

- ___ 10. Which of the following statements is NOT true about wetlands?
- Wetlands result from the eutrophication of a lake.
 - Lack of oxygen and lack of minerals create an atmosphere that is inhospitable to many plants.
 - Freshwater marshes often form along the stream's mouth and in areas with deltas.
 - Wetlands only exist in freshwater areas.

Matching

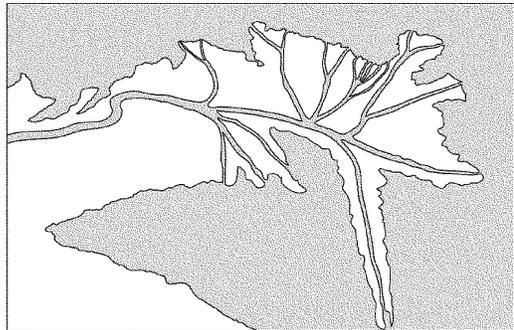
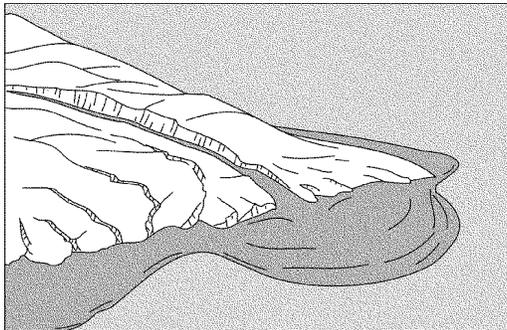
Match each item with the correct definition below.

- | | |
|-----------------|------------|
| a. rejuvenation | e. meander |
| b. lake | f. delta |
| c. stream banks | g. wetland |
| d. flood | |

- ___ 11. A triangular deposit that forms where a stream enters a large body of water
- ___ 12. A stream resumes the process of downcutting
- ___ 13. A depression in the land that holds water
- ___ 14. An area periodically saturated with water
- ___ 15. Water spills over the sides of a stream's banks

Short Answer

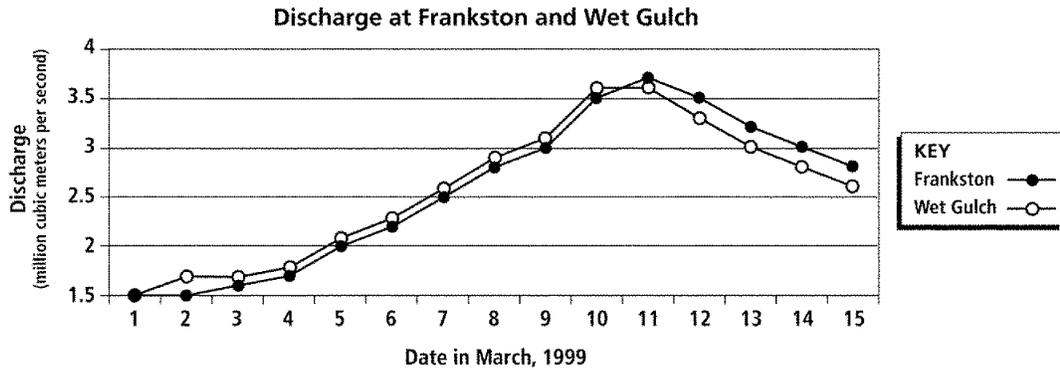
- Compare and contrast materials carried in suspension and solution by the stream.
- Identify the two stream formations shown below. Compare how each is formed.



- Describe three processes of lake formation.
- Explain how people have contributed to the destruction of wetlands.
- Explain how floodplains develop such highly fertile soils.
- What factors increase or decrease the amount of runoff in an area?
- Describe three ways a natural lake can form.
- How does an increase in a stream's velocity affect its discharge and carrying capacity?

24. How do vegetation and slope affect runoff?

The graph shows the discharge of a river that flows through two cities, Frankston and Wet Gulch. At either city, the river's banks cannot handle a discharge of 3.5 million cubic meters per second or more. At that point, the river reaches its flood stage. Study the graph and answer the questions.



25. During how many days in March did the river at Wet Gulch and Frankston overflow its banks?

Problem

The table lists water quality measurements that were taken over a 40-year period at Lake Smith. Measurements included dissolved oxygen, pH, phosphate, nitrogen, the number of largemouth bass, and mosses and grasses. Dissolved oxygen is the measure of the amount of oxygen available to life-forms in the water. Largemouth bass is a common variety of fish found in healthy lakes. Mosses and grasses start to appear as the pH of the water becomes more acidic.

Water Quality at Lake Smith									
	1950	1955	1960	1965	1970	1975	1980	1985	1990
Dissolved oxygen (parts per million, or ppm)	20	19	18	18	16	17	15	11	9
pH	7.6	7.2	7.1	7.0	6.8	6.8	6.5	6.1	5.8
Phosphate (ppm)	0.0	0.10	0.20	0.25	0.28	0.28	0.45	0.55	0.55
Nitrogen (ppm)	0.05	0.18	0.19	0.25	0.28	0.28	0.35	0.40	0.45
Largemouth bass	450	455	448	338	235	220	155	125	50
Mosses and grasses	0	0	2	5	15	18	29	35	55

26. What is eutrophication? Did it occur at Lake Smith? Explain your answer.

Name: _____

ID: A

27. After 1950, farmers in the Lake Smith area increased their use of fertilizers. Does the data support this statement? Explain your answer.
28. How do changes in phosphate and dissolved oxygen content over time compare? Explain the changes that took place.
29. What do you predict will happen to the lake in the next 40 years?
30. The table shows that the number of largemouth bass decreased as the number of mosses and grasses increased. From this data, can you conclude that the increase of mosses and grasses caused the largemouth bass population to decline? Explain your answer.

Surface Water Short Study Guide Answer Section

MULTIPLE CHOICE

1. C
2. A
3. C
4. D
5. A
6. B
7. A
8. C
9. C
10. D

MATCHING

11. F
12. A
13. B
14. G
15. D

SHORT ANSWER

16. Both materials are part of the stream's load. Materials carried in solution are dissolved in the water. Materials carried in suspension, which vary in amount according to the stream's velocity, have a larger particle size like sand and silt.
17. The example on the left is an alluvial fan. The example on the right is a delta. Alluvial fans are sloping depositional features formed at the bases of slopes and composed mostly of sand and gravel. Deltas are triangular deposits that form where a stream enters a large, quiet body of water.
18. Answers may vary. Lakes can form from cutoff meanders that isolate channels of water, other lakes form when streams are blocked off by landslides. Some lakes are remnants of former ocean waters. Lakes can also form from glacial origin.
19. Many wetlands have been filled in to create more land for building and for agriculture.
20. Each time a flood occurs, the floodwater carries along with it a great amount of sediment eroded from Earth's surface and the sides of stream channels. After each subsequent flood, more sediment is deposited and the soil becomes more fertile.
21. Saturated or frozen ground and soil and rocks with few spaces between the particles increase runoff because the ground cannot absorb the water. Soil and rocks with large spaces between the particles and areas with vegetation decrease runoff because more water is absorbed into the ground.

22. Possible responses: Oxbow lakes form when streams cut off meanders and leave isolated channels of water. Lakes can form when stream flow becomes blocked by sediment from landslides. Some form as remnants of former ocean water that have receded to lower-lying areas. Others form because glacial moraines dammed water in ice-gouged basins, or when blocks of ice melt on outwash plains.
23. As a stream's velocity increases, its discharge increases. As its discharge increases, its carrying capacity also increases.
24. Dense vegetation allows more water to enter the ground, thus reducing runoff. The steeper the slope, the faster water flows, and the less water that seeps into the ground, thus increasing runoff.
25. Wet Gulch, 3; Frankston, 2

PROBLEM

26. Eutrophication is the filling in of a lake due to excessive organic growth. This excessive growth then dies and decays, which depletes the available oxygen, leaving less for the other life-forms. Animals, such as largemouth bass, cannot survive in water when the dissolved oxygen falls below a certain level. And since the data show a decrease in largemouth bass, eutrophication at Lake Smith is indicated. As eutrophication continues and the lake fills in, the oxygen content decreases and the acidity increases, which the data suggest took place at Lake Smith. The data also show an increase in mosses and grasses, which thrive when eutrophication fills in a lake and a wetland forms.
27. Possible response: Yes; the phosphate content in the lake water increased after 1950. Agricultural fertilizers contain phosphates, which may have been picked up by runoff and carried into the lake after 1950, thus accounting for the increase in phosphate content.
28. As the phosphate content increased, the amount of dissolved oxygen decreased. Lake organisms like algae most likely thrived on the increased phosphate, then grew rapidly, died, and decayed. The resulting decaying process depleted the water's oxygen and further increased the phosphate content.
29. Possible response: The amounts of phosphate and nitrogen will continue to increase, the pH will drop, the dissolved oxygen will become less, bass will die out, and the mosses and grasses will thrive. The lake will start to fill in.
30. No, the data do not prove a causal relationship between the increase in the number of mosses and grasses and the decline in largemouth bass population. For example, largemouth bass could be negatively affected by the other variables in the chart, such as the decrease in dissolved oxygen, the decreasing pH, and the increasing phosphate level. It is theoretically possible that the increase in vegetation has no impact, a negative impact, or a positive impact on the bass population. However, without scientific testing, it is impossible to conclude one way or another.