

Grade 8 Science

Unit 1: Water Systems on Earth

At the end of this unit students will be expected to:

1. Describe major interactions among the **hydrosphere, lithosphere** and **atmosphere**.
2. Define **water cycle**.
3. Label a diagram of the water cycle.
4. Distinguish between ocean water and fresh water based upon the following factors:
 - **Salinity**
 - **Density**
 - **Freezing point**
5. Identify sources of fresh water. Include:
 - **Drainage basins**
 - **Ground water**
 - **Glaciers**
6. Describe how long periods of **global warming** effect glaciers and describe the consequent effects on the environment.
7. Identify when the last **Ice Age** began and ended and what parts of North America were covered in ice.
8. Describe processes that lead to the development of ocean basins and continental drainage systems. Include:
 - **Volcanic action**
 - **Continental drift**
 - **Erosion**
 - **Glaciations**
9. Investigate technologies that have assisted scientists to research ocean basins. Include:
 - **Sonar**
 - **Satellites**
 - **Core sampling**
 - **Underwater photography/ videography**
 - **Deep sea submersibles**
 - **Diving**
10. Provide examples of how technologies, used to investigate the ocean floor, have improved over time.
11. Identify some strengths and weaknesses of technologies used to investigate the ocean floor.
12. Recognize that no single data collection method provides a complete picture of the ocean floor.

13. Using a diagram, illustrate a typical continental margin from coastal shoreline to mid-ocean ridge. Include:
- **Continental shelf**
 - **Continental slope**
 - **Abyssal plain**
 - **Mid-ocean ridge**
14. Provide examples of public and private Canadian institutions that support scientific and technological research involving the oceans. Include:
- Environment Canada
 - Federal Fisheries
 - Ocean Sciences Centre
 - Centre for Cold Ocean Research (C-Core at MUN)
15. Describe the interactions of the ocean currents, winds, and regional climates.
16. Define **ocean current**.
17. Identify the two types of ocean currents. Include surface and deep water.
18. Identify and explain how temperature differences create deep water currents.
19. Identify wind action as a cause of surface currents.
20. Identify and explain how other factors influence the formation and movement of ocean currents. Include:
- Salinity
 - Earth's spin (**Coriolis Effect**)
 - Shape of continents
 - Temperature
21. Identify local ocean currents. Include:
- Labrador Current (cold)
 - Gulf Stream (warm)
22. Identify **upwellings** as a mechanism for producing nutrient-rich water.
23. Carry out procedures in order to investigate how salinity differences cause deep water currents.
24. Explain how waves and tides are generated.
25. Define **wave**.
26. Identify that waves on the surface of water are the result of a transfer of energy from moving air to the water.

27. Define and illustrate the following wave features:

- **Wave length**
- **Wave height**
- **Crest**
- **Trough**

28. Distinguish between ocean waves, **swells** and **breakers**.

29. Recognize that as waves approach a shoreline the wave length decreases and the wave height increases.

30. Define **tsunami**.

31. Define **tide**.

32. Explain and illustrate how tides are generated by the gravitational pull of the moon.

33. Define **tidal range**.

34. Distinguish between **spring tides** and **neap tides**.

35. Describe the processes of **erosion** and **deposition** in relation to the interaction of waves and tides with shorelines.

36. Identify that wave and tide interactions with shorelines depend on:

- The shape of the shoreline
- Slope of the shoreline
- Type of rock material
- Wave energy

37. Define **headlands** and **bays**.

38. Explain how waves affect headlands and bays differently.

39. Recognize that shoreline slope and rock type determine the type of interaction between waves and shorelines.

40. Research information, from various print and electronic sources, on the processes of erosion and deposition that result from wave action and water flow. Include:

- **Beaches**
- **Shoal**
- **Sand bars**
- **Sea caves**
- **Sea arches**
- **Sea stacks**

41. Provide examples of various technologies designed to contain damage due to waves and tides.

42. Describe the interactions of the ocean currents, winds and regional climate.

43. Define **heat capacity**.

44. Describe how the heat capacity of water relates to climate.
45. Describe how **convection** affects weather.
46. Describe how oceans moderate climate.
47. Distinguish between the effects of **El Niño** and **La Niña** as global climate influences. (cause, effects and results)
48. Recognize how Newfoundland and Labrador's close proximity to the Labrador Current and the Gulf Stream affect our climate. Include:
 - Frequency of fog
 - Temperature fluctuations within short time frames
49. Analyze factors that affect productivity and species distribution in freshwater and marine environments.
50. Interpret patterns and trends in data and infer and explain relationships among the variables.
51. Identify the effects of abiotic factors on plant and animal distributions in marine and freshwater ecosystems. Include:
 - Temperature
 - **Dissolved oxygen**
 - **Phosphates**
 - **pH**
 - **Turbidity**
 - **Pollution**
 - **Upwelling (marine)**
 - Salinity (marine)
 - Ocean Currents (marine)
52. Prepare a report or presentation on the effect of abiotic factors on the distribution of species in freshwater and marine environments and evaluate individual and group processes used in planning and completing the task.
53. Predict and interpret trends in populations of a marine species from graphical data by interpolating and extrapolating data.
54. Describe some positive and negative effects of marine technologies on ocean species.
55. Discuss how new technologies have contributed to overfishing.
56. Discuss how the offshore oil industry impacts marine environments.
57. Discuss potential impacts **aquaculture** technologies have on marine environments.
58. Recognize that problems related to the oceans cannot be completely resolved using scientific and technological knowledge.