

Coral Reefs Web Quest

Lesson Overview:

This lesson introduces students to the coral reef ecosystem. Students will learn about its global distribution, characteristics, formation, uses, the factors that threaten its health and the role geographers play in its protection.

Grade Level:

Grade 6 (may be adapted for use in the BC Geography 12 curriculum)

Time Required:

90 - 120 minutes

Curriculum Connection:

British Columbia Social Studies 6 curriculum

Link to Canadian National Geography Standards:**Essential Element #1:** The World in Spatial Terms

- Distribution of major human and physical features at country and global scales

Oceans Scope & Sequence Standard #1: Location of oceanic features**Essential Element #2:** Places and Regions

- Physical and human characteristics of places and regions in Canada and the world

Oceans Scope & Sequence Standard #2: Places and Regions

- Characteristics of near shore habitats (e.g. coral reefs)

Essential Element #3: Physical Systems

- Ecozones – marine/coastal

Oceans Scope & Sequence Standard #3: Physical Systems

- The biological ocean – processes and interactions

Essential Element #4: Human Systems

- Types and patterns of economic activity

Oceans Scope & Sequence Standard #4: Human Systems

- Oceans as providers of goods and services

Essential Element #5: Environment and Society

- Effects of human modification of the physical environment
- Impact of natural and technological hazards/disasters on the human and physical environment

Oceans Scope & Sequence Standard #5: Environment and Society

- Interconnections between atmospheric, land and ocean issues

Oceans Scope & Sequence Standard #6: Uses of Geography

- Environmental Issues

Geographic Skill #1: Asking Geographic Questions

- Identify geographic issues, define geographic problems and pose geographic questions.

Geographic Skill #2: Acquiring Geographic Information

- Use maps to collect and/or compile geographic information.

Geographic Skill #3: Organizing Geographic Information

- Integrate various types of materials to organize geographic information.

Geographic Skill #4: Analyzing Geographic Information

- Interpret information obtained from maps, satellite images and geographic information systems.

Additional Resources, Materials and Equipment Required:

- “Oceans for Life” Scope and Sequence Chart (teacher use)
- “One Earth, One Ocean, One Life” poster on display
- Student worksheet (one per student)
- World map (one per student) may be downloaded from <http://atlas.gc.ca/rasterimages/english/maps/reference/outlineworld/world01.pdf>
- Access to a computer lab and the Internet (one computer per student or student group)
- Access to a colour printer and/or media projector (optional)
- Satellite image of Australia’s Great Barrier Reef downloaded from http://earthobservatory.nasa.gov/Newsroom/NewImages/Images/PIA03401_lrg.jpg

Main Objective:

The primary objective is to emphasize the importance of the coral reef ecosystem to the well-being of the environment and society.

Learning Outcomes:

By the end of the lesson, students will be able to:

- Identify and clarify a problem, issue or inquiry.
- Research information using print, non-print and electronic sources.
- Organize information from a variety of sources into a structured presentation.
- Assess detailed courses of action to address problems or issues.
- Compare individual rights and social responsibilities in various cultures.
- Demonstrate an understanding of global citizenship.
- Interpret and use tables, satellite images, scales, legends and various types of maps.
- Locate and describe major geographic features and selected countries of the world.
- Relate population growth and economic activity to environmental impact.

The Lesson:

	Teacher Activity	Student Activity
Introduction	<p>Distribute all student activity sheets and outline maps.</p> <p>Project the satellite image of Australia's Great Barrier Reef (refer to the Additional Resources section above for the hyperlink). Alternately print off sufficient colour images of the image for one between four students. If neither of the above options is available, students can be directed to the activity "What do you see?" at the beginning of the Student Activity Sheet.</p> <p>Ask students to identify the feature spanning the northeast portion of the image. Once students have identified the feature, ask them to brainstorm in groups all that they know about coral reefs.</p>	<p>Attempt to identify the feature spanning the NE section of the satellite image.</p>
Lesson Development	<p>Instruct students to complete the Guided Research Activities section of the Student Activity Sheet. Circulate during the lessons to answer any queries or clarify instructions.</p>	<p>Follow the instructions to complete the web quest on coral reefs.</p>
Conclusion	<p>Collect the student worksheets at the end of the second lesson.</p>	<p>Hand in the worksheet for assessment.</p>

Lesson Extension:

- Use the "Oceans for Life" Coral Reefs Organizer to assess student learning.
- Assign the following essay topic: "Canada has no coral reefs. How does human activity in Canada impact the world's coral reefs? What positive steps can Canadians take to limit their impact on coral reefs?"

Assessment of Student Learning:

Assess student learning by asking students to complete the organizer in an open-book setting using their completed and corrected activity sheets.

Student Activity Worksheet One Earth, One Ocean, One Life Web Quest

What do you see?

Open Internet Explorer and view the satellite image at
http://earthobservatory.nasa.gov/Newsroom/NewImages/Images/PIA03401_lrg.jpg

Identify the feature that is located in the northeast portion of the satellite image.
Write your answer in the box below.

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Brainstorming Session:

With the members of your group, brainstorm six facts that you know about these features. Write your answers in the organizer below.

Independent Guided Research Activities

Working on your own, follow the guided research instructions to learn more about coral reefs. You will be accessing several different websites to obtain the information you need to successfully complete this worksheet.

What is a Coral Reef?

Click on the link <http://www.coralreef.org/coralreefinfo/about.html> to answer the questions that follow. Refer to the sections “What is a coral reef?” and “What is coral?”

1. What are coral reefs made of?
2. What percentage of marine species is supported by coral reef ecosystems?
3. What is coral composed of?

Where are coral reefs located?

Refer to the Geographic Information System (GIS) map showing the distribution of coral reefs worldwide found at <http://reefgis.reefbase.org/mapper.asp>

On the GIS map, the coral reefs are shown in tan. Click on the box to the left of the word **Bathymetry** in the table of contents found in the left hand pane of the map. Click on **Refresh the Map** – the coral reefs should stand out more clearly.

Using your pencil, sketch in the location of the world's coral reefs onto your blank outline map.

Confirm the location of the coral reefs you have drawn on your map with the map found at the following website:

http://www.coris.noaa.gov/about/what_are/what_are.html

Scroll down the page to find the map.

4. Write a sentence to describe the location of the world's coral reefs.

Return to the GIS map of coral reefs at <http://reefgis.reefbase.org/mapper.asp> and click on the **Zoom In** tool in the right hand margin of the map (magnifying glass with the “+” sign). With the **Zoom In** tool, draw a rectangle around the continent of Australia. Click on the **Measure Distance** tool in the right hand margin of the map (small ruler) and beginning at the northernmost point of the Great Barrier Reef off the north eastern coast of Australia, click and drag the cursor by tracing down the length of the reef to the southern most point. Without releasing the mouse button, look at the total distance in the bottom left margin.

5. What is the approximate length of the Great Barrier Reef? _____ km

Why are coral reefs located where they are?

Go to the following website <http://www.reef.crc.org.au/aboutreef/coral/coral.html> and read paragraphs 3-5 to determine the conditions under which coral reefs form. Complete the table below by **crossing out the wrong information** to leave the correct conditions for coral growth.

6. Corals grow best in:

Salt /fresh water	Nutrient rich/nutrient poor water
Clear/sediment filled water	Warm (18-22°C)/cool (8-12 °C) water
Shallow/deep water	Conditions where algae can/cannot photosynthesize

Types of coral reefs:

Go to the website <http://www.aquarium.gdynia.pl/rafa2.htm> to find information about different types of coral reefs. Draw a simple aerial (as viewed from above) sketch diagram next to the reef name and description to show the structure of each reef type.

Type of reef	Description	Sketch diagram (aerial view)
Fringing	A reef which forms close to the shore	
Barrier	A reef parallel to the coastline separated by a lagoon or channel	
Atoll	A almost circular coral reef enclosing a shallow lagoon	

Why are coral reefs so valuable?

Go to the following three websites:

<http://www.mcsuk.org/marineworld/coral.htm>

http://www.panda.org/about_wwf/what_we_do/marine/what_we_do/coral_reefs/about/why_important.cfm

<http://www.coralreef.org/coralreefinfo/care.html>

7. Use the information contained in these websites to outline the importance of coral reefs to humans and the environment.

The importance of coral reefs to humans	The importance of coral reefs to the environment

Why are coral reefs under threat?

Go to the following websites to learn about threats to coral reefs:

<http://www.coralreef.org/coralreefinfo/threats.html>

http://www.panda.org/about_wwf/what_we_do/marine/what_we_do/coral_reefs/threats/climatechange.cfm

<http://www.solcomhouse.com/coralreef.htm>

8. For each of the following threats to coral reefs, write a simple sentence to explain how the reef is threatened.

- Over-fishing
- Destructive fishing
- Coral mining

- Careless tourism
- Ocean warming/global warming
- Storms/hurricanes
- Water pollution
- Sedimentation
- Coastal development

What can be done to protect coral reefs?

9. Geographers can work together with oceanographers to determine where coral reefs are under threat. We can do much to help protect and preserve coral reefs. Pretend you are on holiday visiting an island with coral reefs. Write a postcard in your own words to a friend outlining two things you are doing to protect coral reefs. Use this website to help you.

<http://www.coralreef.org/coralreefinfo/help.html>

“Oceans for Life” Coral Reefs Organizer

Essential Elements	Question	Answer
The World in Spatial Terms	Where are coral reefs located?	
Places and Regions	Outline the characteristics of coral reefs.	
Physical Systems	List the conditions that favour coral reef formation.	
Human Systems	What do coral reefs provide for humans?	
Environment and Society	Name three human threats to coral ecosystems	
Uses of Geography	With our understanding of fragile coral reef systems, what two things can we do to protect coral reefs?	