

What Do I Know?

Mod.1.2

TIME

120 minutes

OVERVIEW

Students discuss what they already know about inventions, innovations, and discoveries. As they discuss the Overview of the *Inventions, Innovations, Discoveries* interdisciplinary unit in which they will participate over the next few weeks, they note questions they wish to have answered and points of interest they wish to pursue.

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:

- 2.1.1 *Prior Knowledge* — Seek connections between previous experiences, prior knowledge, and a variety of texts.
- 3.1.1 *Use Personal Knowledge* — Summarize and focus personal knowledge of a topic to determine information needs.
- 3.1.2 *Ask Questions* — Formulate relevant questions to focus information needs for an inquiry.
- 3.2.1 *Identify Personal and Peer Knowledge* — Recall, record, and organize personal and peer knowledge of a topic for inquiry or research.
- 3.3.2 *Record Information* — Make notes on a topic, combining information from more than one source; reference sources appropriately.
- 3.3.4 *Develop New Understanding* — Relate gathered information to prior knowledge to reach conclusions or develop points of view; establish goals for developing further inquiry or research skills.
- 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.

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
- inquiry using electronic sources

- concept mapping

SUGGESTED LEARNING RESOURCES

Software

- concept mapping

Internet

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

CD-ROM

- electronic encyclopedia

Videos

- video about inventions
- Invention Convention and other videos made by students in the previous year's *Inventions, Innovations, and Discoveries* interdisciplinary unit

Print

- Selected Bibliography
- Appendix C: Index of Teaching and Learning Strategies and Tools
- Manitoba Education and Training. *Success for All Learners: A Handbook on Differentiating Instruction: A Resource for Kindergarten to Senior 4 Schools*. Winnipeg, MB: Manitoba Education and Training, 1996. (See Anticipation Guides, 6.25, 6.98; Exit Slips, 6.60; and KWL, 6.20.)

BLMs

- BLM Mod.1.2#1: Overview of *Inventions, Innovations, and Discoveries*
- BLM Mod.1.2#2: Solving Problems in Group Work

Materials

- magazine and newspaper articles about inventions, innovations, and discoveries

SUGGESTIONS FOR INSTRUCTION

Preparation and Set-up

- Set up collaborative learning groups (see OLE.6: Collaborative Learning).
- Assemble materials from the resources suggested in Selected Bibliography or from school/community libraries.
- Start collecting articles about inventions, innovations, and discoveries from newspapers and magazines several weeks ahead of time and/or ask students to do the same. Brainstorm keywords students might look for in headlines or sections in an issue of a newspaper or magazine to help them identify such articles (e.g., in the Science and Technology section).
- Place Bookmarks or Favourites of appropriate websites on the class computers, or ask students to do so. These can also be placed as links on the class website.
- Prepare an Anticipation Guide for the chosen video, modelled on the Anticipation Guide in *Success for All Learners* (6.98).
- Arrange to have an Elder or community member talk to the whole class or to small groups of students about inventions, innovations, and discoveries.
- Create a PowerPoint presentation to introduce the *Inventions, Innovations, and Discoveries* interdisciplinary unit to the class. (This presentation is also used to activate knowledge in ICT.8: Make Your Point.)

Activating Strategies

- Introduce students to the variety of print and electronic resources assembled for this interdisciplinary unit and explain what they can expect to find. Students browse the resources and bookmarked websites at times set aside for that purpose. They record in their journals (see OLE.8: Reflection Journal) a resource that caught their attention, and explain why.
- Show a movie or an appropriate segment of a movie about inventions. Students use an Anticipation Guide to take notes.
- Students listen to a presentation on inventions, innovations, or discoveries by an Elder or community member. They use an Anticipation Guide to take notes.
- Introduce the *Inventions, Innovations, and Discoveries* interdisciplinary unit in general terms. (It will be explained in more detail later.)
- Take notes as students brainstorm what they think they already know about discoveries, innovations, inventions, and inventors as a whole group. Use a KWL (Know, Want to know, Learned) format on chart paper or record suggestions on the class computer and projection system.

Acquiring Strategies

- Print a copy of the brainstormed list for each of the collaborative groups, or post the KWL chart on the classroom wall.
- Each group organizes the list into categories they establish and name, using concept-mapping software (e.g., inventors, electrical inventions, inventions for kids) (see ICT.6: Inspired).
- As a class, compare the categories that the groups created. Discuss the rationale they used to establish categories, focusing on appropriateness, originality, and effectiveness of the categories.
- Explain how to complete a bibliography. Instruct students to record sources of information throughout this unit in their bibliography.
- Distribute copies of BLM Mod.1.2#1: Overview of *Inventions, Innovations, and Discoveries*, explaining each component. Students place the BLM in their Personal OLE Binder.

Applying Strategies

- Students complete Exit Slips, noting three things they want to find out about inventions, innovations, or discoveries, and two questions they have about this interdisciplinary unit.

SUGGESTIONS FOR ASSESSMENT

- Read students' Exit Slips and note frequently asked questions (FAQs). Answer these in class.
- Students assess their beginning skills at group work using BLM Mod.1.2#2: Solving Problems in Group Work.
- Read students' self-assessment and confer with each group about their group-work observations and the possible impact of their solutions.

CONNECTION TO INVENTION CONVENTION

- Reviewing the overview of the whole interdisciplinary unit leads students through the steps from the beginning to the end. They know what to expect.

BLM Mod.1.2#1: Overview of *Inventions, Innovations, and Discoveries*

Name _____ Date _____

Module 1:
What Does It Mean?
An Introduction to *Inventions, Innovations, and Discoveries*

Learning Experience (LE) Title	LE Overview
Mod.1.1: What on Earth?	Infer and predict the purpose of an unfamiliar object through observation.
Mod.1.2: What Do I Know?	Discuss what you already know about inventions, innovations, and discoveries. Note questions you wish to have answered and points of interest you wish to pursue.
Mod.1.3a: Back to the Future: A Timeline of Discoveries	Explore the concept of "discovery." Prepare a timeline to identify and understand discoveries and place them in a social and historical perspective for Canada and the world. Learn how to create a bibliography. Make an oral presentation about your chosen discovery.
Mod.1.3b: Why Do We Invent?	Explore the concept of "inventions." Through investigation, observe that an invention is the result of trying to meet a need that might make our lives easier or more pleasant. Write a paragraph explaining your choice for "the world's greatest invention."
Mod.1.3c: Then and Now: Advances in Computer Technology	Explore the concept of "innovation." Investigate the invention of the computer, from the first mainframe to the latest wireless palm computer, and note the changes and improvements (innovations) that have been made to that invention over time.

Module 2:
Explain That Again: A Further Investigation

LE Title	LE Overview
Mod.2.1: Extra! Extra! Read All about It!	Listen to or read stories about inventions that have affected your life in one way or another. These stories trace the history of an invention from its inception to its current application. Analyze one story and write a newspaper article publicizing the invention profiled in the story.
Mod.2.2: Biography of an Inventor or a Scientist	Research an inventor or a scientist and write a short biography of this person.
Mod.2.3: Rube Goldberg	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." Invent and draw your own Rube Goldberg machine and write descriptions that model how Rube Goldberg described his "inventions."
Mod.2.4: Chindogu: Useless Inventions	Chindogu is a Japanese word meaning "useless invention." Use communication skills 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	Make a tally of the electrical and non-electrical inventions you use in your own home. Use this list to complete a double-bar graph on a spreadsheet.
Mod.2.6: Customer Service Department	Learn to design and conduct a survey to verify the needs and complaints of a selected group of people, which could be satisfied by creating an invention or by improving on one (innovation).

(continued)

**Module 3:
Explore Electricity: The Backbone of Modern Inventions**

LE Title	LE Overview
Mod.3.1: Static Electricity	Investigate static electricity in common objects. Construct an electroscope to test a variety of objects for static electricity. Write a definition of static electricity using appropriate vocabulary.
Mod.3.2: Current Electricity	Explore current electricity. Through experimentation, learn how simple series and simple parallel circuits work. Write a definition for an electrical circuit.
Mod.3.3: Electrical Circuits	Improve your electrical circuits and discover what changes make a light bulb brighter. Investigate and invent useful electrical circuits, including switches.
Mod.3.4: Electromagnetism	Explore electromagnetism by building an electromagnet. Explore motors and generators by constructing a motor or a generator that can be used to power a simple device you would find useful in your daily life.
Mod.3.5: Awareness of Electrical Energy Consumption	Describe factors that affect the consumption of electrical energy to raise your awareness of energy use. Outline an action plan to reduce energy consumption and promote your plan. Describe ways in which electricity has an impact on your daily life.
Mod.3.6: Safety with Electricity	Design a poster or a web page to promote safety with electricity.

**Module 4:
Invention Convention: The Student As Inventor**

LE Title	LE Overview
Mod.4.1: Design Your Own Invention OR Build a Better . . .	Design and build your own invention, based on a “need” you have identified that could fulfill a specific “want.” OR Improve on a current invention (innovation).
Mod.4.2: Design a Logo/ Business Card	Use graphics software to design you own logo and create a catchphrase to promote your invention. Create a business card that incorporates your logo and catchphrase.
Mod.4.3: Promotion	Review a variety of advertising strategies used to promote products and services. Rotate through learning centres to create a promotional poster, a commercial, a pamphlet, a jingle, and a multimedia presentation or website to promote your invention.
Mod.4.4: Showtime	Plan, promote, set up, and hold an Invention Convention in which you showcase your invention.
Mod. 4.5: Mission Accomplished: A Reflection	Reflect upon the Invention Convention. Note what worked well and what could be improved upon in general for the event. Reflect on your own display, on the feedback you received for your invention, and on the suggestions that were made.

BLM Mod.1.2#2: Solving Problems in Group Work

Group Members _____

1. What problems did your group encounter?

Why?

2. Brainstorm some solutions:

☺ _____

☺ _____

☺ _____

3. For each solution, ask yourself:

- Will it solve the problem?
 - Will people in the group be comfortable with it?
 - Is it fair?
- _____

4. Choose a solution.

5. What help will you need to try your solution?

6. Make a plan and try your solution.

Plan:

7. Did it work? Explain.

8. If not, go back to #4 and try again.

Solving Problems in Group Work: Reproduced from *Grades 5 to 8 English Language Arts: A Foundation for Implementation* (Manitoba Education and Training BLM-35).