

# How the Ice Age Helped Shape Montana

name: \_\_\_\_\_

Go to the following web site: <http://formontana.net/base.html>

## A. Click on the link titled MISSOURI RIVER.

1. On the map shown on the web site, what does the solid red line mark the location of?
2. What is it about the Milk River Valley from Havre to Nashua that suggests it was not formed by the Milk River?
3. The Missouri used to flow northeast toward Canada's Hudson Bay. Now it flows through the Dakotas, emptying into the Mississippi River near St. Louis. What caused the change?
4. Click on the Hot Link titled "\*Compare the Map to an image that shows topography". Which valley is broader? Circle one.
  - a. the pre-ice age Missouri Valley from Big Sandy to Havre
  - b. the present valley of the Missouri southeast of Big Sandy

## B. Click on RETURN TO BASE CAMP. Then click on the link titled HI-LINE.

5. How do geologists know that the rock in the photo was not formed in northcentral Montana?
6. Rocks like this one from Canada can be seen scattered throughout northcentral Montana. Why aren't rocks from Canada found south of the Missouri River?
7. What river's valley is marked #4 on the photo?

## C. Click on RETURN TO BASE CAMP. Then click on the link titled STRIATIONS.

8. Explain how a glacier caused the striations shown in this photo.
9. What do the scratches help geologists figure out?
10. Besides striations, what two other types of evidence help geologists figure out how far south the ice advanced during the last ice age?

## D. Click on the link titled ICE AGE AMERICA.

11. In which part of the United States did the ice sheet extend the farthest south?
12. This map depicts the continent as it appeared \_\_\_\_\_ years ago.
13. Was Alaska covered with ice during the ice age depicted on the map?

**E. Go back to the base camp at <http://formontana.net/base.html>. Click on LAKE GREAT FALLS.**

14. What two factors combined to cause the formation of Glacial Lake Great Falls?

15. The cut bank in the photo shows silt and clay deposited on the bottom of prehistoric Lake Great Falls. Why did the smallest particles (silts, clay) only settle to the bottom of the lake during the winter?

16. How do geologists know how deep the lake was where the city of Great Falls sits today?

17. Scroll down to the map at the bottom of the screen. List three other glacial lakes that existed at times during the last ice age.

**F. Click on RETURN TO BASE CAMP. Then click on LAKE MISSOULA.**

18. What caused the unusual parallel lines highlighted by snow on this Missoula mountainside?

19. Explain how a glacier caused prehistoric Glacial Lake Missoula to form.

20. What caused the waters of the lake to rush across Eastern Washington in a cataclysmic flood?

21. It is believed that the waters of Lake Missoula flooded eastern Washington many times. How long ago did these floods happen?

22. Scroll down to the map at the bottom of the screen. Describe the location of the ice dam that blocked the Clark Fork River.

**G. Click on RETURN TO BASE CAMP and then click on FLATHEAD LAKE.**

23. When the glacier reached the Mission Range it split, with one lobe flowing into the Swan Valley and the other moving toward present-day Polson. Why did the lobe that extended into the Swan Valley reach farther south?

24. What is the Polson Moraine, and how did it form?

25. Why didn't the area where Flathead Lake sits today fill with sediments as the ice age came to a close?

26. Why are moraine-dammed lakes usually short-lived?

27. Why didn't the lake drain itself as it overflowed the Polson Moraine?

**H. Click on RETURN TO BASE CAMP. Then click on the link titled MORaine.**

28. This photo, taken 30 miles north of Missoula, shows a “lateral moraine”. Where did the rock material that makes up the moraine come from?

29. Why did the material get deposited here?

30. One aspect of “till” that helps geologists identify it is that it is unsorted. Explain what “unsorted” sediment consists of.

31. Was this moraine formed by a continental glacier, or by a valley glacier (a.k.a. alpine glacier)?

**I. Click on RETURN TO BASE CAMP. Then click on TROUGH.**

33. How can geologists tell that a glacier once flowed through this valley?

34. Why do alpine glaciers eventually stop advancing?

35. What must be true in order for an “end moraine” to build up?

**J. Click on RETURN TO BASE CAMP. Then click on TRIPLE DIVIDE PEAK.**

36. Triple Divide Peak, shown near the center of the photo, is a horn. Explain how a horn is formed.

37. Why is it called “Triple Divide Peak”?

38. Scroll down and click on “\*A more detailed look at Triple Divide Peak”. What three bodies of water does runoff from Triple Divide Peak drain into?

39. Which part of the ocean would the melted snows of Mt. Stimson flow into?

**K. Click on RETURN TO BASE CAMP. Then click on WARMING.**

40. When were the two photos taken?

41. What’s the point of showing the photos side by side?

42. According to some experts, how long will it be until all of the glaciers in Glacier National Park have melted away?

43. List five sources of carbon dioxide mentioned in the bottom paragraph beneath the photos.

44. Why do car windows and carbon dioxide in the atmosphere let light waves pass through, but trap infrared (heat) waves?

