

Reading Check Answers, p. 43

1. A basin is a low spot in the Earth's surface.
 2. Scientists believe Earth's water came from ice in comets that struck the Earth. 
 3. In plate tectonics, pieces of Earth's surface, called plates, float over molten rock called magma.
 4. ocean ridge—When two tectonic plates move apart, magma pushes up through the gap and cools, forming an undersea mountain ridge. 
- trench—When an ocean plate collides with a continental plate, the ocean plate is forced underneath, forming a trench.
- abyssal plain—The wide, flat areas covered in

sediment are abyssal plains.

Reading Check Answers, p. 47

1. A continental margin is made of a continental shelf and a continental slope.

2. In sonar mapping, a ship sends sound waves to the ocean floor. Then, the time it takes the sound to reflect back is measured and the water depth is calculated.

3. In satellite mapping, large areas of the ocean can be surveyed in a short time.

4. Manned submersibles carry people down into the ocean. Remote-controlled submersibles can go down much deeper, but do not carry people. They can carry cameras and video equipment, and they are controlled by someone at the surface.

Section 2.1 Assessment, p. 51

Check Your Understanding Answers

Checking Concepts

1. (a) Earth's five major oceans are the Pacific, Atlantic, Indian, Southern, and Arctic.

(b) The Pacific Ocean is the largest and the Arctic Ocean is the smallest.

2. The water that formed the oceans came from the ice in comets that struck the Earth and from water vapour thrown into the atmosphere during volcanic eruptions.

3. The wide flat areas of ocean basins are called abyssal plains.

4. Ocean ridges are the places on the ocean floor where two tectonic plates are moving apart.

5. A trench is formed where one tectonic plate is forced underneath another on the ocean floor.

6. The steep side of the edge of a continent is called the continental slope.

Reading Check Answers, p. 56

1. An ocean current is a large amount of ocean water moving in a particular and unchanging direction.

2. Three factors that produce ocean surface currents are wind, the rotation of the Earth, and the shapes of the continents.

3. Ocean currents are directly related to the prevailing winds.

4. The spin of the Earth causes currents to curve

clockwise in the northern hemisphere and counterclockwise in the southern hemisphere. This is called the Coriolis effect.

5. Continents deflect east-west currents either to the north or to the south.

Reading Check Answers, p. 59

1. Density currents are sinking masses of cold water that flow downward and move along the ocean floor.

2. Students' sketches should show the mixed layer as relatively narrow, the thermocline as thicker than the mixed layer, and then deep water down to the ocean floor.

3. Fresh water can enter the ocean in several ways. Students should list two of these sources: from a river, from glacial melting, and from

precipitation.

4. Upwelling is a vertical movement of water from the ocean floor to the surface.

5. Upwelling brings nutrients from the ocean floor to the surface, helping plant life to grow, and attracting fish.

Section 2.2 Assessment, p. 63

Check Your Understanding Answers

Checking Concepts

1. The three main causes of an ocean's surface currents are wind action, Earth's rotation, and the shape of the continents.

2. (a) North of the equator, winds and currents will be deflected clockwise.

(b) South of the equator, winds and currents will be deflected counter-clockwise.

3. The thermocline is the layer of ocean water 200 m to 1000 m below the surface where the water temperature declines rapidly.

4. When cold, dense ocean water meets warmer less dense ocean water, the mixing of the two currents creates heavy fog.

5. Upwelling can occur when strong offshore winds push surface water away from the shore, and cold deep water rushes up to replace it, such as on the Grand Banks.

Section 2.2 Assessment, p. 63

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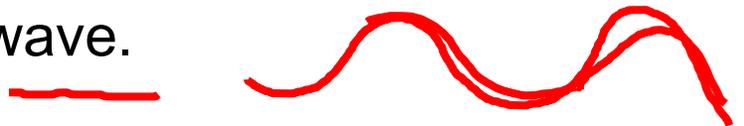
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Reading Check Answers, p. 69

1. A swell is a smooth wave.



2. As a wave approaches the shore, its wavelength decreases and its height increases. It collapses on shore as a breaker.

3. A tsunami is caused by earthquakes, volcanic eruptions, or landslides on the ocean floor.

4. Shoreline erosion can be from longshore currents running along the shore and taking away sediment and sand, waves wearing away at rocks on the shore, and the action of seawater

on minerals in rocks, eroding them by chemical action.

5. Waves erode a shoreline unevenly creating bays in the areas where the rocks erode more quickly and also creating headlands in between the bays.

Reading Check Answers, p. 71

1. Spring tides occur when Earth, the Moon, and the Sun are in line. Neap tides occur when the Sun and the Moon are at right angles to each other. Spring tides have a higher than average tidal range. Neap tides have a lower than average tidal range.

2. A tidal range is the difference in level between a high tide and a low tide.

3. Tidal action is the result of the Moon's gravitational pull on Earth.

4. A shoreline with a narrow V-shaped bay will have higher tides than a bay that is wider and has a larger mouth.

Section 2.3 Assessment, p. 77

Check Your Understanding Answers

Checking Concepts

1. Sea stacks can be formed from eroded headlands or when a sea arch collapses.

2. Shorelines are in a constant state of change from waves that erode and redeposit sediments.

3. The cycle of tidal movement is linked to the motion of the Moon. The Moon's motion is a predictable cycle.

4. A tidal bore is a wave produced when a rising tide enters a long V-shaped bay, such as the bay of Fundy. A tsunami is caused by activity at the ocean floor, such as an earthquake. It has nothing to do with tides.

5. Tsunamis strike land at up to 800 km/h and have a wavelength of up to 150 km. The size and speed of the wave means the destructive force is spread over a large area.

6. Tidal ranges vary in different areas due to the shape of the shoreline. A V-shaped bay will have a larger tidal range than an open shoreline will.

7. The tidal range for Corner Brook is
 $1.45 \text{ m} - 0.58 \text{ m} = 0.87 \text{ m}$.

Understanding Key Ideas

8. Ocean waves are similar to other kinds of waves in that they have height, wavelength, and speed of motion.

9.

concentrates concentrates

headland spreads out

bay

wave energy

Headlands extend farther out into the ocean than other parts of the shoreline, so they

receive the main force of the waves.

Time Required

- 90–100 min
- 10–20 min for brainstorming
- 40 min for research
- 40 min to prepare the presentation or poster

Science Background

Students may investigate the vulnerability of Placentia to flooding, aggravated by recent urban

development, and the shoreline defences constructed

by the Department of Municipal Affairs; the coastal

protection measures implemented in the flood-prone

Burin Peninsula (or the 1929 tsunami in the Grand

Banks that caused the loss of 28 lives on the Burin

Peninsula); the frequent washouts on the highway across the mouth of Holyrood Pond, and the gravel ridge and sea wall that have been constructed there; or other similar events and technologies.

Activity Notes

- To make the most efficient use of resources, you may wish to have students work with a partner or in small groups for this activity.
- If you plan to assess students' work in this activity, discuss your assessment criteria with them beforehand.
- Remind students that they must record their source material and that they must rewrite their research material for their presentation or poster

in their own words. If your school has a policy on plagiarism, you may wish to take this opportunity to review it with the class.

Supporting Diverse Student Needs

- Cooperative group work helps develop interpersonal and verbal-linguistic intelligence. Meet with groups to approve plans for their displays, and to ensure that all group members will have a chance to contribute in a meaningful way. Students who wish to customize their presentations or posters in What to Do point 4 with music, poetry, or other creative features should be encouraged to do so as long as the requirements of the question are also

included.

- For enrichment, have students create a presentation or poster of technologies that might help to prevent the damaging effects of these events (in What to Do point 3) as well and share their research with the class.

Using the Feature

www Science: Wave-Weathered Wonders, p. 76

This feature provides an excellent opportunity for

students to share their own experiences with waveweathered

wonders of Newfoundland and Labrador.

Water Systems on Earth 2 • MHR TR 1-Chapter Review Answers

Checking Concepts

1. The ocean floor is not flat because tectonic plates cause ocean ridges and trenches in the ocean floor.

2. Three factors that affect ocean surface currents

are wind action, Earth's rotation (the Coriolis effect), and the shape of the continents.

3. Winds form as a result of masses of air moving

rapidly from one area to another due to uneven heating of Earth's surface.

4. Ocean waves form when winds blow across the surface of the water.

5. Some people who make their living from the sea need to know when there would be a low tide so they can gather the exposed shellfish that would normally be underwater.

6. As the trough of the wave reaches the shore, it is slowed down by friction, but the crest continues. The crest "outruns" the trough and topples forward or "breaks." 7. The limestone shoreline will change more quickly than the granite one because limestone

is a softer rock and will erode more quickly.

8. Ocean trenches are found on the sea floor where two tectonic plates have collided and one has been forced underneath the other.