



Science Unit: *Marine Critters & Communities*

Lesson 1: *Ocean Exploration*

School Year: 2007/2008
Developed for: L'École Bilingue, Vancouver School District
Developed by: Jean Marcus (scientist), Chantal Bennett and Claire Létourneau (teachers)
Grade level: Presented to grades 2 - 3; appropriate for grades 1 – 6 with age appropriate modifications; Présenté au niveau de la 2e et 3e année; approprié aux niveaux de la 1re à la 6e année en y apportant les modifications nécessaires.
Duration of lesson: 1 hour and 20 minutes
Notes: This lesson was taught in a French immersion school.

Objectives

1. Learn basic ocean facts through hands on activities.
2. Explore how people use the ocean.
3. Discover that many animals and plants live in the ocean.
4. Gain an understanding that marine critters have specific ocean homes.

Background Information

The ocean covers over 70% of the planet and holds 99% of the world's inhabitable "space". Our planet should perhaps be called "Ocean" rather than "Earth"! This lesson aims to provide students with basic ocean facts, such as the vastness of the ocean (surface area and depth), and the unique chemical and physical features of ocean water (salinity and temperature). The lesson will also incorporate an activity which addresses the concept of how marine organisms live in different places (habitats). The habitat concept and the habitat variables (salinity and temperature) introduced in this lesson will be used in subsequent lessons.

Vocabulary

Ocean	The entire body of salt water that covers >70% of the Earth's surface
Marine	Relating to the ocean (e.g. a marine animal is an animal that lives in the ocean)
Freshwater	Water that is not salty
Seawater	Water that is salty; ocean water
Salinity	The amount of salt in water
Depth	The distance of a place beneath the ocean to the surface of the ocean
Temperature	The degree of hotness or coldness (of a place, person)
Coastline / Shoreline	The land along the edge of the ocean
Tide	The regular rising and falling of the ocean each day
Organism	An individual living thing, like an animal or plant
Habitat	The home of an organism



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Materials

* note: all lessons in this unit require a scrap book that each student keeps for the duration of the 6-week curriculum (for pasting in their activity sheets, drawings etc.)

For Activity 1

- Worksheet #1: “Mon outil de recherche”

For Activity 2

- Scrap book*
- Map of the world for each student, cut into puzzle pieces
- Ziploc or sandwich bags for individual puzzles
- Glue
- Worksheet #2

For Activity 3

- 3 small containers for holding water per station (~4 students per station)
- Fresh water
- Salt
- Plastic spoons (1 per student)
- Tape for labeling containers
- 2 organism fact sheets per station
- Worksheet #2

For Activity 4

- Large transparent container (a water jug works well)
- Ice water
- Hot water
- Blue and red food coloring
- Saran wrap
- Worksheet #2

In the Classroom

Introductory Discussion

1. HOOK: brainstorm with students about their knowledge of the ocean. Ask questions like:
 - What does the word ocean mean to you? What is the first word or image you think of when you hear the word ocean?
 - How much of planet Earth is covered by the ocean? Take a guess!
 - How many oceans are there?
 - What does the ocean taste like? Feel like? Look like?
 - How deep do you think the ocean is? Is it deeper than Mt. Everest is tall?
 - Do you or your friends or family use the ocean? If so, how?
 - What types of animals and plants do you think live in the ocean?
 - Do you think there are more types of animals and plants living in the ocean or living on land?
2. OTHER ITEMS TO REVIEW:
 - Explain the size and vastness of the ocean using a map, but don't give away the answer, as they will discover this for themselves in Activity #2.
 - Explain the depth of the ocean in terms the students can relate to and explain the different depth zones using a visual aid.



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- Explain that most of the diversity of life on Earth is found in the oceans – many plants and animals live in the ocean or along the edge of land where it meets the ocean
3. BRIEF DESCRIPTION OF SCIENCE ACTIVITIES:
 - Four activities: (1) work sheet exploring the concept of the ocean; (2) puzzle of the world to see that 70% of our planet is covered by the ocean; (3) ocean salinity and habitat activity; and (4) demonstration of temperature stratification in the ocean.
 4. BRIEF DESCRIPTION OF SCIENCE PROCESS
 - Prediction and observation.
 5. SAFETY GUIDELINES.
 - No specific guidelines.

Science Activity/Experiment

Activity 1: Worksheet exploring the concept of the ocean

After the introductory talk and class discussion brainstorming about the ocean, students fill out Worksheet #1 entitled “My research tool” (Mon outil de recherche) with ocean as the central term. The central term is surrounded by 4 boxes, labeled: 1) What is it?; 2) What can you do there?; 3) Do you find plants or animals there? Which ones?; and 4) Create a picture that represents the place. Students draw and write terms they associate with each category.

Activity 2: Ocean Planet Puzzle

Purpose of Activity: To have students ponder how large the ocean is.

Activity Prediction & Observations: Before assembling the puzzle, students guess what % of the Earth is covered by ocean. Students then assemble the puzzle and after it is completed, they count how many pieces contain “ocean” to estimate the % of the Earth’s surface covered by seawater. Their prediction is tested by comparing their initial guess to the answer given by the puzzle.

Methods and Instructions:

Set-up prior to activity:

- a) Find a simple map of the world with the ocean as blue and land as green.
- b) Each student gets one puzzle. Cut the maps into 10 pieces, so that each piece is mostly covered in blue or green (i.e. easy for the student to decide if it is ‘ocean’ or ‘land’).
- c) Bag puzzles individually for students.
- d) Hand out Worksheet #2 so they can make their prediction before completing the activity.

In-class instructions:

- e) Before assembling the puzzle, each student guesses how much of the world is covered by ocean, they write their guess on Worksheet #2.
- f) Each student assembles the puzzle and counts the pieces covered by blue (ocean) and green (land). They fill in their answer on Worksheet #2.
- g) After each student completes the activity, have a short class discussion on the size of the ocean.

Activity 3: Ocean salinity and habitat activity

Purpose of Activity: To have students discover different water salinities and associate this range with habitat preferences of different animals and plants.

Methods and Instructions:

Set-up prior to activity: For each station (4 students per station) prepare:

- a) Three containers with: (1) fresh water, (2) mildly salty water, and (3) very salty water. Label the 3 containers randomly (A, B, C) and record which letter corresponds to which water mixture.
- b) Two organism fact sheets, one for animals and one for plants. The fact sheets list 3 organisms with a picture of the animal or plant and a short description of where it lives, giving clues to its salinity preferences. Choose 3 organisms that have salinity preferences that correspond to the water in the 3 containers. For example, for the animals you could use: (1) River Otter is a aquatic



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mammal that lives in rivers and lakes, (2) Sea star is a animal shaped like a star that always lives in the ocean, and (3) Shore crab is an animals that lives on the edge of the ocean and where it is exposed to both fresh and salt water.

- c) In-class instructions:
- d) Instruct students to taste the water in the 3 containers. They decide as a group which container contains freshwater, mildly salty water and very salty water. They write their decision on Worksheet #2.
- e) Students then read about the 3 animals and 3 plants and match the organisms to the appropriate water habitat on Worksheet #2.
- f) After all groups complete the activity, have a short discussion on habitat preferences of different plants and animals.

Activity 4: Temperature and depth demonstration

Purpose of Activity: To have students discover how temperature changes with ocean depth.

Demonstration: Explain to students what you are going to do (see Methods below). Ask students to predict what will happen when you add the warm water. Also ask students if they think temperature varies with depth in the ocean and why.

Prediction or Hypothesis: Before doing the demonstration, students will color and label the drawing of a cut-away of the ocean (Worksheet #2) and guess what ocean depth zones will be warm, tepid and cold.

Methods and Instructions:

- a) Fill a large container half-full with ice water. Add a few drops of blue food coloring.
- b) Place a piece of saran wrap on top of the cold, blue water.
- c) Mix a few drops of red food coloring into hot water. Gently pour the red hot water on top of the cold layer.
- d) Pull out the saran wrap. The cold and hot water layers should stay separated.
- e) Have the students observe the layers throughout the day. As the layers reach the same temperature, they will mix.
- f) End with a class discussion that temperature is another aspect (along with salinity) of aquatic habitats that determine where animals and plants live.

Closure Discussion

Discussions are incorporated after each activity. For a final discussion, explain that next week we will use what we learnt this week (salinity, temperature and idea of habitats) to begin making our mural of the BC Rocky Shoreline.

References

1. Argentino et al. 2006. À la découverte de notre monde. Guide pédagogique. Rand McNally Canada Inc. Fiche #6 – Mon Outil de Recherche.
2. Bosak, S. 1991. Science Is...A source book of fascinating facts, projects and activities. Liquid Layers, p.57. (Activity # 4 is a modified version of Liquid Layers).

Name: _____ Date: _____

Ocean Exploration – Worksheet 1

Theme: OCEAN

<p>What is it?</p>	<p>Do you find plants in the ocean? Which ones?</p> <p>Do you find animals in the ocean? Which ones?</p>
<p>What can you do in the ocean?</p>	<p>Draw a picture that represents the ocean to you.</p>

Nom: _____

Date: _____

Mon outil de recherche

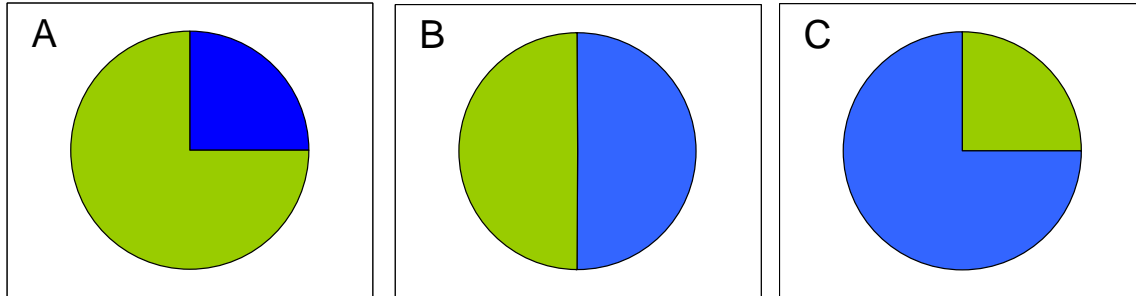
<p>Qu'est-ce que c'est?</p>	<p>Est-ce qu'on trouve des plantes à cet endroit-là? Lesquelles?</p> <p>Est-ce qu'on trouve des animaux à cet endroit-là? Lesquels?</p>
<p>Qu'est-ce que tu pourrais faire à cet endroit-là?</p>	<p>Fais un dessin qui te représente à cet endroit-là.</p>

Ocean Exploration - Worksheet 2

Sea Size: How BIG Is The Ocean?

1. Circle your guess! Do you think there is:

- A) More land than ocean
- B) The same amount of land and ocean
- C) More ocean than land



2. Count your ocean puzzle pieces and fill in the blanks!

- There are _____ total pieces.
- There are _____ green (land) pieces.
- There are _____ blue (ocean) pieces.

The answer is _____. There is _____ ocean than land on our planet.

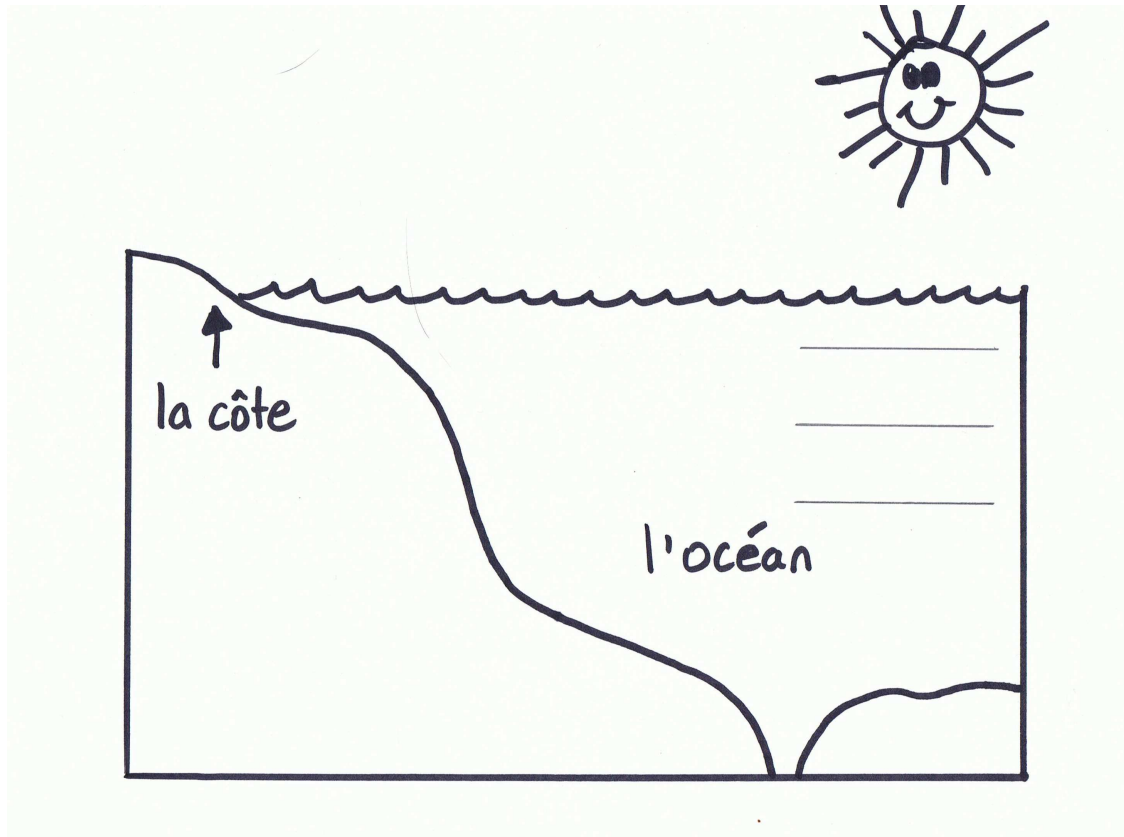
Sea Salt: Match your animals and plants to the right watery habitat!

Taste the water in the 3 containers (A, B and C) and fill in your guess in the table. Match your 3 plants and 3 animals to their water habitat.

Animals	Make your guess! A, B or C	Plants
Sea star	Not salty (fresh water)	Kelp
River otter	A little salty	Sea asparagus
Shore crab	Very salty	Douglas fir tree

Ocean Depth and Temperature

What temperature (warm, tepid, cold) do you think matches the 3 different depth zones in the picture? Fill in your guess on the lines!



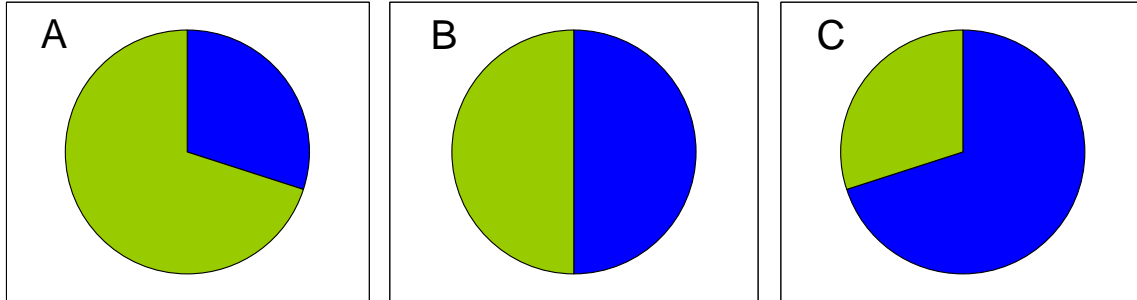
Nom: _____

Exploration de l'océan – feuille d'activité #2

Devine quelle est la grandeur de l'océan

1. Encerle ta réponse.

- A) Plus de terre que d'océan
- B) Terre et océan sont égales
- C) Plus d'océan que de terre



2. Compte les pièces de ton casse-tête.

- Il y a _____ pièces en tout.
- Il y a _____ pièces vertes (terre).
- Il y a _____ pièces bleues (océan).

La réponse est _____. Il y a _____ d'océan que de terre sur notre planète.

Sel marin: Choisis le meilleur habitat aquatique

Goûte l'eau dans les 3 contenants, A, B et C. Devine quelle eau ces 3 plantes et ces 3 animaux aiment le mieux. Ecris la lettre à côté du nom.

Animaux	Devine! A, B or C	Plantes
L'étoile de mer	eau pas salé =	Le varech
Loutre de rivière	eau un peu salé =	Asperge de mer
Crabe de rivage	eau très salé =	Sapin Douglas

Profondeur et température de l'océan

Ecris les températures de l'eau **chaud – tiède – froid** sur les lignes du dessin.

Plus l'eau est profonde plus l'eau est _____.

