ladder to gain access to a flat roof, and to transport fifteen 10 Kg. bundles of building materials to the roof. The roof, which is 6m above ground level, has a railing around it. You will have access to a 6m step ladder, or a 10m extension ladder. The ground surface you will be sitting the base of the ladder on is a new cement floor. There is a doorway to access the building, directly beneath where the ladder is to be put up. Use the template below to assemble the steps and details for your “Instructions”. Show this completed plan to the teacher before you begin to write.

Topic: \_\_\_\_\_

<p><b>Introduction:</b> <i>Establish the topic, indicating why this is important, and why you are writing about this.</i></p>
<p><b>Aim:</b> <i>Briefly outline what you intend to do, or what will be accomplished.</i></p>
<p><b>Materials / Equipment:</b> <i>What you are going to need to accomplish this task.</i></p>
<p><b>Procedure:</b> <i>The steps which must be followed, in the appropriate order, and including all important details.</i></p>
<p><b>Testing / Confirmation:</b> <i>How you will know if the process ‘worked’; how you will know you accomplished the task.</i></p>
<p><b>Extensions / Conclusion:</b> <i>A brief statement of the value of what was accomplished, and how the concept could be of further use.</i></p>



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## Key Standards For Writing for a Purpose: **Using a Template**

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**SUBJECT: Safety Literacy, Writing a Procedure, Grade 9-12**

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity in developing a student's future career potential.*

### **References**

International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).  
Conference Board of Canada Employability Skills Profile 2000+ (2000).  
Conference Board of Canada Innovation Skills Profile (2002).

### **ITEA Technological Literacy Benchmarks**

*Standard 1: The characteristics and scope of technology*

G: The development of technology is a human activity and is the result of individual or collective needs and the ability to be creative.

*Standard 2: The core concepts of technology*

N: Systems thinking involves considering how every part relates to others.

*Standard 12: Use and maintain technological products and systems*

L. Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.

N. Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision.

O. Operate systems so that they function in the way they were designed.

### **Conference Board of Canada Employability Skills**

*Communicate*

CBC1 read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

CBC3 listen and ask questions to understand and appreciate the points of view of others;

CBC4 share information using a range of information and communications technologies (e.g., voice, e-mail, computers);

CBC5 use relevant scientific, technological and mathematical knowledge and skills to explain or clarify ideas;

*Think and Solve Problems*

CBC18 check to see if a solution works, and act on opportunities for improvement.

### **Conference Board of Canada Innovation Skills**

*Creativity and Continuous Improvement Skills*

IS3 ask questions to assess situations, identify problems, and seek solutions;

*Risk Taking Skills*

IS20 assess risk, and manage your approach to risk—take appropriate risks when applying new approaches;

IS33 listen and ask questions to understand what is new and different about others points of view;

*Implementation Skills*

IS46 use the right tools and technologies to complete a task, project, or assignment.



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**Pair Work: Take Five**

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**SUBJECT: Safety Literacy, Safety Presentation, Grades 9-12**

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Peer-instruction is an increasingly common phenomenon in our world today. Many organizations use “train-the-trainer” models for instruction, and to update their employees. Being instructed by a peer reduces the formality for the listener, and is excellent motivation to review, for the one presenting.

Students often have an aversion to public speaking. However, sharing ideas and information in a group setting is an increasingly valuable skill to equip our students in preparing them for the world of work. The more practice students have, the more comfortable they will be speaking publicly. The short presentation times, and relatively simple preparation process of this activity, combined with the support of a partner, and the use of projected graphics as props, are factors that will increase student comfort and confidence with oral communication.

**Purpose**

- To create a comfortable, safe environment in which students may be successful in making a brief presentation on a single concept.
- Reinforce learning of the general topic (WHMIS symbols) by analyzing, and teaching others about a single concept within the topic (one symbol).

**Payoff****Students will:**

- develop a strategy that can be used to review content material in all areas.
- share responsibility for teaching and reviewing with each other.
- “talk” their way into meaning and understanding, as they discuss the topic and rehearse their presentation .

**Tips and Resources**

- Limit the presentations to only one or two per class.
- Establish an understanding of when “Take Five” pairs will meet to formulate and rehearse their presentation. It is recommended that it be sometime during the period of the day before their presentation since the presentation is a relatively simple one.
- Have students use a projected graphic of the posters to enhance the focus of the class on the presentation.
- Provide students with alternative / additional sources... some relate better to one publication than others. The following are websites that are samples of WHMIS symbol education sites:
  - <http://www.coop.engr.uvic.ca/engrweb/whmis/symbols.html>
  - <http://www.chem.queensu.ca/Safety/whmissym.htm>
  - [http://www.gov.on.ca/LAB/english/hs/whmis/whmis\\_appa.html](http://www.gov.on.ca/LAB/english/hs/whmis/whmis_appa.html)
- Use this review-and-share strategy on a regular basis, with other units, to reinforce the learning of subject-specific vocabulary. This will also make oral presentations an anticipated, accepted part of class time, and will improve the students’ comfort with speaking in front of a group.
- It might be helpful to designate a “student A” and “student B” in each pair. This could be used so that students take turns in roles, such as “main presenter”, or “first to speak”. This might be particularly useful if you extend the use of this strategy throughout the entire course.

**Further Support**

- For special needs students, or students who are extremely shy, consider using video taping, or teacher-led ‘question and answer’ presentation models.



**Pair Work: Take Five**

**SUBJECT: Safety Literacy, Safety Presentation, Grades 9-12**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Arrange for student copies, and a projected graphic, of the WHMIS posters.</li> <li>• Describe the routine for this activity, and its connection with “train-the-trainer” practices in industry.</li> <li>• Model a presentation similar to the one for this activity, using it to demonstrate effective use of the projected graphic.</li> <li>• Arrange students as “Take Five” buddies.</li> <li>• Assign a WHMIS symbol to be reported on, to each pair of “Take Five” buddies.</li> <li>• Set out a schedule, or outline, for the students’ reports.</li> </ul>	<ul style="list-style-type: none"> <li>• Acquire copies of the WHMIS posters.</li> <li>• Review use of projector; ask if uncertain about how to use it.</li> <li>• Listen actively and critically to understand and learn roles and responsibilities.</li> <li>• Meet briefly with partner. Arrange to meet to discuss presentation. Commit to reviewing the information on the posters, and to look for examples of the use of WHMIS labels and symbols at home, in stores, or at places of work.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Invite students to engage in a Think/Pair/Share session with their partner during class on the day prior to their presentation. Students could use the accompanying <i>Think / Share / Pair Outline</i> as a means of taking notes and organizing the information. Provide them with a copy of the accompanying <i>WHMIS ‘Take Five’ Presentation Sequence</i> to organize their presentation.</li> <li>• If students seem to be having trouble relating to the WHMIS posters, arrange for them to view related internet sites, or to access other resources.</li> <li>• Provide support for students to deal with unfamiliar words. Developing a <i>word wall</i> over the course of this activity would be helpful.</li> <li>• Publicly provide positive verbal comments and feedback at the end of the presentation.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>The day before the presentation:</b> Meet with partner to review the information concerning their assigned symbol. Use the outline form provided by the teacher to organize their presentation. Divide the presentation so that each partner has a role. Make point form notes of both the agreed arrangement of the presentation, and of the points which will comprise the content of the presentation.</li> <li>• <b>The day of the presentation:</b> Meet with partner prior to presentation time, review roles and responsibilities.</li> <li>• <b>During the presentation:</b> make effective use of projected graphic; monitor audience reaction; practice and develop skills of explaining, rephrasing and clarifying for the other students; support partner in recalling, and explaining the details of the presentation.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Privately provide feedback to each pair, on items that need improvement. Do this “only as necessary”.</li> </ul>	

Notes



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## “Take Five” - Think / Share / Pair Outline

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### WHMIS SYMBOLS

1. What is the meaning of the symbol you have been assigned?
2. In your own words, what are the *risks* of the material?
3. Note the details and examples of the risk of the material:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
4. In your own words, what *precautions* should be taken with this material?
5. Note the details and examples of how to take these *precautions* with this material:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
6. In what ways do the features of the graphic design of the WHMIS symbol relate to the meaning of the symbol?
7. What features of the symbol act as cues to help us to memorize the meaning of the symbol?
8. What features of the graphic design suggest the consequences of coming in contact with this material?




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## “Take Five” Presentation Sequence

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### WHMIS Symbols

*Use this form to guide you through your presentation. Add key words or cues, to remind you what to say.*

1. Introduce the symbol using the projected graphic.
2. Define the meaning of the symbol.
3. Point out the graphic features of the symbol, and explain how they relate to the meaning.
4. Outline the key consequences.
5. Point out how the graphic features of the symbol remind us of the consequences of improper handling or storage of the material.
6. Outline precautions to be taken when handling or storing this material.

# WHMIS Symbols



# WHMIS SYMBOLS

**Compressed Gas**



**MATERIALS WHICH ARE NORMALLY GASEOUS KEPT IN A PRESSURIZED CONTAINER**

- Could explode due to pressure
- Could explode if heated or dropped
- Possible hazard from both the force of explosion and the release of contents

**ENSURE CONTAINER IS ALWAYS SECURED**

- Store in appropriate designated areas
- Do not drop or allow to fall

**Flammable and Combustible**



**MATERIALS WHICH WILL CONTINUE TO BURN AFTER BEING EXPOSED TO A FLAME OR OTHER IGNITION SOURCE**

- May ignite spontaneously
- May be a material which will release flammable products if allowed to degrade or when exposed to water

**STORE IN PROPERLY DESIGNATED AREAS WORK IN WELL VENTILATED AREAS**

- Avoid heating
- Avoid sources of sparks / flames
- Ensure electrical sources are safe

**Oxidizing Material**



**MATERIALS WHICH CAN CAUSE OTHER MATERIALS TO BURN OR SUPPORT COMBUSTION**

- Can cause skin or eye burns
- Increase fire and explosion hazard
- May cause combustibles to explode or react violently

**STORE IN AREAS AWAY FROM COMBUSTIBLES WEAR BODY, HAND, FACE AND EYE PROTECTION**

- Store in proper containers which will not rust or oxidize

**Toxic Immediate and Severe**



**POISONS / POTENTIALLY FATAL MATERIALS WHICH CAUSE IMMEDIATE AND SEVERE HARM**

- May be fatal if ingested or inhaled
- May be absorbed through the skin
- Small volumes have a toxic effect

**AVOID BREATHING DUST OR VAPOURS AND AVOID CONTACT WITH SKIN OR EYES**

- Wear protective clothing which is effective against fumes and vapours
- Wear face and eye protection
- Work in well ventilated areas and wear breathing protection

**Toxic Long Term Concealed**



**MATERIALS WHICH HAVE HARMFUL EFFECTS AFTER REPEATED EXPOSURES OR OVER LONG PERIODS OF TIME**

- May cause death or permanent injury
- May cause birth defects or sterility
- May cause cancer
- May be sensitizer causing allergies

**WEAR APPROPRIATE PERSONAL PROTECTION WORK IN A WELL VENTILATED AREA**

- Store in appropriate designated areas
- Avoid direct contact
- Use hand, body, face and eye protection
- Ensure respiratory and body protection is appropriate for the specific hazard

**Biohazardous Infectious**



**INFECTIOUS AGENTS OR A BIOLOGICAL TOXIN CAUSING A SERIOUS DISEASE OR DEATH**

- May cause anaphylactic shock
- Includes Viruses, Yeasts, Moulds, Bacteria and Parasites which affect humans
- Includes fluids containing toxic products
- Includes cellular components

**SPECIAL TRAINING REQUIRED WORK IN DESIGNATED BIOLOGICAL AREAS WITH APPROPRIATE ENGINEERING CONTROLS**

- Avoid fuming aerosols
- Avoid breathing vapours
- Avoid contamination of people / area
- Store only in special designated areas

**Corrosive Materials**



**MATERIALS WHICH REACT WITH METALS AND LIVING TISSUE**

- Eye and skin irritation on exposure
- Severe burns/tissue damage on longer exposure
- Lung damage if inhaled
- May cause blindness if eyes contacted
- Environmental damage from fumes

**WEAR BODY, FACE AND EYE PROTECTION USE BREATHING APPARATUS**

- Ensure protective equipment is appropriate
- Work in well ventilated area
- Avoid all direct body contact
- Use appropriate storage containers with proper non-venting closures

**Dangerously Reactive**



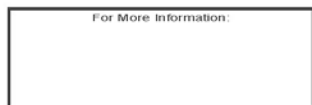
**MATERIALS WHICH MAY HAVE UNEXPECTED REACTIONS**

- May react with water
- May be chemically unstable
- May explode if exposed to shock or heat
- May release toxic or flammable vapours
- May vigorously polymerize
- May burn unexpectedly

**HANDLE WITH CARE AVOIDING VIBRATION, SHOCKS AND SUDDEN TEMPERATURE CHANGES**

- Store in appropriate containers
- Ensure storage containers are sealed
- Store and work in designated areas

People working safely in the safest and healthiest workplaces in the world.



## Consumer Hazardous Symbols



**ESAO**  
The EDUCATION  
SAFETY ASSOCIATION  
of ONTARIO

# CONSUMER SYMBOLS

A revised hazardous labelling system is being introduced between October 2001 and October 2003. Hazardous products using this household / consumer labelling system may be sold up to October 2005.

The outer border indicates the degree of hazard.  
The centre symbol indicates the type of hazard.

### WARNING



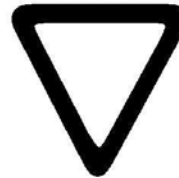
SPECIAL HAZARD  
SPECIAL REQUIREMENTS

### DANGER



SEVERE HAZARD  
IMMEDIATE HARM

### CAUTION



MODERATE HAZARD  
LONG TERM / HIDDEN HARM

### BORDER INDICATES THE DEGREE OF HAZARD

Example



Dangerous  
Corrosive  
Material

### SYMBOL INDICATES THE TYPE OF HAZARD



#### FLAMMABLE

- Fire Hazard
- Will ignite if exposed to a spark or flame
- Store away from heat
- Use in a ventilated area



#### POISON

- Potentially fatal if inhaled or swallowed
- May have serious long term health effects
- Wear gloves / face mask
- Wash after using



#### EXPLOSIVE

- Handle container with care
- May explode if heated or dropped
- May react violently with other materials
- Keep away from heat



#### CORROSIVE

- Causes skin / eye burns
- Do not breathe fumes
- Wear gloves and eye protection
- Keep containers sealed
- May damage metals

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and healthiest workplaces in the world.

For More Information:

## Consumer Hazardous Symbols (cont.)




**ESAO**  
The EDUCATION  
SAFETY ASSOCIATION  
of ONTARIO


# CONSUMER SYMBOLS


These warning labels are used for household and special products.

This revised labelling for Consumer Products is being phased in between October 2001 and October 2003

Hazard	Precautions	Degrees of Hazard	Label Warning
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TOXIC PRODUCTS			
	<b>Poisonous</b> May be lethal. or May cause serious and irreversible effects.	Do not get in eyes or on skin. Do not breathe fumes. Wear protective clothing and safety equipment as indicated on the label.	<b>Very toxic</b> - Extreme Danger - Sales Restricted <b>Toxic</b> - Danger <b>Harmful</b> - Caution

CORROSIVE PRODUCT			
	<b>Causes Burns</b> Will cause chemical burns to the skin, eyes and lungs. May form dangerous fumes when mixed with other chemicals.	Do not mix with other chemicals. Do not get in eyes or on skin. Do not breathe fumes. Do not swallow. Wear protective clothing as indicated on the label.	<b>Very Corrosive</b> - Extreme Danger <b>Corrosive</b> - Danger <b>Irritant</b> - Caution

FLAMMABLE PRODUCT			
	<b>Fire hazard</b> May ignite if exposed to a spark or flame or May spontaneously ignite	Read the specific instructions on the label. Use only in well ventilated areas. Keep away from flames and objects that spark. Store in a safe location.	<b>Very Flammable</b> - Extreme danger <b>Flammable</b> - Danger <b>Spontaneously Combustible</b> - Caution

PRESSURIZED CONTAINER		
	<b>Explosion Hazard</b> Under Pressure may explode if heated. If ruptured hazardous contents will be released	Do not puncture. Do not burn. Store away from heat.

**Example of Consumer Labelling**  
The symbols and hazard warnings must be on the front or main display panel of the container.

  
**DANGER**  
 POISON  
 CORROSIVE

  
**DANGER**  
 CORROSIF

These warnings may be located in a border anywhere on the displayed part of the container.

QUICK SKIN BONDING ADHESIVES		
	<b>Bonds Skin Instantly</b>	Do not get in mouth, eyes or on skin.

English: Warnings, Precautions, First Aid and hazardous ingredients

French: Mise en garde, précautions et premier soins et ingrédients dangereux

For More Information:

People working safely in the safest and healthiest workplaces in the world.




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## Pair Work: Take Five

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**SUBJECT: Safety Literacy, Safety Presentation, Grades 9-12**

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### Key Standards for Pair Work: Take Five

*This activity and the associated literacy strategy has been designed to be directly linked to course expectations in most Technological Education courses from Grade 9-12. Please refer to the relevant course expectations in the Ontario Curriculum for assessment purposes.*

*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity in developing a student's future career potential.*

#### References

- The Ontario Curriculum, Grades 1-8 Science and Technology (1998).
- The Ontario Curriculum, Grades 11 and 12 Technological Education (2000).
- International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).
- Conference Board of Canada Employability Skills Profile 2000+ (2000).
- Conference Board of Canada Innovation Skills Profile (2002).

#### ITEA Technological Literacy Benchmarks

*Standard 1: The characteristics and scope of technology*

- J. The nature and development of technological knowledge and processes are functions of the setting.

*Standard 12: Use and maintain technological products and systems*

- L. Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.

#### Conference Board of Canada Employability Skills

*Communicate*

- CBC1 read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

- CBC2 write and speak so others pay attention and understand;

*Demonstrate Positive Attitudes and Behaviours*

- CBC19 feel good about yourself and be confident;

*Be Responsible*

- CBC27 be accountable for your actions and the actions of your group;

*Be Adaptable*

- CBC29 work independently or as a part of a team;

*Work Safely*

- CBC40 be aware of personal and group health and safety practices and procedures, and act in accordance with these;

*Work With Others*

- CBC45 accept and provide feedback in a constructive and considerate manner.

#### Conference Board of Canada Innovation Skills

*Creativity and Continuous Improvement Skills*

- IS6 look for surprising connections - be open-minded when exploring possible solutions;

- IS7 put forward your own ideas with confidence.

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**Small Group Discussions: Group Roles**

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**SUBJECT: The Process of Design, Group Design Grades 9-12**

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The process of designing is rarely an individual effort. It is important to work with people to generate ideas, to test concepts, to question and 'bounce' ideas off one another. However, working in groups takes practice to learn the intricacies of sharing ideas creatively. In this strategy, students are divided into groups of a certain size – for example, five members. Each student is assigned a specific role and responsibility to carry out during the small-group discussion.

**Purpose**

- Encourage active participation by all group members.
- Foster awareness of the various tasks necessary in small-group discussion.
- Make students comfortable in a variety of roles in a discussion group.
- Encourage structure in group work to foster effective design skills.

**Payoff**

Students will:

- all speak in small groups.
- have specific roles to fulfill, clearly defining their role in the small group.
- receive positive feedback that is built into the process.
- participate actively in their learning.

**Tips and Resources**

- It is important to vary the composition of small groups, allowing students the opportunity to work with many classmates of various abilities, interests, backgrounds, home languages, and other characteristics.
- It is a good idea to repeat this activity throughout the year. This will allow students the opportunity to experience different roles and to improve their skills.
- Time the exercise to keep students focused on the task.
- If research is required, involve all students in the process, regardless of their role. This activity provides an excellent way for students to share research and come to a consensus about important information.
- For role ideas, see Student/Teacher Resource, *Sample Role Cards*.
- To encourage students to reflect on their learning, use Student Resource, *Small-group Discussion Reflection Sheet*.

**Further Support**

- Although it's important to vary the composition of groups, it is also important to consider the particular needs of struggling students. Encourage the use of mentors.



**Small Group Discussions: Group Roles**

**SUBJECT: The Process of Design, Group Design Grades 9-12**

**Notes**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>Choose the task or topic for discussion.</li> <li>Decide how many students will be in each group.</li> <li>Decide on the roles for each group member.</li> <li>Prepare role cards for each student. See Student Resource, <i>Sample Role Cards</i>.</li> <li>For example:                     <ul style="list-style-type: none"> <li><b>Team Leader:</b> defines the task, keeps the group on task, and suggests a new way of looking at things.</li> <li><b>Task Manager:</b> gathers and summarizes materials the group will need, keeps track of time, and collects materials the group used.</li> <li><b>Recorder:</b> records ideas generated by the group, and clarifies the ideas with the group before recording.</li> <li><b>Spokesperson:</b> reports the group's ideas to the class.</li> <li><b>Team Supporter:</b> provides positive feedback for each speaker, makes sure everyone gets a turn, and intercepts negative behaviour.</li> </ul> </li> </ul>	<p><b>Before</b></p> <ul style="list-style-type: none"> <li>Understand the question/task.</li> <li>Understand their roles and responsibilities.</li> <li>Read the role card for their particular role.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>Divide the class into groups.</li> <li>Present the parameters of the task.</li> <li>Explain time limits and keep track of time.</li> <li>Circulate around the room, ensuring that all students are fulfilling their roles.</li> <li>Comment constructively on the group process.</li> </ul>	<p><b>During</b></p> <ul style="list-style-type: none"> <li>Fulfill the roles to the best of their abilities.</li> <li>Use active listening skills.</li> <li>Act positively and encourage other group members.</li> <li>Participate fully in the discussion.</li> <li>Adhere to the time limits set by the teacher.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>Ask students to individually complete an evaluation of the discussion. See Student Resource, <i>Small-group Discussion Reflection Sheet</i>.</li> <li>Put students in groups.</li> <li>Debrief with the whole class, asking students to comment on the success, benefits of the exercise.</li> <li>Plan to repeat this activity, allowing students to try each of the other roles.</li> </ul>	<p><b>After</b></p> <ul style="list-style-type: none"> <li>Complete the <i>Small-group Discussion Reflection Sheet</i>.</li> <li>Discuss the successes and benefits of using structures/rules in small groups.</li> </ul>



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## Sample Role Cards for Design Group

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### Team Leader

*Your role:*

- Ensure everyone understands his/her role, and the task at hand.
- Lead the discussion; initiate discussion points. Check off questions generated and ensure answers are generated and recorded. As you are listening to the design ideas, consider alternatives and bring them to the discussion at opportune points.
- Ensure the discussion is on topic; always bring it back to a conclusion on each design point.

### Task Manager

*Your role:*

- Collect and bring any materials to the discussion table. Ensure everyone has paper to sketch and take notes.
- Keep track of time. Let everyone know when you are approaching the time limit. Warn Team Leader if the conversation is off topic and time limit is near.
- Gather materials at end of discussion and ensure the Recorder and Spokesperson have all materials required.

### Recorder

*Your role:*

- Review the task with the group at start of discussion
- Record relevant ideas, particularly answers to questions.
- Ask members to repeat or clarify statements as required for accurate recording.
- Assist Spokesperson with materials for final presentation.

### Spokesperson

*Your role:*

- Relay the group's findings to the larger group.
- Work with Recorder to ensure you have necessary materials for presentation to the larger group at the end of the discussion.
- Prepare key discussion points and answers to questions.
- Ask for clarification from any team member as required.

### Team Supporter

*Your role:*

- Provide positive encouragement to speakers.
- Ensure a positive atmosphere by reminding participants to allow speakers their chance.
- Assist Spokesperson with the presentation.
- Gently remind Team Leader if team gets off topic.



Student Resource

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## Design Group Reflection Sheet

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Name: \_\_\_\_\_  
 Role: \_\_\_\_\_  
 Design Project: \_\_\_\_\_

Comment on your group's ability to work together in a positive manner. Consider the cooperation, listening and organization aspects of the group work.

What are the group's strengths?

In what areas could the group improve?

Do you feel the design solutions arrived at were the best? If not, why not?

Comment on your own ability to work together in a positive manner. Consider the cooperation, listening, and organization aspects of your work.

What are your strengths?

In what areas could you improve?

Comment on your success in fulfilling the role you were assigned.



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## **Key Standards For Small Group Discussion: Group Roles**

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**SUBJECT: The Process of Design, Group Design Grades 9-12**

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*This literacy strategy is based on the following technological literacy benchmarks and employability and innovations skills. These are to guide the teacher in developing assessment strategies and as a tool to illustrate the importance of the activity in developing a student's future career potential.*

### **References**

The Ontario Curriculum, Grades 1-8 Science and Technology (1998).  
The Ontario Curriculum, Grades 11 and 12 Technological Education (2000).  
International Technology Education Association (ITEA) Standards for Technological Literacy, Content for the Study of Technology (2004).  
Conference Board of Canada Employability Skills Profile 2000+ (2000).  
Conference Board of Canada Innovation Skills Profile (2002).

### **ITEA Technological Literacy Benchmarks**

#### *Standard 8: The attributes of design*

H. The design process includes defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, exploring possibilities, selecting an approach, developing a design proposal, making a model or prototype, testing and evaluating the design using specifications, refining the design, creating or making it, and communicating processes and results.

#### *Standard 11: Apply the design process*

N. Identify criteria and constraints and determine how these will affect the design process.

### **Conference Board of Canada Employability Skills**

#### *Work with Others*

CBC41 understand and work within the dynamics of a group;  
CBC42 ensure that a team's purpose and objectives are clear;  
CBC43 be flexible: respect, be open to and supportive of the thoughts, opinions and contributions of others in a group;  
CBC44 recognize and respect people's diversity, individual differences and perspectives.

### **Conference Board of Canada Innovation Skills**

#### *Creativity and Continuous Improvement Skills*

IS1 seek different points of view - explore options;  
IS2 be adaptable and flexible when challenging ideas;  
IS3 ask questions to assess situations, identify problems, and seek solutions;

#### *Relationship Building Skills*

IS31 engage others to make use of their skills, knowledge, and abilities;  
IS32 Share information and expertise—explain and clarify new and different ideas;  
IS33 listen and ask questions to understand what is new and different about others points of view.



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**Small Group Discussions: Place Mat**

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**SUBJECT: Project Management, Grades 9-12**

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In this easy-to-use strategy, students are divided into small groups, gathered around a piece of chart paper. First, students individually think about a question and write down their ideas on their own section of the chart paper. Then students share ideas to discover common elements, which can be written in the centre of the chart paper. In this activity students are asked to write down important key points about project management.

**Purpose**

- Encourage active participation by all members in group discussions.
- Encourage collaboration and conflict resolution. Give all students an opportunity to share ideas and learn from each other in a co-operative small-group discussion.
- Access student prior learning.

**Payoff****Students will:**

- actively participate in small group activities.
- understand and work within the dynamics of a group.
- share prior knowledge as part of a group.
- have an opportunity to reflect and participate.
- have fun interacting with others and extending their learning while accomplishing the task.

**Tips and Resources**

- It is recommended that this activity be introduced as the first of 4 relating to project management.
- This activity should take no longer than one period (76 minutes). It should be followed by *Making Notes* strategy, *SUBJECT: Project Management Research*.
- It is important to vary the composition of small groups whenever possible, allowing students the opportunity to work with many classmates of various abilities, interests, backgrounds, home languages, and other characteristics.
- The strategy can be used with a wide variety of questions and prompts.
- Choose several key words to help get things started (e.g., time management, scheduling projects, critical paths, roles and responsibilities).
- Place mat also works well as an icebreaker when students are just getting to know each other.
- Resources:
  - Teacher Resource: *Small Group Discussions, Place Mat Strategy*
  - Student/Teacher Resource: *Place Mat Template*
  - Student Resource: *Strategy Reflection*
  - Teacher Resource: *Key Standards For Getting Ready to Read: Small-Group Discussions*

**Further Support**

- Give careful consideration to the composition of the small groups, and vary the membership according to the students' styles of learning and interaction, subject-matter proficiency, and other characteristics.
- Group students either with varied or similar skills to allow for enhancement or remediation.
- Small group activities provide great opportunities for struggling students.
- Some students may benefit from one-on-one conferencing prior to sharing their ideas with the group.
- Allow opportunities for individual conferencing.
- Although it is important to vary the composition of groups, it is also important to consider the particular needs of struggling students.



**Small Group Discussions: Place Mat**

**SUBJECT: Project Management, Grades 9-12**

**Notes**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>• Refer to “Tips and Resources” to prepare for this activity.</li> <li>• Divide students into groups of 4 or 5.</li> <li>• Review small group discussion etiquette.</li> <li>• Describe the activity.</li> <li>• Distribute chart paper to each group.</li> <li>• Ask the students to divide the chart paper into sections equal to the number of students in the group, leaving a square in the centre of the chart.</li> </ul>	<ul style="list-style-type: none"> <li>• Listen actively and critically to understand and learn.</li> <li>• Participate in the brainstorming session.</li> <li>• Contribute responses in class discussions.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>• Follow the instruction sheet.</li> <li>• Direct each group member to think about, then write about, project management in their personal area of the chart paper for a determined amount of time.</li> <li>• Provide some key points to get students started.</li> <li>• Monitor progress and conference with groups or individuals having difficulties.</li> <li>• Allow a few minutes for students to fill in the squares.</li> <li>• Have groups switch place mats as per instruction sheet.</li> <li>• Complete the exercise.</li> </ul>	<ul style="list-style-type: none"> <li>• Gather their thoughts about the topic and write in their area of the place mat, respecting the space of other members of the group.</li> <li>• Complete the place mats as instructed.</li> <li>• Record common ideas in the centre of the place mat.</li> <li>• Follow small group discussion etiquette.</li> </ul>
<p><b>After</b></p> <ul style="list-style-type: none"> <li>• Have students post the charts to share their group’s thinking with the class.</li> <li>• Discuss all the key features of project management and have students continue on to the research activity on project management.</li> <li>• Distribute reflection papers.</li> <li>• As a class, reflect on learning by discussing the individual reflection papers.</li> </ul>	<ul style="list-style-type: none"> <li>• Take turns sharing ideas with the group.</li> <li>• Engage in discussion with all group members to arrive at common elements or ideas.</li> <li>• Use oral skills, such as active listening, requesting clarification, and coming to consensus.</li> <li>• Circulate around the room to look at the ideas on the charts of other groups.</li> <li>• Complete the reflection paper.</li> </ul>

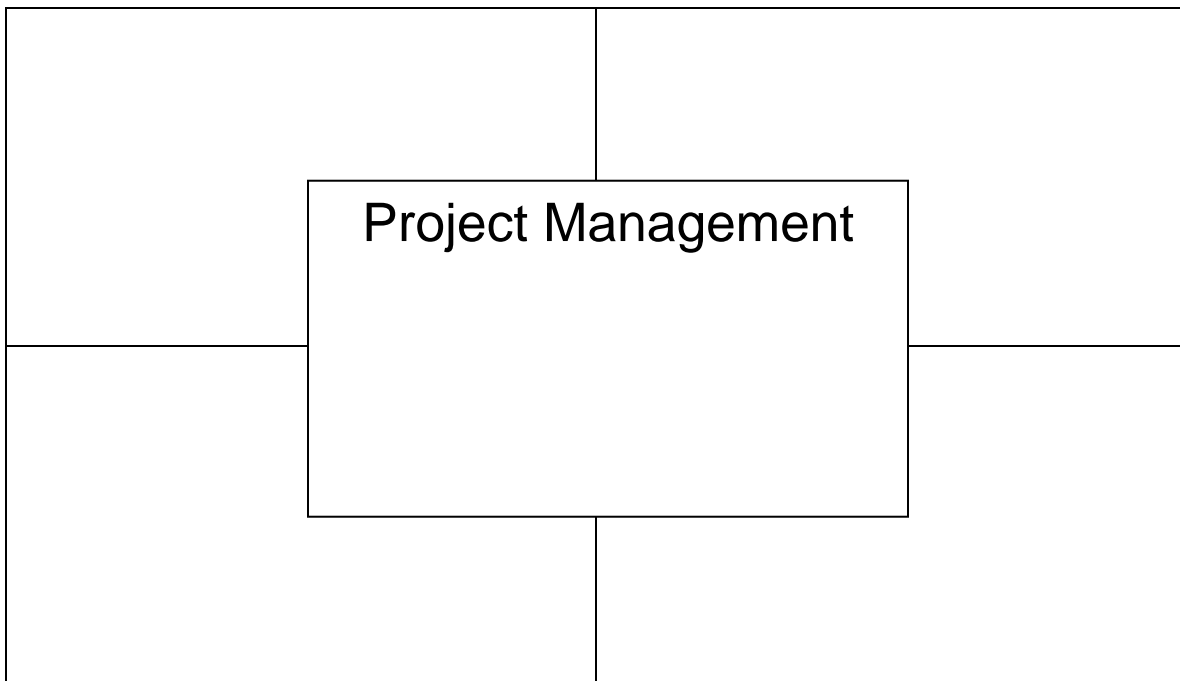


## SMALL GROUP DISCUSSIONS, PLACE MAT STRATEGY

### Instructions:

1. Divide the class into groups of four. This activity can also be done in smaller groups but avoid groups larger than four.
2. Give each group a place mat divided as per sample below. As an option, students can create their own place mats.
3. Each group member is asked to list all he/she knows about project management in his/her corner of the place mat leaving the centre square blank.
4. Switch the place mat with another group. Read their brainstormed notes and add more points of your own.
5. Pass the place mat on once more and ask groups to discuss the points made on the place mat in front of them and decide on the most significant points.
6. Return place mats back to their original groups.
7. As a group discuss the main points and write the main points and features in the centre square.
8. Allow for a whole group sharing of main observations.
9. Have one member of each group present one point or key feature from the centre square.
10. Keep the place mats for future reference and as exemplars.

### PLACE MAT TEMPLATE





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## SMALL GROUP DISCUSSION ETIQUETTE

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1. Be a team player. Respect each other's ideas. Question and participate.
2. Allow all members of the group an opportunity to participate.
3. Take turns speaking – one person speaks at a time.
4. Allow one speaker at a time. Let others know that you have not finished speaking.
5. Wait your turn – don't interrupt.
6. Use supportive gestures & body language:
  - Maintain eye contact with the speaker;
  - Nod to show you are listening;
  - Use encouraging facial expressions.
7. Listen carefully and attentively to other speakers.
8. Always support each other. Do not 'put down' ideas. Show respect for others' ideas.
9. Avoid negative criticism.
10. Stay on topic. Stay on task.
11. Ask questions when you don't understand.
12. Do not allow anyone to manipulate the discussion; let other people talk and be a good listener.
13. All decisions are made in such a way that everyone has equal input.
14. Relax, be yourself, be honest, have fun.



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## STRATEGY REFLECTION

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1. How did this strategy help you to better understand the topic?

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2. Did you find the information useful?

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3. Describe some project management information you were not aware of.

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4. What did you like best about this strategy and why?

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5. After your literature discussion, put a check next to each item that describes how you participated:

I contributed to the group task.

I was on task and on topic during group discussions?

I listened carefully to what others said.

I was pleasant with all other members.

I got along with everyone in the group.

I asked questions when I needed clarification about a comment somebody else had made or about the literature in general.

I maintained positive body language when others were speaking - keeping eye contact, leaning forward, and nodding to let speakers know I was following their ideas.




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## Key Standards For Small Group Discussions

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**SUBJECT: Project Management, Grades 9-12**

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- Conference Board of Canada Innovation Skills Profile (2002).

### **ITEA Technological Literacy Benchmarks**

*Standard 2: The core concepts of technology*

EE: Management is the process of planning, organizing, and controlling work.

*Standard 12: Use and maintain technological products and systems*

L: Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.

### **Conference Board of Canada Employability Skills**

*Communicate*

CBC3 listen and ask questions to understand and appreciate the points of view of others;

CBC4 share information using a range of information and communications technologies (e.g., voice, e-mail, computers);

### **Conference Board of Canada Innovation Skills**

*Relationship-Building Skills*

IS29 Understand and work within the dynamics of a group;

IS32 Respect and support the ideas, approaches, and contributions of others;

IS40 Promote personal development in others so they are better able to contribute to a team.

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**Small Group Discussions: Jigsaw**

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**SUBJECT: Safety Literacy, Safety Presentation, Grades 9 - 12**

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Peer Instruction is a more widely occurring pedagogy in our world today. With a complex and rapidly changing set of information that workers need to understand, the process of sharing information with colleagues becomes an optimal method of keeping current. Additionally, when they are a part of the delivery system themselves, a corporate sense of 'responsibility for learning' develops. Jigsaw is a method that can be used to propagate vital information to a group or class. Each student is assigned to a "home group" of three to five members, and an "expert group" consisting of members from different home groups. Students meet in their expert group to receive and discuss new information, and to work out how to best convey the information. They then return to their home group, where all members share their expert knowledge.

**Purpose**

- Encourage group sharing and learning on a particular topic or technical task.
- Provide struggling learners with a wider range of explanations than they would get in a teacher-led, whole-class setting.

**Payoff**

Students will

- increase their comprehension, and have a more compelling reason to understand the information.
- receive clarification of concepts from peers, and benefit from the support of other students.
- share responsibility for each other's learning as they use critical thinking and social skills to convey important information to others.
- gain self-confidence through their contribution to a co-operative learning effort.

**Tips and Resources**

- The example activity given here is used to teach students about Workplace Hazardous Material Information System (W.H.M.I.S.) symbols and associated hazards, but also could be used to teach about other safety procedures and sets of information.
- Give students the opportunity for research in their expert groups, particularly as they generate examples of where types of hazards are commonly encountered. Students may need to examine labels on products they find at home, and around the school. Internet research could yield examples related to the symbol they are assigned.
- Evaluation of the effectiveness of any particular expert group, or of any individual expert in a home group, could be based in part on testing the class after the home group instruction has taken place.
- If a student misses a home group instructional day, the expert can deliver the lesson/information, one-on-one, the next day. This reduces the impact of absences.
- While the W.H.M.I.S. activity serves as a good introduction to Jigsaw, it may be helpful for students to be provided with some coaching on working in a small group. See Think Literacy: Cross Curricular Approaches, Grades 7-12 pp.158-159.

**Further Support**

- Students who struggle with this could achieve some of the objectives of this strategy if the teacher provides a script or checklist for them to follow when delivering their lesson/information to their home group.
- Special needs students could be guided through the expert role by a peer-tutor or the teacher, and modifications made to their responsibilities to the home group.



**Small Group Discussions: Jigsaw**

**SUBJECT: Safety Literacy, Safety Presentation, Grades 9 - 12**

What teachers do	What students do
<p><b>Before</b></p> <ul style="list-style-type: none"> <li>Assign each student to a “home group” of three to five students.</li> <li>Assign each student to an “expert group,” with a focus on a particular W.H.M.I.S. symbol or symbol set (Toxic, Corrosion, Flammable, Pressure) from the “W.H.M.I.S. Symbols” and “Consumer Hazardous Symbols” posters included in the preceding strategy (Pair Work: Take Five).</li> </ul>	<ul style="list-style-type: none"> <li>Meet briefly with the home groups before breaking off into the expert groups.</li> </ul>
<p><b>During</b></p> <ul style="list-style-type: none"> <li>Establish the parameters of the information you wish to have the experts share with their home group. Provide a graphic organizer such as the accompanying <i>Student Resource Sample Graphic Organizer – W.H.M.I.S Symbols</i>.</li> <li>Have the expert groups meet to read the section you have assigned, discuss and clarify the information, and generate a list of common examples of the hazard which students can relate to.</li> <li>Remind students that, in the role of ‘expert’ in their home group, they will need to consider how best to teach the group about the hazard. Suggest that they consider creating a graphic organizer to help students in their home groups to be able to record the information. Encourage the use of safe tangible objects which could be used during the home group presentations (e.g., Material Data Sheets, household containers, empty compressed gas containers).</li> <li>Convene home groups so that each student can share his or her expertise with all members of the home group.</li> </ul>	<ul style="list-style-type: none"> <li>Listen to the teacher’s explanation of the task. Examine any graphic organizer provide by the teacher; understand the purpose of each section.</li> <li>Analyze the information from the WHMIS poster related to the WHMIS symbol they have been assigned and record it on the graphic organizer provided.</li> <li>Work together to become “experts” on the particular symbol assigned, and all the aspects related to it.</li> <li>Share and discuss how to report on the learned information to their home group, actively contributing ideas and examples of where one would encounter hazards represented by the symbol. Consider designing a graphic organizer as a tool for home group students to make notes.</li> <li>Consider ways of conveying the information vividly, using safe objects related to the topic.</li> <li>Present the information to the home group; monitor their understanding by asking questions, and rephrasing as necessary.</li> <li>Make use of any graphic organizer provided to home group by making notes about the information presented by the expert.</li> </ul>

Notes

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**Sample Graphic Organizer – W.H.M.I.S Symbols**

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**Meaning of the Symbol**

What is there about the symbol that helps us to remember the type of hazard it represents?

What are the key consequences of improper handling or improper use of materials labelled with this symbol?

What are some examples of materials you would find at home, labelled with this symbol?

What are some examples of materials you would find in the school, labelled with this symbol?

What is there about the symbol that helps us to remember the consequences of improper handling or use of these materials?

Outline the precautions which need to be taken when handling or storing these materials.

**Sample Graphic Organizer – W.H.M.I.S Symbols**



**Meaning of the Symbol**

What is there about the symbol that helps us to remember the type of hazard it represents?

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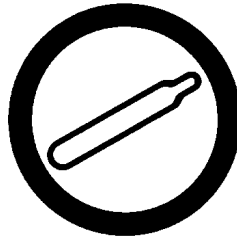
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## Sample Graphic Organizer – W.H.M.I.S Symbols

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What is there about the symbol that helps us to remember the consequences of improper handling or use of these materials?
Outline the precautions which need to be taken when handling or storing these materials.

**Sample Graphic Organizer – W.H.M.I.S Symbols**



<b>Meaning of the Symbol</b>
<p>What is there about the symbol that helps us to remember the type of hazard it represents?</p>
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<p>What is there about the symbol that helps us to remember the consequences of improper handling or use of these materials?</p>
<p>Outline the precautions which need to be taken when handling or storing these materials.</p>



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## Key Standards for Small Group Discussions: **Jigsaw**

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**SUBJECT: Safety Literacy, Safety Presentation, Grades 9-12**

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Conference Board of Canada Employability Skills Profile 2000+ (2000).

Conference Board of Canada Innovation Skills Profile (2002).

### **ITEA Technological Literacy Benchmarks**

*Standard 1: The characteristics and scope of technology*

J: The nature and development of technological knowledge and processes are functions of the setting.

*Standard 12: Use and maintain technological products and systems*

L: Document processes and procedures and communicate them to different audiences using appropriate oral and written techniques.

### **Conference Board of Canada Employability Skills**

*Communicate*

CBC1 read and understand information presented in a variety of forms (e.g., words, graphs, charts, diagrams);

CBC2 write and speak so others pay attention and understand;

*Demonstrate Positive Attitudes and Behaviours*

CBC19 feel good about yourself and be confident

*Be Responsible*

CBC27 be accountable for your actions and the actions of your group;

*Be Adaptable*

CBC29 work independently or as a part of a team;

*Work Safely*

CBC40 be aware of personal and group health and safety practices and procedures, and act in accordance with these;

*Work With Others*

CBC45 accept and provide feedback in a constructive and considerate manner.

### **Conference Board of Canada Innovation Skills**

*Creativity and Continuous Improvement Skills*

IS6 look for surprising connections - be open-minded when exploring possible solutions;

IS7 put forward your own ideas with confidence.