# Module 2:
# Explain That Again: A Further Investigation

Many of the learning experiences (LEs) in Module 2: Explain That Again: A Further Investigation prepare students for LEs in Module 3: Explore Electricity: The Backbone of Modern Inventions. It is, therefore, suggested that Modules 2 and 3 LEs be addressed concurrently (in close proximity) so that concepts can be reinforced shortly after they have been introduced.

The six LEs that make up Module 2: Explain That Again: A Further Investigation are described below.

| LE Title | Estimated Time | Overview |
|---|---|---|
| **Mod.2.1: Extra! Extra! Read All about It!** | 180 minutes | Students listen to or read stories about inventions that have affected their lives in one way or another. These stories trace the history of an invention from its inception to its current application. Students analyze one story and write a newspaper article publicizing the invention profiled in their story. |
| **Mod.2.2: Biography of an Inventor or a Scientist** | 180 minutes | Students research an inventor or a scientist and write a short biography of this person. |
| **Mod.2.3: Rube Goldberg** | 150 minutes | Students discover that the American cartoonist Rube Goldberg (1883-1970) became famous for developing sketches of oddball inventions that came to be called "Rube Goldberg Machines." A Rube Goldberg machine is defined as a device or method "that brings about by complicated means what apparently could have been accomplished simply" ("Rube Goldberg," *ITP Nelson Canadian Dictionary of the English Language*). Students invent and draw their own Rube Goldberg machine and write descriptions that model how Rube Goldberg described his "inventions." |
| **Mod.2.4: Chindogu: Useless Inventions** | 180 minutes | Chindogu is a Japanese word meaning "useless invention." Students use the communication skills of writing, speaking, and representing to persuade a "consumer" of the advantages and merits of purchasing a useless invention. This can be accomplished through a written advertisement, a video commercial, a poster, or some other appropriate means. |
| **Mod.2.5: Tally-Ho** | 120 (2 x 60) minutes | Students tally the electrical and non-electrical inventions they use in their own homes. They use this list to create a double-bar graph using a spreadsheet. |
| **Mod.2.6: Customer Service Department** | 120 (2 x 60) minutes | Students learn to design and conduct a survey. They design a survey to verify the needs and complaints of a selected group of people, which could be satisfied by creating an invention or improving on one (innovation). |

# Extra! Extra! Read All about It! **Mod.2.1**

***TIME***
180 minutes

***OVERVIEW***
Students listen to or read stories about inventions that have affected their lives in one way or another. These stories trace the history of an invention from its inception to its current application. Students analyze one story and write a newspaper article publicizing the invention profiled in their story.

***LEARNING OUTCOMES***
Through this learning experience (LE), students will achieve specific learning outcomes (SLOs) in various subject areas. Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified.

**English Language Arts**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- 2.1.2 *Comprehension Strategies* — Use comprehension strategies [such as asking questions, making notes, adjusting reading rate…] appropriate to the type of text and purpose [including summarizing, outlining, remembering ideas, and responding personally].
- 3.3.1 *Organize Information* — Organize information and ideas using a variety of strategies and techniques [such as comparing and contrasting, classifying and sorting according to subtopics, sequences, order of priority or importance...].
- 4.1.3 *Organize Ideas* — Adapt models from listening, reading, and viewing experiences to enhance own oral, written, and visual texts using organizational patterns [such as stanzas, chronological order, paragraphs...].
- 4.2.1 *Appraise Own and Others' Work* — Share own stories and creations at appropriate times during revision and use criteria to provide feedback for others and to revise and assess own work and presentations.
- 4.2.2 *Revise Content* — Revise to eliminate unnecessary information.
- 4.2.4 *Enhance Artistry* — Choose language, sounds, and images [including transitional devices] to enhance meaning and emphasis.
- 4.2.5 *Enhance Presentation* — Prepare detailed and organized compositions, presentations, reports, and inquiry or research projects using templates or pre-established organizers.
- 5.2.1 *Cooperate with Others* — Assist group members to maintain focus and complete tasks; identify and solve group process issues.

**Science**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- SLOs related to Scientific Inquiry or the Design Process in Cluster 0: Overall Skills and Attitudes.

**Social Studies**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- 6-KI-011 Describe daily life on a prairie homestead between 1890 and 1914.
  *Examples: survey system, role of women, challenges facing early settlers, education...*
- 6-VL-010 Appreciate the efforts of people in early Canada to overcome environmental hardships.
- 6-KE-056 Relate stories of the Depression and describe its impact on Canada.
  *Examples: changes in agricultural practices, development of the social safety net, new political parties...*
- 6-KE-057 Give examples of the impact of technological development on life in Canada from 1914 to 1945.
  *Examples: electricity, telecommunication, transportation, medicine, industrialization...*
- 6-KE-058 Give examples of ways in which industry and technology have changed life in Canada since 1945.
  *Examples: urbanization, transportation, communication, education...*
- 6-KE-059 Give examples of inventions and technologies created in Canada.
  *Examples: kayaks, snowmobiles, Canadarm, insulin, canola...*
- 6-KL-026 Describe the influence of the natural environment on life in Canada.
- 6-KL-026A Describe the influence of the land on their First Nation, Inuit, or Métis identity.
  *Examples: values, beliefs, traditions, customs, art, clothing...*
- 6-VC-004 Appreciate the benefits of living in Canada.
  *Examples: freedoms, education, health, safety...*

## *ICT LITERACY SKILLS AND COMPETENCIES*

Consider the intent of this LE and your choice of instructional and assessment strategies to determine which skills and competencies students may achieve, in addition to those identified below:

- basic operating skills
- word processing

## *SUGGESTED LEARNING RESOURCES*

### Software

- word processing

### Print

- Selected Bibliography (see Fiction)
- Appendix C: Index of Teaching and Learning Strategies and Tools
- Manitoba Education and Training. *Grades 5 to 8 English Language Arts: A Foundation for Implementation.* Winnipeg, MB: Manitoba Education and Training, 1998. (See Criteria for Assessing Original Text: Expository or Informational Text, Grade 6, 320.)

### BLMs

- BLM Mod.2.1#1: 5Ws + H Guide
- BLM Mod.2.1#2: Five-Step Revising and Editing Checklist

## *SUGGESTIONS FOR INSTRUCTION*

### Preparation and Set-up

- Select print resources (or electronic ones that have been printed) that contain short stories or articles on inventions that affect students' lives (e.g., adhesive tape, ballpoint pen, pocket calculator).
- Review the information in OLE.9: Newspapers.
- Make an electronic version of BLM Mod.2.1#1: 5Ws + H Guide.

**Activating Strategies**

- Select an appropriate short story about an invention for students to listen to or read independently (see Fiction suggestions in Selected Bibliography).
- Review the 5Ws + H (Who? What? Where? When? Why? How?) of newspaper writing (see OLE.9: Newspapers).
- As a class, students identify and discuss the 5Ws + H of the invention story read in class. Use a computer and a projection system to show BLM Mod.2.1#1: 5Ws + H Guide and to fill in the categories as students agree on content.
- As a class, draft a feature newspaper article on the invention featured in the short story, using the completed BLM Mod.2.1#1: 5Ws + H Guide.

**Acquiring Strategies**

- Students select an invention short story for their own use and identify the 5Ws + H of their story, using BLM Mod.2.1#1: 5Ws + H Guide.
- Students refer to the Timeline of Discoveries chart developed in Mod.1.3b#1: Why Do We Invent? They consider the social conditions and historical events of the time to put the selected invention into perspective when writing their article.

**Applying Strategies**

- Students write a newspaper article featuring their selected invention, using the 5Ws + H they previously filled out. Using word-processing software, they write and print the first draft (see ICT.2: Write This Down). Students edit their newspaper article with a partner, using BLM Mod.2.1#2: Five-Step Revising and Editing Checklist. They choose a snappy headline, write the final copy, and print it.
- A group of students compiles the articles in a class *Invention Convention* newsletter. Another group posts the articles on the class website. (See ICT.11: Make It: Creating an Effective Web Page.)

**Variations/Extensions**

- In collaborative groups, students select an invention article that a team member has written and dramatize it in a TV newscast. Videotape the presentation and show it at parent-teacher interviews or on open-house nights.

***SUGGESTIONS FOR ASSESSMENT***

- Assess students' use of BLM Mod.2.1#2: Five-Step Revising and Editing Checklist by comparing the first draft of their invention articles to the final copy.
- Confer with students to verify that they have addressed the 5Ws + H questions. Discuss the writing with students, using Criteria for Assessing Original Text: Expository or Informational Text (see Print resources suggested for this LE).

***CONNECTION TO* INVENTION CONVENTION**

- Students use skills developed in this LE when they promote their invention through writing a feature article and/or videotaping a commercial advertisement for the Invention Convention.

## BLM Mod.2.1#1: 5Ws + H Guide

Name _____ Date _____

Use the following guide to identify and write about essential components in the invention story. Jot down the information in note form.

**Who** was (were) the inventor(s)?

- 
- 

**What** was the invention? Name and describe its purpose and how it works.

- 
- 
- 
- 
- 

**Where** was it invented? Be as specific as you can.

- 
- 
- 
- 
- 

**When** was it invented? Over what period of time? (Was there more than one date?)

- 
- 
- 
- 
- 

**Why** was it invented? What need was being met?

- 
- 
- 
- 
- 

**How** was it invented? What steps led to the invention?

- 
- 
- 
- 
- 

# BLM Mod.2.1#2: Five-Step Revising and Editing Checklist

Name _____ Date _____

| Criteria | Self | Partner | Teacher |
|---|---|---|---|
| **1. Meaning** | | | |
| Does my writing make sense and say what I think it says? | | | |
| **2. Capitalization** | | | |
| Did I use capital letters correctly? | | | |
| • for references to "I" | | | |
| • in first words of sentences | | | |
| • for names of people, pets, cities, towns, countries, streets | | | |
| • for days, months, titles | | | |
| **3. Punctuation** | | | |
| Did I check whether I used correct punctuation marks? | | | |
| • **period (.)**<br>— at end of "telling" sentence (e.g., I like my cat.)<br>— with abbreviations (e.g., Mon.) | | | |
| • **question mark (?)**<br>— at end of "question" sentence (e.g., Where did he go?) | | | |
| • **comma (,)**<br>— when listing things (e.g., I like peas, carrots, and corn.)<br>— to separate speaker from spoken words (e.g., He said, "How are you?") | | | |
| • **apostrophe (')**<br>— to mark contractions (e.g., don't)<br>— to note ownership/possessives (e.g., my sister's cat) | | | |
| • **quotation marks (" ")**<br>— around a speakers' words (e.g., She said, "Where is it?") | | | |
| **4. Spelling** | | | |
| Did I check my spelling carefully? | | | |
| • Did I use my dictionary when I needed help? | | | |
| • Did I underline the words that I need help with? | | | |
| **5. Handwriting** | | | |
| Is my printing/handwriting neat and easy to read? | | | |

**Five-Step Revising and Editing Checklist:** Adapted by permission of The Diagnostic Learning Centre, The Winnipeg School Division.

**Reference:**

Manitoba Education and Training, *Grades 5 to 8 English Language Arts: A Foundation for Implementation.* Winnipeg, MB: Manitoba Education and Training, 1998. Strategies That Make a Difference, 228.

# Biography of an Inventor or a Scientist **Mod.2.2**

***TIME***
180 minutes

***OVERVIEW***
Students research an inventor or a scientist and write a short biography of this person.

***LEARNING OUTCOMES***
Through this learning experience (LE), students will achieve specific learning outcomes (SLOs) in various subject areas. Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified.

**English Language Arts**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- 2.3.1 *Forms and Genres* — Recognize key characteristics of various forms and genres of oral, literary, and media texts [such as novels, biographies, autobiographies, myths, poetry, drawings and prints…].
- 3.2.5 *Make Sense of Information* — Use organizational patterns of oral, visual, and written texts [including main ideas and supporting details, explanation, comparison and contrast, cause and effect, and sequence] to construct meaning; skim, scan, and read closely to gather information.
- 3.3.2 *Record Information* — Make notes on a topic, combining information from more than one source; reference sources appropriately.
- 4.2.1 *Appraise Own and Others' Work* — Share own stories and creations at appropriate times during revision and use criteria to provide feedback for others and to revise and assess own work and presentations.
- 4.2.2 *Revise Content* — Revise to eliminate unnecessary information.
- 4.2.4 *Enhance Artistry* — Choose language, sounds, and images [including transitional devices] to enhance meaning and emphasis.
- 4.2.5 *Enhance Presentation* — Prepare detailed and organized compositions, presentations, reports, and inquiry or research projects using templates or pre-established organizers.
- 4.4.1 *Share Ideas and Information* — Share information on a topic with class members in a planned and focused group session using a variety of strategies [such as interactive dialogues, demonstrations, dramatizations, audiovisual and artistic representations…].
- 4.4.2 *Effective Oral Communication* — Use appropriate volume, phrasing, intonation, non-verbal cues [such as body language, facial expression...], and presentation space to enhance communication.
- 4.4.3 *Attentive Listening and Viewing* — Demonstrate critical listening and viewing skills and strategies [such as recognizing main idea and details, identifying inference...] and show respect for presenter(s) through appropriate audience behaviours [such as giving non-verbal encouragement, responding to emotional aspects of the presentation...].

**Science**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- SLOs related to Scientific Inquiry or the Design Process in Cluster 0: Overall Skills and Attitudes.
- 6-1-15 Identify and describe contributions of scientists and naturalists who have increased our understanding of the diversity of living things.
- 6-4-03 Identify Canadians who have contributed to space science or space technology, and describe their achievements.

**Social Studies**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- 6-KI-021 Identify various individuals from Canada's past and present, and describe their achievements.

***ICT LITERACY SKILLS AND COMPETENCIES***
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which skills and competencies students may achieve, in addition to those identified below:
- basic operating skills
- communicating electronically
- concept mapping
- inquiry using electronic sources
- publishing electronically
- word processing

***SUGGESTED LEARNING RESOURCES***
**Software**
- word processing
- concept mapping
- email
- web page authoring

**Internet**
- IMYM Links Database: <http://www.edu.gov.mb.ca/ks4/tech/imym/resources/links.html>
- Search the Internet using the search terms "biography scientist" and "biography inventors" or using the name of a specific inventor or scientist.

**CD-ROM**
- electronic encyclopedia

**Print**
- individual and collective biographies of inventors and scientists (see Biographies in Selected Bibliography)
- Appendix C: Index of Teaching and Learning Strategies and Tools
- Manitoba Education and Training. *Grades 5 to 8 English Language Arts: A Foundation for Implementation.* Winnipeg, MB: Manitoba Education and Training, 1998. (See Prepare and Share Expository or Informational Text, Grade 6, 378.)

**BLMs**
- BLM Mod.2.1#2: Five-Step Revising and Editing Checklist

- BLM Mod.2.2#1: Venn Diagram

**TBLMs**
- TBLM Mod.2.2#1: Suggested Lead Statements to Discuss Personality Traits
- TBLM Mod.2.2#2: Biographies and Autobiographies
- TBLM Mod.2.2#3: Observation Checklist for Speaking and Listening Skills

**Materials**
- cash register tape

***SUGGESTIONS FOR INSTRUCTION***
**Preparation and Set-up**
- Collect and display biographical material about male and female inventors and scientists, encompassing a wide range of subjects and cultural backgrounds, including Aboriginal perspectives. Ensure that students have time to access the materials before starting this LE. Ask students to write journal entries to respond to the material they peruse.
- Make a wall chart entitled Prepare and Share Expository or Informational Text (see Print resources suggested for this LE).

**Activating Strategies**
- Select and read excerpts from four or five biographies that exemplify characteristics of biographies (see TBLM Mod.2.2#2: Biographies and Autobiographies). Choose excerpts from print material, the Internet, and electronic encyclopedias. Students work alone or in pairs to note similarities and differences between the excerpts, using BLM Mod.2.2#1: Venn Diagram or concept-mapping software.
  *Examples:*
  - **Similarities:** chronological order, emphasis on life achievement, mention of role model, hardships encountered to achieve success, or description with evidence of personality traits
  - **Differences:** not in chronological order, record of facts only, or facts or achievement missing
- Students brainstorm a list of personality traits. They discuss what makes one person more famous and memorable than another. (See TBLM Mod.2.2#1: Suggested Lead Statements to Discuss Personality Traits.) Show students how to access the thesaurus on the word processor to find more descriptive words for various personality traits.

**Acquiring Strategies**
- Review the characteristics of biographies (see TBLM Mod.2.2#2: Biographies and Autobiographies). Students reread the previously selected excerpts to identify or confirm common characteristics such as timeline, setting, characterization, accomplishments or challenges, and supportive people. Students note the identified characteristics on a class wall chart, with examples.
- Students choose an inventor or a scientist to research. This may be someone associated with the inventions article they researched and wrote in Mod.2.1: Extra! Extra! Read All about It! To find information about their chosen inventor or scientist, students access resources from print text, the Internet, electronic encyclopedias, and so on.
- Using concept-mapping software, students record biographical information. They sort their notes into categories that reflect the characteristics of biographies.

**Applying Strategies**

- Using word-processing software, students individually compose a biography of their chosen inventor or scientist. They edit their biographies together with a partner, using BLM Mod.2.1#2: Five-Step Revising and Editing Checklist.
- Student-written biographies can be posted on the school website, with a link to the email address of the student biographer. Invite students to ask each other questions about the inventors or scientists through email. Student biographers answer the questions they receive.
- Using the Prepare and Share Expository or Informational Text wall chart, students select and list five points to focus on for their presentation. They hand in their List for Presentation. After the presentation, they comment on whether they think they were successful at following their plan.
- Students assume the identity of the inventor or scientist about whom they wrote a biography. The class interviews each student inventor or scientist in turn. (The inventor or scientist can be a guest speaker at an OLE.7: Speak Ye!, Hear Ye! session.) Students write two things they learned about each person on an Exit Slip.

**Variations/Extensions**

- Students make a mini-timeline representative of the life achievements of their chosen inventor or scientist, using cash register tape. (Consider using a scale such as 1 cm = 1 year.) Students include four or five selected events or accomplishments in their mini-timeline. They write a sentence and create an illustration for each selected event or accomplishment. Post the mini-timelines on the classroom wall, one above another, to create a giant timeline. Students examine the giant timeline as well as the Timeline of Discoveries created in Mod.1.3a: Back to the Future: A Timeline of Discoveries. They observe similarities or patterns in the lives of scientists, their inventions, and the social or political climate of the time in which they lived.
- Student biographers answer email while assuming the identity of the inventor or scientist.

***SUGGESTIONS FOR ASSESSMENT***

- Verify how effective students were in using BLM Mod.2.1#2: Five-Step Revising and Editing Checklist to edit their biographies. Confer with students to review the editing concepts.
- Check students' Venn Diagrams or concept-mapping webs for accuracy of information.
- Confer with students using their planned List for Presentation and their self-assessment of their performance.
- Use TBLM Mod.2.2#3: Observation Checklist for Speaking and Listening Skills to assess students' participation. This TBLM can be used throughout the unit to observe each student's progression of skills.

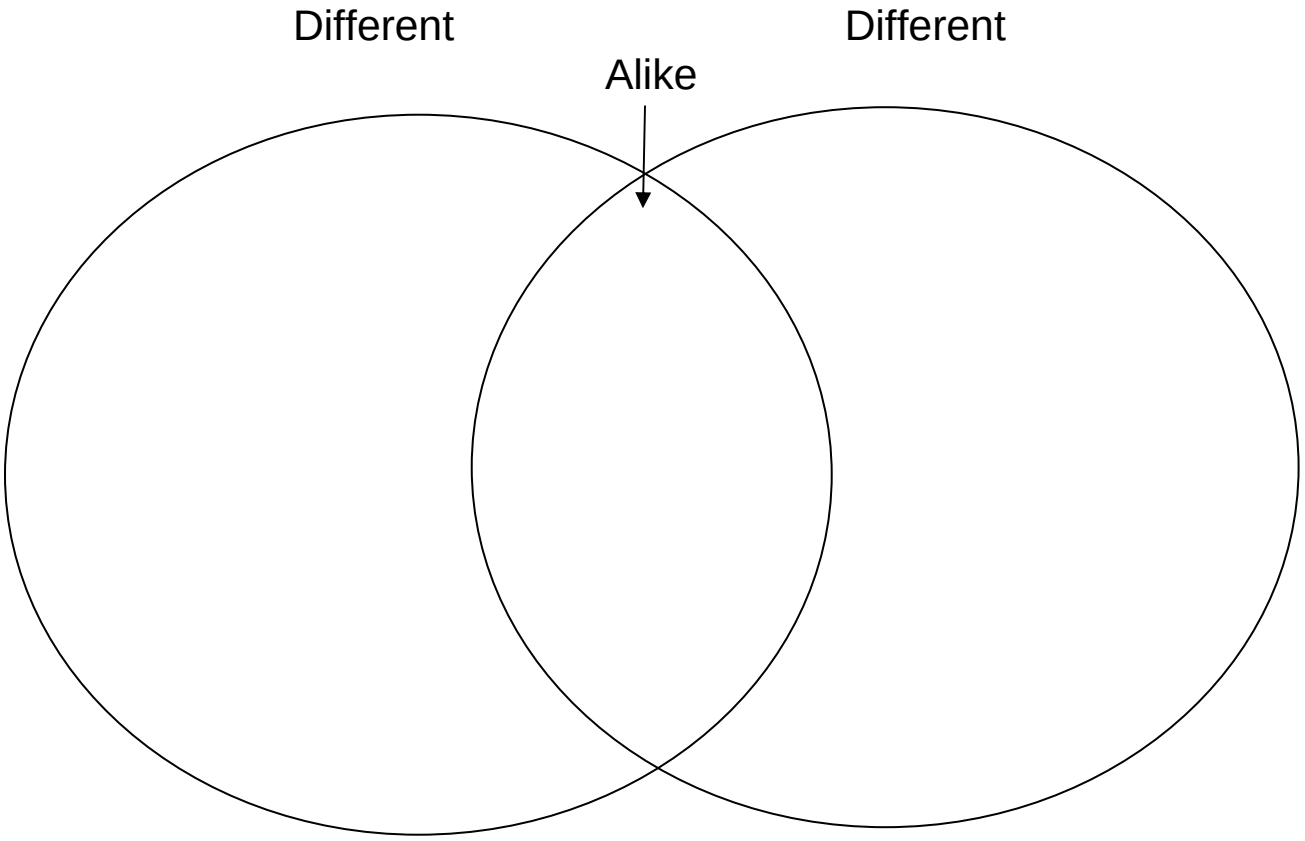
***CONNECTION TO* INVENTION CONVENTION**

- While reading biographies, students become aware of challenges an inventor must face and overcome to develop an invention. Students practise communication skills with their oral presentation, as they assume the character of their inventor or scientist.

## BLM Mod.2.2#1: Venn Diagram

Name _____ Date _____

_____ and _____



## TBLM Mod.2.2#1: Suggested Lead Statements to Discuss Personality Traits

| Sample Lead Statement | Personality Trait |
|---|---|
| • If I don't run away in the face of danger, I am… | brave, courageous |
| • If I keep trying an experiment even though it fails often, I am… | persistent |
| • If I keep exploring even though everyone tells me there's nothing there, I am… | determined |
| • If I keep thinking of new ways to do something, I am… | creative, inventive |
| • | |
| • | |
| • | |
| • | |
| • | |
| • | |

# TBLM Mod.2.2#2: Biographies and Autobiographies

**Description and Characteristics**

- **Biographies** are stories of people's lives written by someone else.
- **Autobiographies** are personal life stories written about oneself.
- Both biographies and autobiographies commonly have a theme and are written in chronological sequence. They include
  - timeline
  - setting
  - characterization
  - accomplishments or challenges
  - supportive people

**Introduction**

- Identify the theme.
- Provide an authentic setting.
- Set a timeline.

**Body**

- Focus on the person's character (e.g., the person is honest, curious, innovative, resilient, courageous) as the most important element.
- Show the individual as a dynamic person, changing over time.
- Describe the person, including reference to personality.
- Mention supportive people who were an influence.
- List the person's accomplishments or challenges.

**Theme**

- Focus on the person's accomplishments and challenges. (These are the main components of a biography.)
- Ensure that all information provided supports the theme.

## TBLM Mod.2.2#3: Observation Checklist for Speaking and Listening Skills

| **Student Name** | **Date** | | | |
|---|---|---|---|---|
| | | | | |
| **Student As Speaker** | | | | |
| 1. Uses voice appropriately. | | | | |
| 2. Uses sentences in oral communication. | | | | |
| 3. Maintains topic. | | | | |
| 4. Speaks fluently and talks for an appropriate length of time. | | | | |
| 5. Responds to the audience on request. | | | | |
| **Student As Audience** | | | | |
| 1. Listens attentively. | | | | |
| 2. Asks questions or offers comments. | | | | |
| 3. Takes turns during discussion. | | | | |

**Speaking and Listening Skills: Observation Checklist:** Adapted from *Grades 5 to 8 English Language Arts: A Foundation for Implementation* (Manitoba Education and Training BLM-95).

# Rube Goldberg **Mod.2.3**

***TIME***
150 minutes

***OVERVIEW***
Students discover that the American cartoonist Rube Goldberg (1883-1970) became famous for developing sketches of oddball inventions that came to be called “Rube Goldberg Machines.” A Rube Goldberg machine is defined as a device or method “that brings about by complicated means what apparently could have been accomplished simply” (“Rube Goldberg,” *ITP Nelson Canadian Dictionary of the English Language*). Students invent and draw their own Rube Goldberg machine and write descriptions that model how Rube Goldberg described his “inventions.”

***LEARNING OUTCOMES***
Through this learning experience (LE), students will achieve specific learning outcomes (SLOs) in various subject areas. Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified.

**English Language Arts**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- 2.3.1 *Forms and Genres* — Recognize key characteristics of various forms and genres of oral, literary, and media texts [such as novels, biographies, autobiographies, myths, poetry, drawings and prints…].
- 2.3.2 *Techniques and Elements* — Identify significant elements and techniques in oral, literary, and media texts, and examine how they interact to create effects.
- 4.1.1 *Generate Ideas* — Focus a topic for oral, written, and visual texts integrating ideas from experiences and a variety of other sources.
- 4.1.3 *Organize Ideas* — Adapt models from listening, reading, and viewing experiences to enhance own oral, written, and visual texts using organizational patterns [such as stanzas, chronological order, paragraphs...].
- 4.2.1 *Appraise Own and Others’ Work* — Share own stories and creations at appropriate times during revision and use criteria to provide feedback for others and to revise and assess own work and presentations.
- 4.2.2 *Revise Content* — Revise to eliminate unnecessary information.
- 4.2.4 *Enhance Artistry* — Choose language, sounds, and images [including transitional devices] to enhance meaning and emphasis.

**Science**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- SLOs related to Scientific Inquiry or the Design Process in Cluster 0: Overall Skills and Attitudes.

***ICT LITERACY SKILLS AND COMPETENCIES***
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which skills and competencies students may achieve, in addition to those identified below:

- basic operating skills
- graphics creation
- inquiry using electronic sources
- electronic publishing
- word processing

## *SUGGESTED LEARNING RESOURCES*

### Software

- word processing
- web page authoring
- graphics

### Internet

- IMYM Links Database: <http://www.edu.gov.mb.ca/ks4/tech/imym/resources/links.html>
- The Official Rube Goldberg Web Site: <http://www.Rube-Goldberg.com>

### Print

- Appendix C: Index of Teaching and Learning Strategies and Tools
- Manitoba Education and Training. *Grades 5 to 8 English Language Arts: A Foundation for Implementation.* Winnipeg, MB: Manitoba Education and Training, 1998. (See Explanatory Paragraphs, Grade 6, 302; Signal or Transitional Words, Grade 6, 310.)

### Games

- *Mousetrap* (by Hasbro)
- *The Incredible Machine 2* (by MobyGames of Sierra Entertainment)

### BLMs

- BLM Mod.2.3#1: Rube Goldberg
- BLM Mod.2.3#2: Explanatory Paragraph Checklist

## *SUGGESTIONS FOR INSTRUCTION*

### Preparation and Set-up

- Bookmark The Official Rube Goldberg Web Site on the class computers or place the link on the class website.
- Make wall charts of the following (see Print resources suggested for this LE):
  - Signal or Transitional Words
  - Explanatory Paragraph
- Students search the school library for information on Rube Goldberg.

### Activating Strategies

- Using a computer and projection system, students view a Rube Goldberg machine from The Official Rube Goldberg Web Site.
- At home, students watch one episode of the *Red Green Show*. They describe a Red Green invention and the need it fulfills (e.g., making popcorn for a crowd by using a clothes dryer, cleaning the inside of a convertible car by making a lift system that allows the car to be tipped over a trash container).
- Students discuss what Rube Goldberg and Red Green have in common (e.g., both use roundabout ways to fulfill a need, both use items available around a house, both create

inventions that seem to work in theory, in both cases there are much easier ways of doing what the inventors intend to accomplish).
- Students define a Rube Goldberg invention and write the definition in their Invention Journal (see OLE.8: Reflection Journal).
- Students complete Part A of BLM Mod.2.3#1: Rube Goldberg.

**Acquiring Strategies**
- Students explore more examples of Rube Goldberg machines from both electronic and print resources.
- Students examine the writing style in the descriptions of the machines (e.g., it is written in "telegraphic" style, not with full sentences). They look at the vocabulary used in the description of the steps and make a list of the verbs on a class chart. Students note that Rube Goldberg uses precise language with an economy of words, yet his instructions are clear.
- Review Signal or Transitional Words on the class wall chart.
- Review the steps for writing an explanatory paragraph as outlined on the Explanatory Paragraph wall chart. Using the illustration of a Rube Goldberg machine, students collaborate as a class to write a step-by-step description of how the machine works, including appropriate signal or transitional words. Compare the class description with the original Rube Goldberg description.

**Applying Strategies**
- Brainstorm simple daily needs of students (e.g., pick up clothes from bedroom floor, take out the garbage, empty the dishwasher, make the bed, brush teeth).
- Based on the class discussion, students identify a personal need they would like to have fulfilled more easily and design a Rube Goldberg-type invention to meet that need. Using Rube Goldberg-style writing, students draft instructions for how their invention works (see Part B of BLM Mod.2.3#1: Rube Goldberg). In Think-Pair-Share groups, students exchange their invention design and instructions, and provide each other with feedback on the accuracy of the instructions.
- Students review their draft instructions and write final step-by-step instructions describing how their invention functions.
- Students complete BLM Mod.2.3#2: Explanatory Paragraph Checklist.

**Variations/Extensions**
- Use software (e.g., *The Incredible Machine 2*) to build original inventions.
- Play a game (e.g., *Mousetrap*) to stimulate imagination and inventiveness.
- Students use a Venn Diagram to compare a Red Green and a Rube Goldberg invention.
- After completing Mod.3.4: Electromagnetism, students use their knowledge of motors and electromagnets to attempt to build their Rube Goldberg invention.
- Students sketch and scan their Rube Goldberg invention and place the graphics on the class website.

***SUGGESTIONS FOR ASSESSMENT***
- Review students' completed BLM Mod.2.3#2: Explanatory Paragraph Checklist. Read students' instructions for their Rube Goldberg inventions. Check whether students' assessment of their writing is accurate.
- Observe group work. Do the peer suggestions lead to improvement?
- Check students' completed BLM Mod.2.3#1: Rube Goldberg. Are students making appropriate changes or clarifications?

***CONNECTION TO* INVENTION CONVENTION**

- Students let their imaginations run free when they create a Rube Goldberg invention. This provides students with practice in preparation for designing and creating their own invention.

## BLM Mod.2.3#1: Rube Goldberg

Name _____ Date _____

The cartoonist, Rube Goldberg, used a variety of simple machines to develop "oddball" inventions. A Rube Goldberg machine is defined as a device or method "that brings about by complicated means what apparently could have been accomplished simply" ("Rube Goldberg," *ITP Nelson Canadian Dictionary of the English Language*).

**Part A:** Imagine that you are a reporter. Your assignment for the day is to gather some information on an interesting fellow named Rube Goldberg. Write your notes below.

**Part B:** On a blank sheet of paper, sketch your own Rube Goldberg-type invention. Then write a detailed, step-by-step description of how your invention functions, including no less than seven steps.

| **Name of Invention:** |
| --- |
| **Description:**<br><br>1.<br><br>2.<br><br>3.<br><br>4.<br><br>5.<br><br>6.<br><br>7. |

## BLM Mod.2.3#2: Explanatory Paragraph Checklist

Name _____ Date _____

| Criteria | Student | | Teacher | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| 1. Is the topic sentence clearly worded? | | | | |
| 2. Is it clear what is being explained? | | | | |
| 3. Are the steps in the correct order? | | | | |
| 4. Are the steps clearly stated and easy to follow? | | | | |
| 5. Are the best signal or transitional words used? | | | | |
| 6. Does the paragraph have an effective closing sentence? | | | | |
| **Student Questions/Comments** | | | | |
| **Teacher Comments** | | | | |

**Exploratory Paragraph Checklist:** Adapted from *Grades 5 to 8 English Language Arts: A Foundation for Implementation* (Manitoba Education and Training, Grade 6, 302).

# Chindogu: Useless Inventions **Mod.2.4**

***TIME***
180 minutes

***OVERVIEW***
Chindogu is a Japanese word meaning "useless invention." Students use the communication skills of writing, speaking, and representing to persuade a "consumer" of the advantages and merits of purchasing a useless invention. This can be accomplished through a written advertisement, a video commercial, a poster, or some other appropriate means.

***LEARNING OUTCOMES***
Through this learning experience (LE), students will achieve specific learning outcomes (SLOs) in various subject areas. Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified.

**English Language Arts**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- 2.3.2 *Techniques and Elements* — Identify significant elements and techniques in oral, literary, and media texts, and examine how they interact to create effects.
- 2.3.3 *Vocabulary* — Experiment with ambiguity in language [such as puns, jokes based on multiple meanings, poetry…] in a variety of contexts.
- 4.1.1 *Generate Ideas* — Focus a topic for oral, written, and visual texts integrating ideas from experiences and a variety of other sources.
- 4.1.2 *Choose Forms* — Select specific forms [such as diaries, narratives, speeches, letters, poetry, mime...] that serve particular audiences and purposes.
- 4.2.4 *Enhance Artistry* — Choose language, sounds, and images [including transitional devices] to enhance meaning and emphasis.
- 4.2.5 *Enhance Presentation* — Prepare detailed and organized compositions, presentations, reports, and inquiry or research projects using templates or pre-established organizers.
- 4.4.2 *Effective Oral Communication* — Use appropriate volume, phrasing, intonation, non-verbal cues [such as body language, facial expression...], and presentation space to enhance communication.
- 4.4.3 *Attentive Listening and Viewing* — Demonstrate critical listening and viewing skills and strategies [such as recognizing main idea and details, identifying inference...] and show respect for presenter(s) through appropriate audience behaviours [such as giving non-verbal encouragement, responding to emotional aspects of the presentation...].

**Science**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- SLOs related to Scientific Inquiry or the Design Process in Cluster 0: Overall Skills and Attitudes.

## *ICT LITERACY SKILLS AND COMPETENCIES*

Consider the intent of this LE and your choice of instructional and assessment strategies to determine which skills and competencies students may achieve, in addition to those identified below:

- basic operating skills
- concept mapping
- graphics creation
- inquiry using electronic sources
- electronic publishing
- spreadsheet analysis
- web page authoring
- word processing

## *SUGGESTED LEARNING RESOURCES*

### Software

- word processing
- spreadsheet
- web authoring
- graphics

### Internet

- IMYM Links Database: <http://www.edu.gov.mb.ca/ks4/tech/imym/resources/links.html>
- Searching the Internet using the term “chindogu” will return several hits, many with illustrations.

### Print

- Appendix C: Index of Teaching and Learning Strategies and Tools
- Kawakami , Kenji. *101 Unuseless Japanese Inventions: The Art of Chindogu.* London, UK: Harper Collins, 1995.

### Video

- Canadian Learning Company. *Alistair’s Time Machine.* Videocassette. Toronto, ON: Canadian Learning Company, 1991. (Use the segment entitled “Inventions That Never Really Made It.”)

### BLMs

- BLM Mod.2.4#1: Peer Assessment of an Advertisement
- BLM Mod.2.4#2: Advertisement Planning
- BLM Mod.2.4#3: Useless Inventions Discussion List

### TBLMs

- TBLM Mod.2.4#1: Useless Inventions
- TBLM Mod.2.4#2: Examples of Advertising Strategies

## *SUGGESTIONS FOR INSTRUCTION*

### Preparation and Set-up

- Students collect and contribute magazine and newspaper advertisements, promotional flyers, and printed web banners directed at young people. These are used to set up a wall display.
- Select appropriate learning resources that students can access during this LE.

**Activating Strategies**

- Students survey parents and/or peers to identify which advertisements or commercials they like best and which they like least, and to determine why. As a class, categorize and graph or chart the survey results using a spreadsheet (see ICT.12: Chart This). Discuss the results, focusing on why each of the identified advertisements or commercials was effective or ineffective at persuading the reader/viewer.
- Use TBLM Mod.2.4#2: Examples of Advertising Strategies to discuss different types of advertising strategies. Students categorize the wall display items (advertisements, promotional flyers, and banners) into the types of strategies discussed.
- Review Mod.1.3b#1: Why Do We Invent? to see how some inventions serve different purposes for different people. Students discuss why the same invention can be useful to some and useless to others.
- Using a computer and projection system, show a website that describes a Chindogu.
- Students visit the selected website, as well as other Chindogu websites, and peruse resources assembled for this LE.

**Acquiring Strategies**

- Brainstorm a list of useless inventions and the purpose such inventions might serve. Use ideas from TBLM Mod.2.4#1: Useless Inventions to get the discussion started. List student suggestions on a class chart or use the "rapid fire" feature of concept-mapping software. (When the concept map is finished, display it in Outline form, print it, and post it.) (See ICT.6: Inspired.)
  OR
  In collaborative groups, students use BLM Mod.2.4#3: Useless Inventions Discussion List to brainstorm for useless inventions, their alleged advantages, and the reasons they are essentially useless.
- Students select one invention to market (from the class chart or their own choice). They prepare an advertisement to sell their chosen useless invention, using any of the types of advertising strategies discussed in class.
- With student input, develop a class rubric to assess the advertisements. Consider the following categories: language, presentation, marketing effectiveness, and communication skills.
- In collaborative groups, students brainstorm effective strategies to "sell" their useless invention. They fill out BLM Mod.2.4#2: Advertisement Planning.

**Applying Strategies**

- Students prepare an advertisement for their useless invention. The advertisement may be presented in the form of a poster using graphics software (see ICT.4: Looks Like This), a newspaper advertisement, a live or videotaped commercial, or a web page banner (see ICT.11: Make It: Creating an Effective Web Page).
- Students introduce their useless invention to the class using their advertisement.

**Variations/Extensions**

- Advertising strategies are sometimes called "propaganda." Students look up that word in the dictionary. They discuss whether this term applies to advertising, and why or why not.
- Students videotape a publicity segment for a useless invention. The advertisement should be no longer than 30 seconds.
- Students vote for the best advertisement and post it on the class website.

- Students compare a Chindogu invention and a Rube Goldberg invention, using BLM 1.3c#1: Compare and Contrast Frame.
- Discuss online marketing aimed at children, and the similarities and differences between this form of marketing and traditional marketing. (To prepare for this discussion, visit websites that provide information and lessons on the subject, such as those identified in the IMYM Links Database.)

***SUGGESTIONS FOR ASSESSMENT***

- Confer with students about their completed BLM Mod.2.4#2: Advertisement Planning. Provide feedback by writing comments about their planning on their BLMs.
- Students use BLM Mod.2.4#1: Peer Assessment of an Advertisement to give feedback on the advertisements of their peers.
- Use the class-developed rubric to assess the useless invention presentations. Confer with students on their performance in their advertising presentation, based on the rubric and observation.

***CONNECTION TO* INVENTION CONVENTION**

- The purpose of this LE is to stimulate creativity for the creation and promotion of student inventions. Students become aware of advertising strategies and practise the communication skills they will need when promoting and selling their own invention at the Invention Convention.

## BLM Mod.2.4#1: Peer Assessment of an Advertisement

Name _____ Date _____

| |
|---|
| 1. What was effective in the advertisement? |
| 2. What convinced me that I need the product being advertised? |
| 3. What needs improvement? |
| 4. What else would have helped convince me? |
| Comments |

## BLM Mod.2.4#2: Advertisement Planning

Name _____ Date _____

| |
|---|
| 1. What useless invention am I trying to sell? |
| 2. Who might need my useless invention? |
| 3. Why would they need my useless invention? |
| 4. How can I convince them that they need my useless invention? What advertising strategy will be most effective? |
| **Teacher Comments** |

## BLM Mod.2.4#3: Useless Inventions Discussion List

Name _____ Date _____

| Useless Invention | "Advantage" | Problem with the Logic |
|---|---|---|
| *Example:*<br>• Solar-powered flashlight | • eliminates the need for batteries | • If a flashlight is used in the dark, there is no source of light or sun to power it. |
| | | |
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| | | |

## TBLM Mod.2.4#1: Useless Inventions

| Invention | Supposed "Advantage" |
|---|---|
| 1. Battery-powered battery charger | • can be used when no electricity is available |
| 2. Dehydrated water | • requires less room to carry |
| 3. Downhill stair climber | • allows you to exercise without becoming too tired |
| 4. Freeze-dried water | • is not so heavy to carry |
| 5. Flashbulb tester | • ensures that your flashbulb will work when needed |
| 6. Ice skate sandals (for use in hot climates) | • keep your toes cool while doing your favourite sport |
| 7. Luminous sundial (for use at night) | • enables you to see the time in the dark |
| 8. Non-intrusive alarm clock (raises a flag instead of ringing a bell) | • does not disturb other people who are still sleeping |
| 9. Solar-powered flashlight | • eliminates the need for batteries |
| 10. Sundial with glow-in-the-dark markings | • enables you to tell time day or night |
| 11. Waterproof teabags | • will not be ruined if they accidentally get wet |

## TBLM Mod.2.4#2: Examples of Advertising Strategies

| Advertising Strategies | |
|---|---|
| **Bandwagon** | • imply that everybody else is doing it, and therefore you can do it too |
| **Card Stacking** | • present only one side of the issue, requiring listeners to seek additional information before making a choice |
| **Name Calling (Mudslinging)** | • make a product look better by slamming and pinning a bad label on the competition |
| **Plain Folks** | • appeal to the common, ordinary people (like “all your neighbours” or “all your friends”) |
| **Price** | • claim that a product has the best price |
| **Rewards** | • promise additions (such as toys, trinkets, free gifts, rebates, and so on) on the next purchase |
| **Snob Appeal** | • appeal to people who want to look like they’re part of an exclusive group (such as movie stars or pop artists) |
| **Testimonial** | • have an individual (such as an athlete, a movie star, a celebrity, and so on) endorse a product |

# Tally-Ho **Mod.2.5**

***TIME***
120 minutes (2 x 60)

***OVERVIEW***
Students tally the electrical and non-electrical inventions they use in their own homes. They use this list to create a double-bar graph using a spreadsheet.

***LEARNING OUTCOMES***
Through this learning experience (LE), students will achieve specific learning outcomes (SLOs) in various subject areas. Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified.

**English Language Arts**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- 3.1.2 *Ask Questions* — Formulate relevant questions to focus information needs for an inquiry.
- 3.1.4 *Create and Follow a Plan* — Create and follow a plan to collect and record information within a pre-established time frame.
- 3.3.1 *Organize Information* — Organize information and ideas using a variety of strategies and techniques [such as comparing and contrasting, classifying and sorting according to subtopics, sequences, order of priority or importance...].
- 5.2.1 *Cooperate with Others* — Assist group members to maintain focus and complete tasks; identify and solve group process issues.
- 5.2.2 *Work in Groups* — Select and assume roles to assist in the achievement of group goals; engage in ongoing feedback.

**Mathematics**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- SP-I.1.6 Formulate questions for possible investigations, given a context, and predict results.
- SP-II.1.6 Select and use appropriate methods for collecting data, such as: designing and using structured questionnaires, conducting experiments, making observations, using electronic networks.
- SP-II.2.6 Discuss how collected data are affected by the nature of the sample, the method of collection, the sample size, and biases.
- SP-III.1.6 Analyze sets of data to make comparisons.
- SP-III.2.6 Display data by hand or by computer in a variety of ways, including: histograms, double-bar graphs, stem-and-leaf-plots.
- SP-IV.1.6 Read and interpret graphs, which are provided; describe the general distribution of data, using: smallest and largest value, frequency, value in the middle (median), patterns.
- SP-IV.2.6 Make inferences to generate a conclusion about the data.

**Science**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:

- SLOs related to Scientific Inquiry or the Design Process in Cluster 0: Overall Skills and Attitudes.
- 6-3-05 List electrical devices used at home, at school, and in the community, and identify the human needs that they fulfill.
  *Examples: heat, light, communication, movement...*
- 6-3-18 Describe factors that affect the consumption of electrical energy, and outline an action plan to reduce electrical energy consumption at home, at school, or in the community.
- 6-3-19 Describe ways in which electricity has had an impact on daily life.

**Social Studies**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- 6-KI-011 Describe daily life on a prairie homestead between 1890 and 1914.
  *Examples: survey system, role of women, challenges facing early settlers, education...*
- 6-KE-056 Relate stories of the Depression and describe its impact on Canada.
  *Examples: changes in agricultural practices, development of the social safety net, new political parties...*
- 6-KE-057 Give examples of the impact of technological development on life in Canada from 1914 to 1945.
  *Examples: electricity, telecommunication, transportation, medicine, industrialization...*
- 6-KE-058 Give examples of ways in which industry and technology have changed life in Canada since 1945.
  *Examples: urbanization, transportation, communication, education...*
- 6-KE-059 Give examples of inventions and technologies created in Canada.
  *Examples: kayaks, snowmobiles, Canadarm, insulin, canola...*

***ICT LITERACY SKILLS AND COMPETENCIES***
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which skills and competencies students may achieve, in addition to those identified below:
- basic operating skills
- communicating electronically
- electronic publishing
- spreadsheet analysis

***SUGGESTED LEARNING RESOURCES***
**Software**
- spreadsheet
- email
- web page authoring
- concept mapping

**Print**
- Appendix C: Index of Teaching and Learning Strategies and Tools
- Manitoba Education and Training. *Grades 5 to 8 English Language Arts: A Foundation for Implementation.* Winnipeg, MB: Manitoba Education and Training, 1998. (See Questioning, in Strategies That Make a Difference, 30-36.)

**BLM**
- BLM Mod.2.5#1: Sample Data-Collection Form

***SUGGESTIONS FOR INSTRUCTION***
**Activating Strategies**
- In collaborative groups, students brainstorm a list of electrical and non-electrical inventions they use daily at school.
- How can these inventions be categorized? (For example, an invention can be used for learning, for playing, for cleaning, in the classroom, in the hallway, in the office, in the library.)
- Students consider electrical and non-electrical inventions in their homes. They predict and hypothesize, answering the following questions:
  - Which electrical and non-electrical inventions do you use most? Why?
  - What room of your home contains the most electrical inventions? Why?
  - What room of your home contains the most non-electrical inventions? Why?
- Each group uses concept-mapping software to report its findings.

**Acquiring Strategies**
- Students discuss ways in which inventions are an integral part of their lives and what needs they fulfill (e.g., provide light, warmth, protection, facilitate communication).
- As a class, discuss how inventions for the home can be categorized. Based on categories they identified, students formulate a guiding question (see ICT.10#1: Questioning) and design a form for collecting data from their homes (see BLM Mod.2.5#1: Sample Data-Collection Form for an example).
- Ask students to agree to a number (e.g., five for each room tallied) for reporting on the inventions **they** use most often, or assign a number.

**Applying Strategies**
- In collaborative groups, students tally the information on each of their data-collection forms, using a common form such as BLM Mod.2.5#1: Sample Data-Collection Form.
- Using a spreadsheet, students record their collected data and construct a double-bar graph. (Proper labelling of the graph is essential.) They
  - present the tallied information to the whole class
  - display the resulting graphs in the classroom
  - post the graphs on the class website
- Students interpret and compare the general distribution of the class data according to the following criteria:
  - invention used most overall (all rooms combined)
  - invention used most for each room
  - non-electrical inventions that also have an electrical version (e.g., toothbrush, screwdriver)
- Students make inferences to generate a conclusion about the data.

**Variations/Extensions**
- Students email their key pals from another class (see ICT.3: Riddle This) about their data collection. They collect data from their key pals or ask them to collect their own. Both classes compare data collected and discuss the similarities. They list the variables that might explain differences (e.g., the nature of the sample, the collection method, the sample size, biases).

- Students invite responses to the website posting of their data collection. They discuss results and variables with respondents.
- Using records of their conversations with parents, grandparents, Elders, and other members of the community (see Mod.1.3b#1: Why Do We Invent?), students fill out BLM Mod.2.5#1: Sample Data-Collection Form. Using BLM Mod.2.2#1: Venn Diagram, students compare inventions of long ago with inventions they use today.

### *SUGGESTIONS FOR ASSESSMENT*

- Check students' BLM Mod.2.5#1: Sample Data-Collection Form to determine whether students have entered data in appropriate categories and whether they have enough data to create a valid double-bar graph.
- Note whether students explain appropriately how they did their survey.
- Check the accuracy of students' double-bar graphs, assessing how they created, labelled, and interpreted them.
- Confer with students to determine whether they make appropriate inferences and draw valid conclusions about the data they collected.

### *CONNECTION TO* INVENTION CONVENTION

- Students become aware of the kinds of inventions they use most in their daily lives at home and at school. This helps them plan for a kind of invention to consider for the Invention Convention.

## BLM Mod.2.5#1: Sample Data-Collection Form

Group Members _____ _____

_____ _____

_____ _____

Use this form to tally the inventions used most in your homes.

| Your Bedroom | |
|---|---|
| **Non-Electrical** | **Electrical** |
| | |

| Bathroom | |
|---|---|
| **Non-Electrical** | **Electrical** |
| | |

| Kitchen/Dining Room | |
|---|---|
| **Non-Electrical** | **Electrical** |
| | |

| Family Room/Living Room | |
|---|---|
| **Non-Electrical** | **Electrical** |
| | |

| Basement/Storage Area | |
|---|---|
| **Non-Electrical** | **Electrical** |
| | |

| Garage (If Applicable) | |
|---|---|
| **Non-Electrical** | **Electrical** |
| | |

# Customer Service Department **Mod.2.6**

***TIME***
120 minutes (2 x 60)

***OVERVIEW***
Students learn to design and conduct a survey. They design a survey to verify the needs and complaints of a selected group of people, which could be satisfied by creating an invention or improving on one (innovation).

***LEARNING OUTCOMES***
Through this learning experience (LE), students will achieve specific learning outcomes (SLOs) in various subject areas. Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified.

**English Language Arts**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- 3.1.2 *Ask Questions* — Formulate relevant questions to focus information needs for an inquiry.
- 3.1.4 *Create and Follow a Plan* — Create and follow a plan to collect and record information within a pre-established time frame.
- 3.3.1 *Organize Information* — Organize information and ideas using a variety of strategies and techniques [such as comparing and contrasting, classifying and sorting according to subtopics, sequences, order of priority or importance...].
- 5.2.1 *Cooperate with Others* — Assist group members to maintain focus and complete tasks; identify and solve group process issues.
- 5.2.2 *Work in Groups* — Select and assume roles to assist in the achievement of group goals; engage in ongoing feedback.

**Mathematics**
Consider the intent of this LE and your choice of instructional and assessment strategies to determine which SLOs students may achieve, in addition to those identified below:
- SP-I.1.6 Formulate questions for possible investigations, given a context, and predict results.
- SP-I.2.6 Identify appropriate data sources: first-hand, second-hand, and combination; select and defend the choice of an appropriate sample or population from which data are collected to answer a question.
- SP-II.1.6 Select and use appropriate methods for collecting data, such as: designing and using structured questionnaires, conducting experiments, making observations, using electronic networks.
- SP-II.2.6 Discuss how collected data are affected by the nature of the sample, the method of collection, the sample size, and biases.
- SP-III.1.6 Analyze sets of data to make comparisons.
- SP-III.2.6 Display data by hand or by computer in a variety of ways, including: histograms, double-bar graphs, stem-and-leaf-plots.
- SP-IV.2.6 Make inferences to generate a conclusion about the data.

## *ICT LITERACY SKILLS AND COMPETENCIES*

Consider the intent of this LE and your choice of instructional and assessment strategies to determine which skills and competencies students may achieve, in addition to those identified below:

- basic operating skills
- communicating electronically
- spreadsheet analysis
- word processing

## *SUGGESTED LEARNING RESOURCES*

### Software

- word processing
- spreadsheet
- email

### Internet

- IMYM Links Database: <http://www.edu.gov.mb.ca/ks4/tech/imym/resources/links.html>

### Print

- Appendix C: Index of Teaching and Learning Strategies and Tools
- Manitoba Education and Training. *Grades 5 to 8 English Language Arts: A Foundation for Implementation.* Winnipeg, MB: Manitoba Education and Training, 1998. (See Questioning, in Strategies That Make a Difference, 30-36.)

### Materials

- magazines

### TBLMs

- TBLM ICT.10#1: Questioning
- TBLM Mod.2.6#1: Steps for Developing a Survey
- TBLM Mod.2.6#2: Variables That May Affect a Telephone Survey

## *SUGGESTIONS FOR INSTRUCTION*

### Preparation and Set-up

- Ask students to bring magazines from home.

### Activating Strategies

- Lead a class discussion.
  - Have students ever been surveyed by telephone solicitors?
  - Have they ever been stopped by a survey taker while shopping with a parent?
  - Can they describe the type of questions being asked in the survey(s)?
- Students scan magazines to find surveys. As a class, examine the survey questions and the choices given for answers.
  - What is the most common form or type of questions found on a survey?
  - Which are the easiest to answer? Why?
- Review contents of TBLM ICT.10#1: Questioning.
- Review and explain the specific contents for surveys, as outlined in TBLM Mod.2.6#1: Steps for Developing a Survey, and give students a copy of the outlined steps.
- Discuss how variables affect data collection (see TBLM Mod.2.6#2: Variables That May Affect a Telephone Survey for an example). As a class, brainstorm for a list of variables

related to a variety of activities such as cleaning (e.g., Who does the cleaning? What needs to be cleaned?), using computers (e.g., Who uses the computer? What use is made of the computer? When is it used?), and so on. Record students' suggestions using a computer and a projection system.

**Acquiring Strategies**

- In collaborative groups, students brainstorm to determine categories of activities and/or things that might elicit complaints from customers (e.g., activities: cleaning, cooking, driving; things: an appliance, a tool, a game).
- Each collaborative group identifies an activity in which customers might participate and/or a problem that customers might experience with the activity. Students discuss and agree on a prediction statement related to the activity/problem (e.g., "I think that if the customers spent less time washing dishes, they would have more time to watch television.").
- Using word processing and following the suggestions outlined in TBLM Mod.2.6#1: Steps for Developing a Survey, students design questions to verify customers' level of satisfaction with an activity or a thing and identify problems that customers might be having, based on the predictions. Students use appropriate neutral language that shows respect and does not lead the respondents. They print a copy of the survey for each group member.

**Applying Strategies**

- Using the survey questions they prepared, students interview a few classmates and family members to test/find out whether the wording of their questionnaire is clear and whether it elicits the kind of the answers they are looking for. In their collaborative groups, students compile comments from the respondents about unclear questions and statements, as well as suggestions for improving/rewording the survey questions.
- Students review the answers provided by respondents, focusing on the most frequent suggestions for survey improvement. They categorize replies, noting areas of high incidence for recommending changes to particular questions or statements.
- Students revise their survey questionnaires and repeat the survey with the more precise questions, and with a larger number of participants, this time collecting actual data in response to the questions.
- Each collaborative group uses a spreadsheet to record collected survey data. Students select an appropriate format to display the data.
- Students discuss and record in their journals variables that may have affected responses (e.g., the nature of the sample, the collection method, the sample size, and biases).
- Students complete an Exit Slip, writing a defence of their choice of sample population for the survey and noting what steps they took to minimize bias.
- Students make inferences to generate a conclusion about the data.

**Variations/Extensions**

- Some students may wish to use a problem identified in the survey and develop an invention or innovation to remedy it.
- As a group, students brainstorm for solutions to the problem they selected.
- Students email their key pals (see ICT.3: Riddle This), querying them with the survey.

***SUGGESTIONS FOR ASSESSMENT***

- Check the accuracy of students' double-bar graphs, assessing how they created, labelled, and interpreted them.
- Note whether students discuss and explain bias and sample size appropriately.
- Assess each group's survey forms for appropriate questions.

- Note whether students formulate appropriate questions and design appropriate questionnaires.
- Read the Exit Slips to determine whether students chose appropriate sample populations and whether they chose appropriate ways to minimize bias.
- Verify that each collaborative group chose appropriate data-display methods.

***CONNECTION TO* INVENTION CONVENTION**

- Becoming aware of customers' dissatisfaction with products or their suggestions of products that would fulfill their needs helps students focus on an invention to increase customer satisfaction or meet customer needs.

## TBLM Mod.2.6#1: Steps for Developing a Survey

1. Include a brief explanation of what you are doing and why you need the information you will be collecting.
   *Example:* I am planning an invention to help people to _____.

2. Include a clear explanation of the format of the questionnaire and how to answer it.
   *Example:* There are _____ questions in this survey.
   They are presented in (explain the format[s]) _____.

3. Ask few questions (four or five). Too many questions could cause respondents to become impatient and give incomplete answers.

4. Ask questions in the affirmative. Avoid the use of "not."
   *Example:* What activities do you like to do on holidays? (Avoid: "not like")

5. Select an appropriate format for questions. Consider one or a combination of the following:

   - Multiple Choice
     *Example:* What appliance do you use most often in your home?
     ____ Television ____ Microwave Oven
     ____ Computer ____ Hair Dryer

   - Open-Ended, Numeric
     *Example:* How many electrical appliances are there in your bedroom? ____

   - Open-Ended, Text
     *Example:* What electrical appliance do you use most often? ____

   - Rating Scale
     *Example:* On a scale of 1 to 5, with 5 being the highest, how would you rate the usefulness of the following appliances?
     ____ Television ____ Microwave Oven
     ____ Computer ____ Hair Dryer

   - Agreement Scale (List in order of "agree" to "disagree.")
     *Example:* How much do you agree with the following statements?

| | Strongly Agree | Agree | Strongly Disagree | Disagree |
|---|---|---|---|---|
| I would prefer to own fewer things so I have less to clean up. | _____ | _____ | _____ | _____ |
| I would like an invention to help me clean up my room. | _____ | _____ | _____ | _____ |

6. List the questions in order from establishing the needs or preferences of respondents to building up to the purpose of the survey, which is how the needs can be fulfilled.

7. Test the questionnaire on a partner. Ask for feedback on whether the questions are clear or how they could be improved.

## TBLM Mod.2.6#2: Variables That May Affect a Telephone Survey

In a telephone survey, the respondent may…

1. be engaged in an activity, such as cooking a meal, and may be distracted while answering questions
2. answer anything to complete the survey as quickly as possible
3. not understand a question that is asked orally (Some people need to read them.)
4. find a multiple-choice format confusing, offering too many choices to remember
5. become tired and quit before answering all questions (Is the survey too long?)
6. lie about his or her age and provide answers that are inconsistent with the assumed age