modified

Science Eight

Unit Five:

Fresh & Salt Water Systems

Name:

Date Received:

Date In:

Unit E: Freshwater and Saltwater Systems

Outcome #1- Describe the distribution and characteristics of water in local and global environments, and identify the significance of water supply and quality to the needs of humans and other living things

Essential Outcomes (Ideas I must understand)	My Understanding
• describe, in general terms, the distribution of water in Alberta, Canada and the world; and interpret information about water characteristics *(e.g., identify glaciers, snow, polar icecaps, ground water and oceans as components of Earth's water; interpret graphical information on the availability of potable water)*	1 2 3 4
• recognize that fresh water and salt water contain varying amounts of dissolved materials, particulates and biological components; and interpret information on these component materials	1 2 3 4
• identify major factors used in determining if water is potable, and describe and demonstrate tests of water quality *(e.g., investigate and describe the physical characteristics of a sample of water, such as clarity, salinity and hardness; investigate biological tests)*	1 2 3 4
• describe, in general terms, methods for generating fresh water from salt water, based on evaporation, distillation and reverse osmosis	1 2 3 4

Outcome #2- Investigate and interpret linkages among landforms, water and climate

Essential Outcomes (Ideas I must understand)	My Understanding
• describe the processes of erosion and deposition resulting from wave action and water flow, by: – identifying dissolved solids and sediment loads, and identifying sources and endpoints for these materials – investigating wave and their interactions with the shore	1 2 3 4
• investigate and describe stream characteristics *(e.g., describe the slope, flow rate and stream profile characteristics of a model stream on a stream table)*	1 2 3 4
• describe processes leading to the development of ocean basins and continental drainage systems *(e.g., describe the formation of geological features on the ocean floor, such as continental shelves and trenches)*	1 2 3 4
• identify evidence of glacial action, and analyze factors affecting the growth and attrition of glaciers and polar icecaps *(e.g., identify factors that affect the size of polar ice sheets and the Columbia Icefield)*	1 2 3 4
• describe the movement of ocean currents and its impact on regional climates (*e.g., effects of the Gulf Stream, Labrador Current, El Niño, La Niña*)	

Outcome #3- Analyze factors affecting productivity and species distribution in marine and freshwater environments

Essential Outcomes (Ideas I must understand)	My Understanding
• investigate life forms found in fresh water and salt water, and identify and interpret examples of adaptations to these environments *(e.g., describe and interpret examples of fish and invertebrate species found in a local freshwater environment)*	1 2 3 4
• analyze factors that contribute to the development of adaptations in species found in saltwater and freshwater environments	1 2 3 4
• investigate and interpret examples of seasonal, short-term and long-term change in populations of living things found in aquatic environments *(e.g., algal blooms, changes in local freshwater fish populations, cod and salmon stock depletion)*	1 2 3 4
• analyze relationships between water quality and living things, and infer the quality of water based on the diversity of life supported by it	

Outcome #4- Analyze human impacts on aquatic systems; and identify the roles of science and technology in addressing related questions, problems and issues

Essential Outcomes (Ideas I must understand)	My Understanding
• analyze human water uses, and identify the nature and scope of impacts resulting from different uses *(e.g., identify pollutants in ground water and surface water systems resulting from domestic and industrial use; analyze the effects of agriculture and forestry practices on stream flow and water quality)*	1 2 3 4
• identify current practices and technologies that affect water quality, evaluate environmental costs and benefits, and identify and evaluate alternatives *(e.g., research and analyze alternatives for ensuring safe supplies of potable water; research, analyze and debate alternatives for a specific water quality issue, such as the location and design of a landfill, the protection of a natural waterway, the use of secondary and tertiary wastewater treatment, the salinization of soils due to irrigation, the eutrophication of ponds and streams due to excess use of phosphates in fertilizers and detergents, or a proposal to export water resources)*	1 2 3 4
• illustrate the role of scientific research in monitoring environments and supporting development of appropriate environmental technologies *(e.g., describe a local example of aquatic monitoring, and describe how this research contributes to watershed management)*	1 2 3 4
• provide examples of problems that cannot be solved using scientific and technological knowledge alone *(e.g., the need to prevent pollutants from entering aquatic environments, the need to avoid damage from ice sheets and icebergs)*	

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Science Eight
Water Systems
Task #1

1. Contrast between salt & fresh water:

2. Carry out "How do we use water?" on page 367 of your text.
   Complete the procedure #1-3
   Complete the questions #1-2 including the extension
   Answer these questions below

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3. What is the "water cycle"?

4. Draw a diagram that represents the water cycle. Label the diagram as best you can.

5. There are 4 main processes in the water cycle. Describe how each of them take place.

6. When you consider the water cycle diagram that you drew above. Explain why pollution is NEVER an isolated problem?

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7. Research near the town of Banff has provided some surprising results. Tests of the glaciers have reveled high levels of pollution. This was surprising since there are no "major" polluting contributors in the area. Using your understanding of the water cycle, account for this pollution.

8. Provide some other examples of how pollution can enter the water cycle.

9. What are some steps we could take to try and stop pollution from moving through the water cycle?

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Science Eight
Water Systems
Task #2

1. Contrast between a Lake and a Pond:

2. How does erosion change the clarity of water?

3. How does fast flowing water increase the "life" found in a water system? (Read page 391)

4. Define "Watershed".

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5. When large amounts of precipitation fall on an area of land, explain why "run-off" increases.

6. What role do the Rocky Mountains play in regards to water flow in North America? (Use the term *Continental Divide*)

7. Draw an example of a river, and locate the "headwaters" and "outflow" on your diagram.

8. What is the general direction that water flows in Alberta? (Page 393)

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9. What is erosion?

10. List some environmental factors that determine the rate of erosion?

11. Consider an area of forest where logging has occurred. How will this drastic loss of trees change the rate of erosion?

12. What is deposition?

13. Can you explain why "land" is often created at the mouth of a river?

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TOPICS 1-2

VOCABULARY CHECK

BLM 5-5

Vocabulary Matching

Goal • Review your understanding of terms in Topics 1- 2.

What to Do

Match each description in column A with the correct term in column B. Place the letter for the term on the line beside the description.

A	B
___ 1. process in which water is changed to water vapour	(a) salt water
___ 2. large crack in the surface of a glacier ice	(b) fresh water
___ 3. water that flows out of a glacier	(c) evaporation
___ 4. glacier ice that covers a large area of flat land	(d) drainage
___ 5. pointed ridge left by glaciers eroding rocks in two directions	(e) condensation
___ 6. large area of accumulated snow that is compacted into ice	(f) precipitation
___ 7. type of water found in oceans and seas	(g) meltwater
___ 8. process by which water returns over the land to the ocean	(h) glacier
___ 9. ridge of accumulated rock, gravel, and sand left by a glacier	(i) iceberg
___ 10. glacier ice covering a highland area	(j) striations
___ 11. process in which water vapour becomes water	(k) cirque
___ 12. type of water found in lakes, rivers, and streams	(l) arête
___ 13. process in which water in the atmosphere returns to Earth	(m)moraine
___ 14. scars left on rocks by glaciers scraping across the surface	(n) ice field
___ 15. bowl shape left in the side of a mountain by a glacier	(o) icecap
	(p) crevasse
	(q) calve

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BLM 5-6

TOPIC 1–2 ASSESSMENT

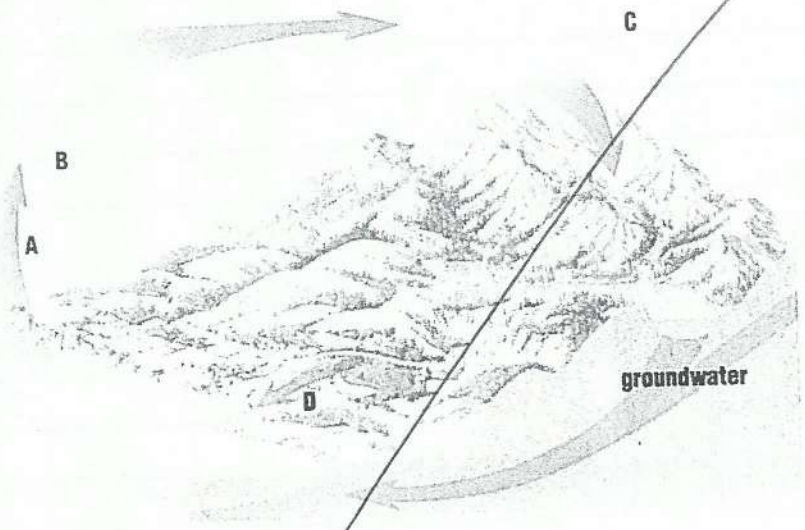
Topics 1–2 Test

Goal • Check your understanding of concepts in Topics 1–2.

What to Do

Answer the following questions in the space provided.

1.



(a) The diagram above represents _____

(b) Provide the correct term for each process represented by the letter in the diagram.

A _____

B _____

C _____

D _____

2. Is water gaining or losing energy in each process below?

(a) ice melting _____

(b) rain evaporating _____

(c) steam condensing _____

(d) snow falling _____

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TOPIC 1–2 ASSESSMENT

Topics 1–2 Test (continued)

BLM 5-6

3. Rank the following forms of water from most common (1) to least common (4) on Earth.

_____ (a) ground water

_____ (b) rivers and lakes

_____ (c) glaciers

_____ (d) oceans and seas

4. Which type of ice (continental glacier, ice pack, or ice field) is found in each location below?

(a) Greenland _____

(b) Antarctica _____

(c) Canadian Arctic _____

(d) Rocky Mountains _____

5. Name and describe three types of glacier deposition.

_____

_____

_____

_____

_____

_____

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Science Eight
Water Systems
Task #3

1. Define the following terms:

   - Permeable

   - Impermeable

   - Aquifer

   - Water Table

2. List some concerns that arise when there are too many water wells constructed in one area:

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3. Draw a diagram (like 5.46 on page 403) that shows the following components: (Aquifer, water table, permeable material, and impermeable material)

4. Consider the following statement:
"A watershed reflects the health of the surrounding ecosystem."

Do you agree or disagree with this statement? Explain your answer.

5. Rainwater in southern Alberta can end up in the Gulf of Mexico. How is this possible?

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BLM 5-7

TOPIC 3
REINFORCEMENT

Watersheds

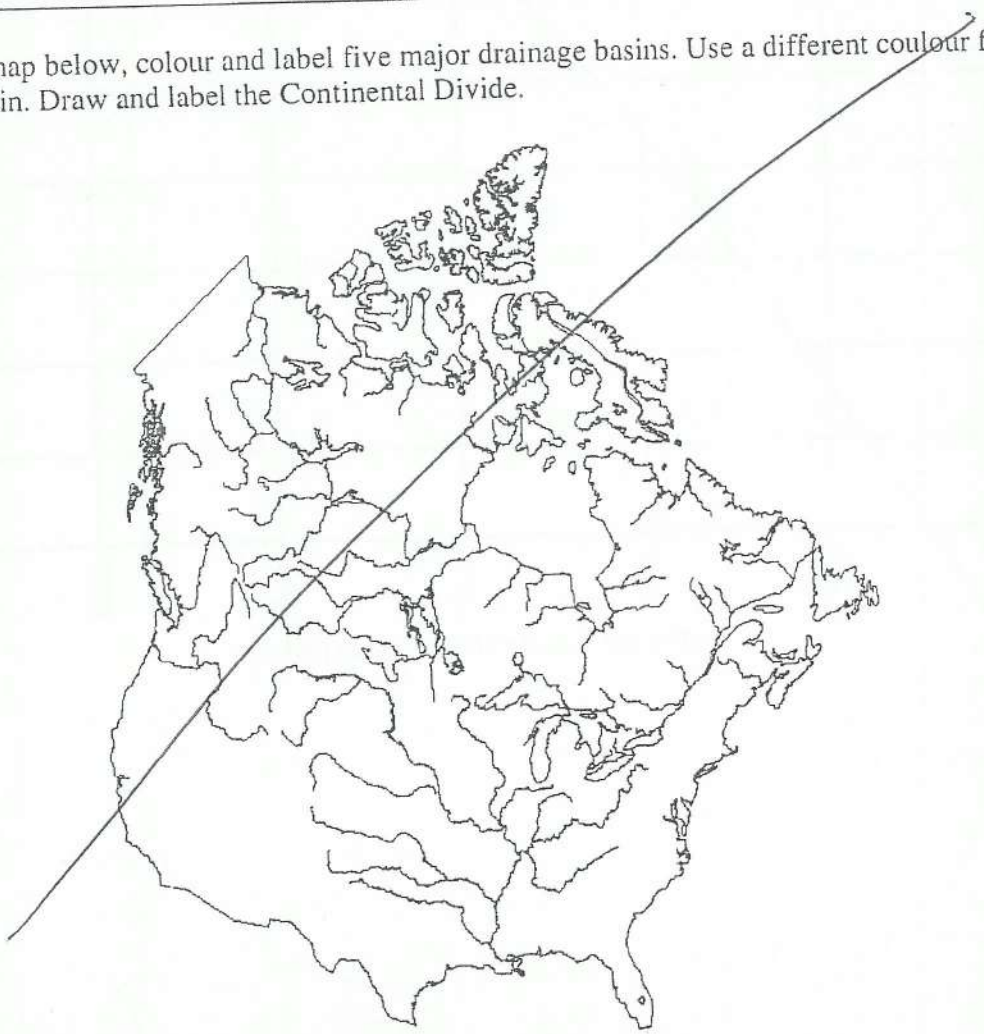
Goal • Show your knowledge of watersheds.

What to Do
Answer the following questions in the space provided.

1. What is a watershed (or drainage basin)?

2. What is a drainage divide?

3. On the map below, colour and label five major drainage basins. Use a different coulour for each basin. Draw and label the Continental Divide.



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TOPIC 3
SKILL BUILDER

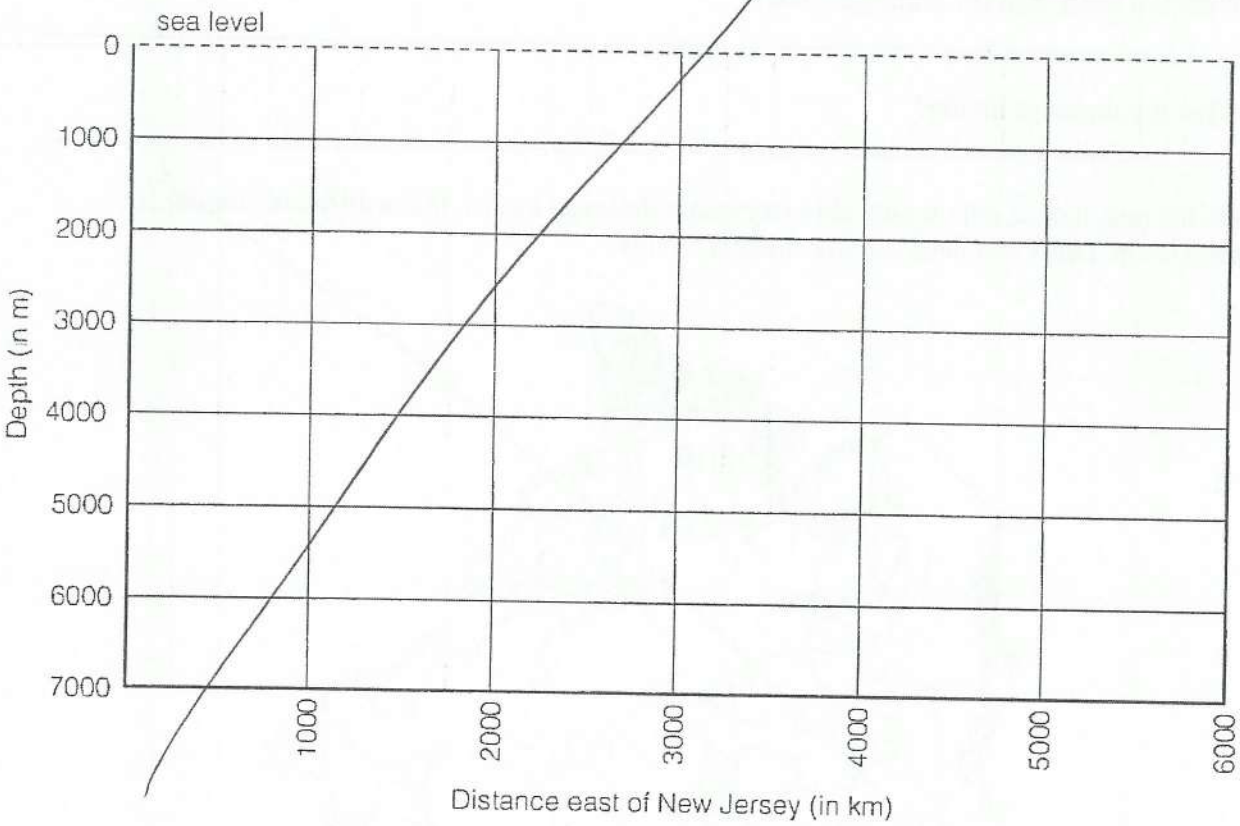
BLM 5-10

Mapping the Ocean Floor

Goal • Record data for Think & Link Investigation 5-F: Mapping the Ocean Floor.

What to Do

Use the grid below to plot the data for the sea-floor profile from Think & Link Investigation 5-F: Mapping the Ocean Floor.



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BLM 5-12

TOPIC 4
REINFORCEMENT

The Tide Is High

Goal • Review your understanding of tides.

What to Do
Answer the following questions in the space provided.

1. Tides are the regular daily cycle of the slow rise and fall of the ocean. Illustrate the terms "spring tide" and "neap tide" in the boxes below. Make sure that you show the position of Earth, Moon, and Sun.

Spring Tide

Neap Tide

2. What is the difference between a spring tide and a neap tide?

3. What does the term "tidal range" mean?

4. How does gravity affect tides?

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TOPIC 4

REINFORCEMENT

BLM 5-11

The Motion of the Ocean

Goal • Demonstrate your understanding of how energy passes through ocean water.

What to Do

Answer the following questions in the space provided.

1. What is a wave?

2. On what does the height of a wave depend?

3. What are some properties of waves?

4. Why does a wave collapse when it reaches the shore?

5. How is water able to pass energy along?

6. Draw and label a diagram that shows how energy passes through ocean water. Be sure to include the following features: wave height, wavelength, crest, trough, direction of wave, circular position of particles, one-half wavelength.

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BLM 5-13

TOPIC 4
REINFORCEMENT

Understanding Water and Climate

Goal • Review your understanding of warm and cold ocean currents.

What to Do
Answer the following questions in the space provided.

1. (a) Where do warm currents originate?

   (b) How do warm currents affect climate?

2. (a) Where do cold currents originate?

   (b) How do cold currents affect climate?

3. How does the difference in temperature between water and land affect weather systems?

4. In the winter, land near a large lake is warmer than land a distance away from the lake. Explain why.

5. Why is Britain's climate much milder than southern and central Alberta's, even though both places are at the same latitude?

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TOPICS 3-4

VOCABULARY CHECK

Water Terms

BLM 5-14

Goal • Review your understanding of terms in Topics 3-4.

What to Do

Match each description in column A with the correct term in column B. Place the letter for the term on the line beside the description.

A	B
___ 1. large ripples set in motion by steady winds	(a) trenches
___ 2. smooth waves caused by faraway storms	(b) tidal range
___ 3. parts of the ocean that reach into the land	(c) swells
___ 4. the difference in level between a high tide and a low tide	(d) waves
___ 5. long undersea mountain chains that run along the centre of the oceans	(e) abyssal plains
___ 6. large submarine mountain peaks	(f) mid-ocean ridges
___ 7. steep submarine canyons	(g) continental slope
___ 8. wide, open features of the deep ocean	(h) bays
___ 9. feature that plunges at a steep angle to the floor of the ocean basin	(i) seamounts
___ 10. process of wearing away of rock or soil	(j) divide
___ 11. amount of eroded material carried by a stream	(k) deposition
___ 12. process of dropping sediments as a stream slows	(l) headwaters
___ 13. water found beneath the surface of Earth	(m)erosion
___ 14. large underground water reservoir	(n) aquifer
___ 15. point on the land where water runs into different drainage basins	(o) sediment load
___ 16. area where a river originates	(p) groundwater
	(q) flood plain

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Science Eight
Water Systems
Task #4

1. Define "salinity":

2. What is the average salinity of oceans?

3. Each year Europe and North America move 3 cm closer to each other. Using the term "Ocean Ridges", explain why they are moving towards each other.

4. Ocean ridges are constantly add more ground to the ocean floor. What is causing this continuous growth?

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5. How are trenches formed?

6. Cities like Vancouver and Los Angeles fear that one day they will face a devastating earth quake. Explain why there is a strong chance that this earthquake will occur?

7. In diagram 5.59B, why does Juan de Fuca Plate move below the North American Plate?

8. Look at diagram 5.60. How does the depth of the ocean change as you move further out from the coastline of a continent?

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9. Define each of the following terms:

- Abyssal Plains

- Continental Shelf

- Continental Slope

10. Consider the final paragraph on page 417. There are 3 major properties regarding waves. List them below.

11. Draw out a complete and labeled diagram of one wavelength of a wave

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TOPIC 5

VOCABULARY CHECK

BLM 5-17

Fishing for Life on the Sea Floor

Goal • Check your understanding of new vocabulary.

What to Do

Answer the following questions in the space provided.

1. Complete each sentence with the correct term(s).

   (a) A population explosion of algae is called a(n) _____.

   (b) Certain bacteria use the process of _____ to produce food from chemicals.

   (c) Cracks in the ocean floor are called _____.

   (d) The Grand Banks were reported by (last name) _____.

   (e) The Grand Banks were a major fishing ground for the capture of these three types of fish: _____, _____, and _____.

   (f) Some bacteria use _____, such as sulfur compounds, to produce food.

   (g) The waters of the Labrador Current are _____.

   (h) The waters of the Gulf Stream are _____.

   (i) _____ and changes in water temperature or nutrient levels are possible causes of the decline in fish populations in the Grand Banks.

   (j) Toxic chemicals can enter a food _____ and create health hazards.

   (k) Where the Labrador Current and the Gulf Stream meet, there are good conditions for _____, on which the larger fish depend for food.

   (l) The arrival of new _____ of plants or animals can dramatically alter a natural ecosystem.

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BLM 5-18

TOPIC 6
REINFORCEMENT

Acid Precipitation

Goal • Review your understanding of air pollution and water systems.

What to Do

Answer the following questions in the space provided. Refer to pages 396 and 480 to 481 of your textbook if you need help.

1. Why is the water cycle important, apart from recycling water?

2. What is the function of evaporation and condensation in the water cycle?

3. Name some human activities that can add impurities to water.

4. What is acid precipitation?

5. Just how acidic is acid precipitation? Compare it to vinegar.

6. How is acid precipitation harmful to the environment?

7. Describe two measures that can be taken to reduce acid precipitation.

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TOPIC 6

SKILL BUILDER

BLM 5-19

Understanding the pH Scale

Goal • Show your understanding of the pH scale and acid precipitation.

Introduction

The pH scale is used to determine acidity. The lower the pH, the more acidic a substance is. Every number on the pH scale means an increase or a decrease in acidity by 10 times.

For example:

- A pH of 6 is 10 times more acidic than a pH of 7.
- A pH of 9 is 100 times less acidic than a pH of 7.

What to Do

Answer the following questions in the space provided.

1. Complete each sentence below.
   (a) A pH of 3 is _____ times less acidic than a pH of 1.
   (b) A pH of 5 is _____ times more acidic than a pH of 10.
   (c) A pH of 5 is 10 times more acidic than a pH of _____.
   (d) A pH of 5 is 1000 times more acidic than a pH of _____.
   (e) A pH of 5 is 10 times less acidic than a pH of _____.
   (f) A pH of 7 is _____ times more acidic than a pH of 10.
   (g) A pH of 2 is _____ times more acidic than a pH of 10.

2. Name three acids that you encounter in your everyday life.

3. What causes acid precipitation to be acidic? Be specific.

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BLM 5-23

TOPICS 5-6 ASSESSMENT

Topics 5-6 Test

Goal • Check your understanding of concepts in Topics 5 and 6.

What to Do

Answer the following questions. Use the back of the page if you need more space.

1. Describe how certain insects can indicate water quality.

2. How does the acid in acid precipitation get into clouds?

3. (a) Explain the benefits of dams.

   (b) Explain two problems that dams create.

4. Describe three things that can be done to make water potable.

5. Explain two steps that can be taken to reverse damage to water systems.

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UNIT 5
ASSESSMENT

BLM 5-24

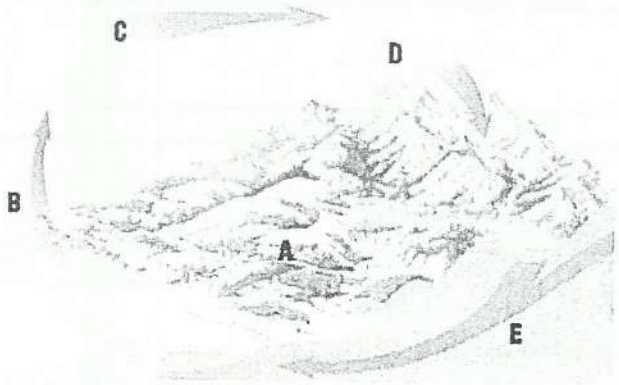
Unit 5 Test

Goal • Assess your understanding of terms and concepts in Unit 5.

What to Do
Carefully read the instructions before answering each set of questions.

Diagram
Answer the following question in the space provided.

1. Identify the appropriate term for the letters in the diagram: precipitation, evaporation, condensation, run-off, groundwater.



A _____

B _____

C _____

D _____

E _____

Matching
Match each description in column A with the correct term in column B. Place the letter for the term on the line beside the description.

A	B
____ 2. free-floating aquatic plants	(a) crevasse
____ 3. wearing away of rocks or soil by wind or water	(b) moraine
____ 4. the largest of the tidal movements	(c) tidal range
____ 5. large underground reservoir of water, found in permeable rock	(d) spring tide
____ 6. water that is fit to drink	(e) erosion
____ 7. variety of different organisms	(f) aquifer
____ 8. large crack in the surface ice of a glacier	(g) detritus
____ 9. the difference between the highest tide and the lowest tide	(h) potable
____ 10. remains of dead organisms that provide food for decomposers	(i) phytoplankton
____ 11. large pile of eroded rocks and debris left by a melted glacier	(j) diversity

UNIT 5
ASSESSMENT

Unit 5 Test (continued)

Multiple Choice
Circle the letter for the best answer.

12. Most of the water vapour in the atmosphere evaporated from
    (a) rivers and lakes
    (b) ground water
    (c) aquifers
    (d) oceans and seas

13. The most abundant form of water on Earth is
    (a) salt water
    (b) fresh water
    (c) groundwater
    (d) atmospheric water vapour

14. Which of the following statements about glaciers is true?
    (a) Glaciers advance until they reach the ocean.
    (b) Glaciers are found only at the North Pole and the South Pole.
    (c) Glaciers can retreat even when flowing downhill.
    (d) Glaciers are composed of salt water.

15. Which of the following processes is **not** part of the water cycle?
    (a) condensation
    (b) deposition
    (c) evaporation
    (d) precipitation

16. Into which water body does water in Alberta **not** drain?
    (a) Hudson Bay
    (b) Gulf of Mexico
    (c) Great Lakes
    (d) Arctic Ocean

Unit 5 Test (continued)

17. The largest amount of water leaves Alberta for
    (a) the Arctic Ocean
    (b) the Gulf of Mexico
    (c) Hudson Bay
    (d) the Great Lakes

18. The most run-off is generated by
    (a) pasture
    (b) city streets
    (c) forested hillsides
    (d) cropland

19. What is the difference between a headwater river and a flood plain river?
    (a) A headwater river is larger and deposits more sediment.
    (b) A headwater river is larger and deposits less sediment.
    (c) A flood plain river is larger and deposits less sediment.
    (d) A flood plain river is larger and deposits more sediment.

20. An aquifer is possible when the rock layers are
    (a) porous and permeable
    (b) non-porous and permeable
    (c) porous and impermeable
    (d) non-porous and impermeable

21. A landfill that is contaminating local groundwater is considered to be
    (a) a point source, since the origin of the contaminants is known and from a small area
    (b) a non-point source, since the materials in the landfill come from a large area
    (c) a non-point source, since the contributors to the landfill are not known
    (d) a point source, since the materials in the landfill come from a variety of people and places

Unit 5 Test (continued)

22. Flooding can be the result of
    (a) slow spring melt and low precipitation
    (b) regulation of streamflow by the use of dams and diversion canals
    (c) rapid spring melt and high precipitation
    (d) increased temperatures and longer summers

23. The motion of water particles in a wave are
    (a) continuously in the same direction the wave is travelling
    (b) circular with a slow drift in one direction
    (c) straight up and down, never moving forward or backward
    (d) continuously in the opposite direction the wave is travelling

24. Salt in the ocean comes from
    (a) huge deposits that dissolve on the ocean floor
    (b) salts that were dissolved from rocks by rivers and were transported to the ocean
    (c) organisms that live in the ocean and produce salt
    (d) rain that contains salt from pollution of the atmosphere

25. The deepest part of the ocean is the
    (a) continental shelf
    (b) continental slope
    (c) abyssal plain
    (d) mid-ocean ridge

26. Why do breakers form near shore?
    (a) The bottom of a wave is held by friction, while the crest continues at the same speed to form a breaker.
    (b) Waves are affected much more by wind as they near shore.
    (c) Incoming waves collide with the outgoing tide, causing turbulence and breakers.
    (d) Sand picked up near shore makes the waves larger, and they become breakers.

Unit 5 Test (continued)

27. Surface currents in the ocean are **not** influenced by
    (a) the uneven heating of Earth by Sun
    (b) the rotation of Earth
    (c) the shapes of the continents
    (d) the position of Moon and Sun

28. How do ponds differ from lakes?
    (a) Light can reach the entire lake bed, so very few plants can grow.
    (b) Light can reach the entire bottom of a pond, so plant life is found everywhere.
    (c) Light reaches only the shallow water near shore in a lake, so plant life is everywhere.
    (d) Light reaches only the shallow water near shore in a pond, so very few plants can grow.

29. Which of the following adaptations can be found on a plant in a fast-moving stream?
    (a) buoyant structures
    (b) gills
    (c) holdfast
    (d) streamlined structure

30. Plankton are adapted to
    (a) attaching to rocks and other organisms
    (b) chasing other organisms
    (c) floating freely
    (d) surviving where there is no light

31. When a body of water is polluted with excess nutrients, there is usually
    (a) an algal bloom
    (b) nothing left living in the water
    (c) too much dissolved oxygen
    (d) a more stable food chain

Unit 5 Test (continued)

32. Hard water refers to
    (a) the way that water freezes quickly
    (b) the fact that there is nothing dissolved in the water
    (c) how difficult it is to remove pollutants from the water
    (d) water with calcium and magnesium dissolved in it

33. Acid precipitation is caused by
    (a) burning fossil fuels, which release sulfur and nitrogen oxides into the air
    (b) dumping of wastes into rivers, streams, and lakes
    (c) a change in aquatic life as a result of global warming
    (d) acidic water evaporating from the ocean

34. Bioindicator species are species that
    (a) are unaffected by water temperature or quality
    (b) have become extinct as a result of pollution
    (c) live only in water with specific qualities, such as pH and temperature
    (d) change their form or colour when water quality changes

Paragraph Answer

Answer the following question in paragraph form.

35. Explain how water is purified for drinking purposes.