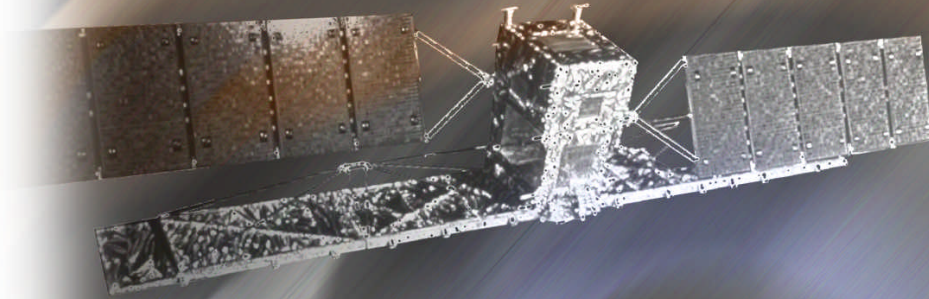


Looking at the Earth's Environment Through the "Eyes" of a Satellite



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Natural Resources
Canada

Ressources naturelles
Canada

Canada Centre for
Remote Sensing

Centre canadien
de télédétection

Canada 



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The Mission

You are an assistant to the Minister of the Environment. You hold a very important position because you are able to advise the Minister about which environmental projects she should focus on.

Combined with the ongoing environmental issues, the world is in a serious state of affairs. There are a number of natural disasters that have just occurred and organizations, from both the developing countries and the industrialized countries are pressuring her for support and money. There is a limited budget.

*You must present a report to the Minister. You must convince her that the environmental situation that **YOU** think is the most serious is the one that gets the money. There is a deadline to meet.*

You must also convince her that the cost of using remote sensing is justified. The Canadian Space Agency recently launched a Canadian earth observation satellite, so she wants to know: will space technology benefit any of the environmental situations?

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In order to accomplish your mission, you must complete 7 phases.

Phase 1. Selecting your environmental issue.

Phase 2. Researching and making brief notes about it.

Phase 3. Understanding remote sensing as a tool for understanding the issue of your choice.

Phase 4. Preparing the report/presentation.

Phase 5. Preparing the short activity for the audience. An example will be provided.

Phase 6. Designing your presentation display with headings, captions, and visuals.

Phase 7. Presenting your report.

Examples are provided for the following components:

Brainstorming

Selection Chart

Glossary

Bibliography

Audience Activity

A variety of environmental issues are represented through these examples.

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Phase 1: Selecting your Topic

A. Browse through several books related to the monitoring or the management of Earth's environment looking for general topics that interest you. A general topic might be floods, deforestation, water resources, pollution, urban growth, hurricanes, climate change, ozone depletion, etc. As you browse, fill in the left hand column of the Selection Chart. It will help you to make a workable choice.

What is 'browsing'?

Browsing through a book means that you look through it quickly. Look at the chapter titles, headings, the pictures, etc. Consider whether the book is too easy? Too detailed? Too difficult?

Reference books or the Internet?

Researching through Internet resources may prove to be valuable or it may prove to be a frustrating experience. It is likely that you will spend an unnecessary amount of time searching for relevant information only to find that the material is meant for adults and is too difficult. The advantage of using library material is that you can show it to your teacher more easily if you need help in understanding a picture or a description.

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What kind of resources can you use to do your research?

- Books from the non-fiction section of your library. When looking at books it is important to use only books that have been recently published.
- Magazines such as Canadian Geographic, National Geographic, National Geographic World, Owl, Equinox etc..
- Atlases, a regular atlas. Remember that there is usually a lot of interesting geographic information in atlases besides the actual maps.
- Encyclopedia.
- The Internet.
- Informational CDs.
- People who are subject matter experts in the various fields of research.

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Here is a list of possible topic choices:

- desertification
- deforestation
 - in rain forest
 - temperate forests
- pollution caused by
 - oil spills
 - industry
 - farming
 - mining
 - city garbage
 - sewage
- climate change
 - global warming
 - greenhouse effect
- disasters
 - hurricanes
 - floods
 - forest fires
 - earthquakes
 - drought
- ozone depletion
- population explosion
- abuse of resources
 - oceans and seas
 - lakes and rivers
 - fresh water supply
 - fish
- reduced biodiversity
 - plants
 - animals
 - birds
 - marine life
 - natural habitats
 - wet land species
 - tropical species
 - temperate species

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B. Fill in the Selection Chart. When you have found a topic that you might be interested in, do a very brief survey of the material that is available to be sure it is a workable topic. You are doing this to make sure that enough material is available to you on your topic of choice. You don't want to spend all your time looking for information that isn't there. Fill in the remaining columns for the topics that interest you. In some cases you may have to write 'none' in a column.

	General topic	What environmental situation or issue do you want to investigate?	What kind of reference material available? Is there adequate material?	Are satellite maps available to cover this situation or issue? Yes/No
1				
2				
3				
4				

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Example of Completed Selection Chart

	General topic	What environmental situation or issue do you want to investigate?	What kind of reference material available? Is there adequate material?	Are satellite maps available to cover this situation or issue? Yes/No
1	Deforestation	Deforestation in tropical areas	Books Posters atlases	Yes
2	Deforestation	Deforestation in temperate climates like Canada	Lots available Newspaper articles	Yes
3	Oceans	Oil Spills	Posters Books	Yes
4	Abuse of Water Resources	Great Lakes	National Geographic Books	Yes

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C. Make your final selection by looking over your Selection Chart. You should base your choice on two things:

- the topic that has the most useful and available resources,
and
- only where there is a relevant satellite image available.

D. Gather your material. Hang on to any material that is useful. Put page markers into books. Use Post-It notes to point to relevant visuals.

You'll need a special place to store the material you are gathering.

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Phase 2: Researching your Topic

A. Browse through the reference material for the topic you have chosen. Look at the chapter headings, the table of contents, and the visuals (the pictures, the charts, the maps). This browsing will help you with the next step.

B. Brainstorm for questions in relation to the environmental issue or situation. **Ask what? Where? Why? Who? When? How?** Parents and/or peers might be able to help you formulate some of these questions.

Example of Brainstorming on the topic of Water Resources

Environmental problem: Abuse of Water Resources

How many ways is water used? For humans? For animals, for plants?

How much of the Earth's water is fresh? Salt water?

How much water does an average person use per day? In wealthy countries? In poor countries?

What is the water cycle?

Where does the water go when it goes down the drain?

Where do cities get their water?

What is acid rain?

How is contaminated water made clean?

Can you take the saltiness out of seawater?

What happens when there is too much water? Or not enough water?

What happens to the environment when there isn't enough clean water?

What happens to humans when there isn't enough clean water?

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C. Organize the questions. Rewrite them under the following main headings. Discard any that are not important. The headings must be:

The Environmental Issue or Situation

Its Causes

Its Effects

The Role of Remote Sensing

Alleviating the Issue or Situation

D. Answering your questions. Use your questions as headings and sub-headings. Answer the questions by making brief notes from your reference material. Be sure to use information from the visuals as well as from the text. "A picture speaks a thousand words."

You should read as many references as possible. It is important to read as widely as your time permits. You are looking for different ways of organizing and describing information. The more you read and the more visuals you study, the more familiar you will become with your topic. Do not take detailed notes. A few brief notes and key words will help you to focus on the important details you will be giving in your final presentation.

E. Collect Visuals. These are the relevant pictures, maps and charts. Be sure you keep track of where you found the visuals in case you need to find them later. For example, note the title of books, the authors and page numbers for your bibliography.

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How do you create a glossary and a bibliography?

The same system works for both a glossary and a bibliography. First, a glossary:

Whenever you take information from a book, write down any **technical word** you come across on an index card or on a special page in your folder. Be sure you have the correct explanation for the words. You can check in the glossary of the text you are reading or in a dictionary. If you still cannot find an explanation that makes sense to you, ask your teacher.

When you are ready to make up your final list of technical words, arrange the index cards in alphabetical order. Then copy the details onto a single page for your presentation.

Glossary Example

Environmental issue: Desertification

Aid Agencies: Organizations that help countries fight poverty, for example by providing equipment, medical supplies, education and emergency food.

Crevice: Cracks in rocks in which small animals can find shelter.

Drought: A long period without rain.

Emergency: A sudden crisis or danger, often to do with floods, drought or other disaster.

Fertilizer: A chemical or animal product added to soil to make it more fertile.

Graze: To feed on grass.

Irrigation: Ways of bringing water to dry areas, such as with wells, pumps or canals.

Nomads: Travelling people who take all their belongings, including animals with them.

Over-grazing: This occurs when too many animals (sheep, goats or cattle) are allowed to feed in one place for too long.

Population density: A measure of how crowded a country is, usually given as the number of people per square kilometre.

Rangelands: Large areas of grassed land, usually used for raising cattle.

Terraces: Sloping land cut into steps to make level areas for growing crops.

Varieties: Different types of a particular plant or crop which have different qualities, for example, the ability to grow in dry conditions or to resist disease.

Yield: The amount of grain or other food a particular crop produces.

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When creating the bibliography, follow the same procedure as for the glossary but use index cards of a different colour. Whenever you take information or pictures from a book, write its title, author, publisher and date on an index card or on a special page in your folder. If you are lucky enough to be able to keep all the books until you have finished your research, you can write on the index cards when the research phase is complete. When you are ready to make up your final list of references, arrange the index cards in alphabetical order, according to the author. Then copy the details onto a single page for your presentation.

Bibliography Example

Environmental situation: Earthquakes

CNN. *Residents flee quake zone as hopes of more survivors dim*. Nov. 15, 1999.
www.cnn.com/world/europe/9911/15/turkey.quake.02/index.html

British Museum, Geological Department Staff. *Earthquakes*. New York: Cambridge University Press, 1986.

Dudman, John. *The San Francisco Earthquake*. New York: Franklin Watts, 1988.

Geological Survey of Canada. *National Earthquake Hazards Program: Western Canada*.
www.pgc.nrcan.gc.ca/seismo/table.htm

House, James & Bradley Steffens. *San Francisco Earthquake*. San Diego: Lucent Books, 1989.

Knapp, Brian. *Earthquake*. Austin Texas: Steck-Vaughn, 1990.

Poynter, Margaret. *Earthquakes: Looking for Answers*. Hillside, New Jersey: Enslow Publishers, 1990.

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Phase 3: Understanding the use of Remote Sensing

A. Look closely at the satellite image. What information does this picture from space convey?

B. Check the technical details of the satellite image. When was it acquired? By which satellite? (This technical information may not always be available. In this case, do the best you can).

C. Obtain a map of the same area as your satellite image. Be sure to relate the satellite image to the country or continent where the features you see in the image are located.

D. Read about remote sensing either by referring to a text or by consulting the web pages “*Watching Over Our Planet from Space*” on the Canada Centre for Remote Sensing’ website. <http://www.ccrs.nrcan.gc.ca/ccrs/eduref/youthkit/edukite.html>

Be ready to explain what remote sensing is and why it is a useful tool in helping us understand the Earth's environment.

E. Consider what your opinion will be. What will you recommend to the Minister? Is the enormous expense of the satellite technology worthwhile?

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Phase 4: Preparing for the report

A. Organize the headings and subheadings so they are in a logical order.

Do not copy information word for word from a book. Be sure you can explain in your own words each point under the headings and sub-headings.

B. Select pictures for as many of the headings as possible. Be sure you can explain all visuals you choose.

C. Bibliography. Organize and write the final details of your bibliography.

D. Glossary. Organize and write the final details of your glossary.



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Phase 5: Prepare the short activity for the audience

It is important to keep this activity short and easy. A multiple-choice questionnaire given orally or a very easy crossword are the preferred activities for this purpose.

Show the rough draft to your teacher.

Audience Activity Example

Environmental Situation: Deforestation

True or False?

1. Deforestation is an environmental situation only in the tropical rain forest regions. T. F.
2. Erosion is one of the most serious side effects caused by deforestation. T. F.
3. Forests are a natural resource. T. F.
4. In Canada , the environmentalists and the foresters always agree on how to use the forests. T. F.
5. The timber from forests is used by humans
 - to build homes T. F.
 - to make furniture T. F.
 - to make glass T. F.
 - to make paper T. F.
 - to provide food T. F.
 - to provide fuel for cooking T. F.
 - to make plastics T. F.
 - to provide special ingredients for medicines T. F.

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Phase 6: Designing the display

Design your display. The display should include:

- a main title
- headings
- sub headings
- visuals - which must have a heading and/or a caption
- don't forget to add your name and the date

Your display must:

- be neat
- have correct spelling
- be organized logically
- have headings and sub-headings that are large enough to be read by your audience

Your teacher has an example of a completed display to show you.

Phase 7: The Presentation

Your report is now ready to be presented to the audience. Remember that the Minister is present in the audience.

Practice for your oral presentation.

You must be able to give your report by explaining each feature of the display. If you are the nervous type, practise a lot. Practice with your parents, older siblings or in front of a mirror. This helps to make you feel more comfortable with the information you are presenting.

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