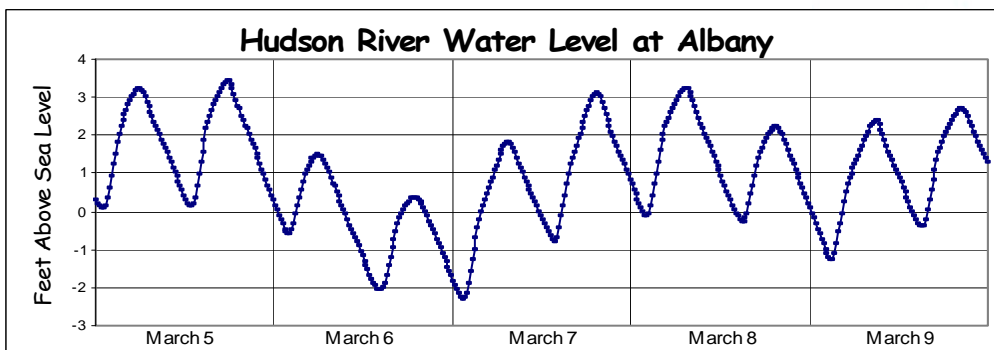
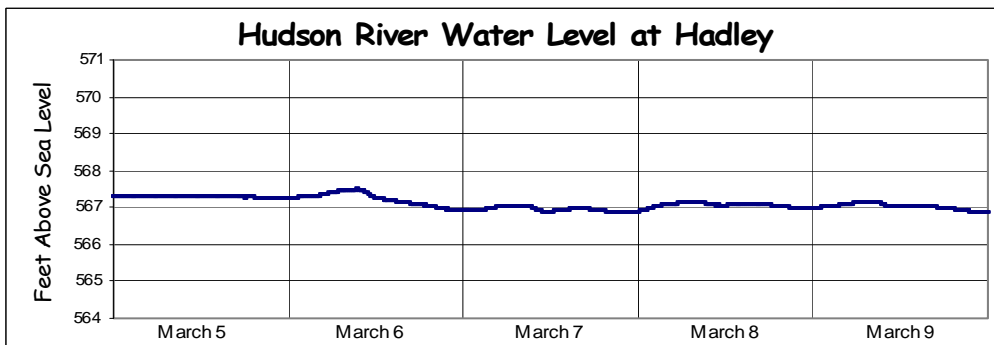
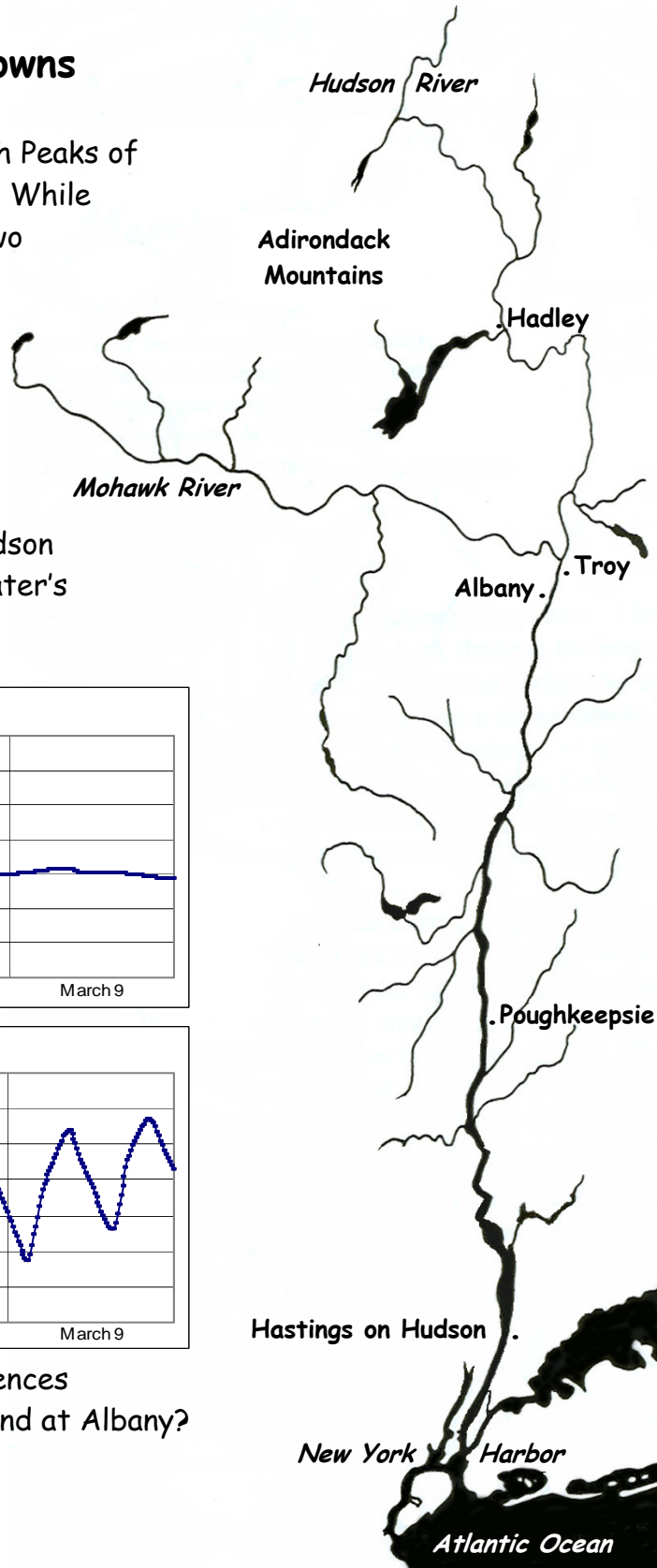


The Hudson's Ups and Downs

The Hudson River flows 315 miles from the High Peaks of the Adirondack Mountains to New York Harbor. While the river has one name, it can be divided into two distinct sections. The two line graphs below illustrate some of the differences between these sections. They show the water level of the Hudson at Hadley and at Albany.

To make these graphs, instruments record the water level every 15 minutes. The water level is not measured from the river bottom; the Hudson is not 567 feet deep at Hadley! Instead, the water's height is measured in relation to sea level.



1. Compare these graphs. What are two differences between Hudson River water levels at Hadley and at Albany?



The dividing line between the two sections of the Hudson is a **dam** at Troy. Below the dam, the Hudson's surface is roughly at sea level. This allows ocean **tides** to affect the river all the way to the dam, more than 150 miles north of the Atlantic Ocean. Like ocean water at the seashore, the Hudson rises and falls with the tides.

2. These pictures show high and low tides at Poughkeepsie. Which is which?

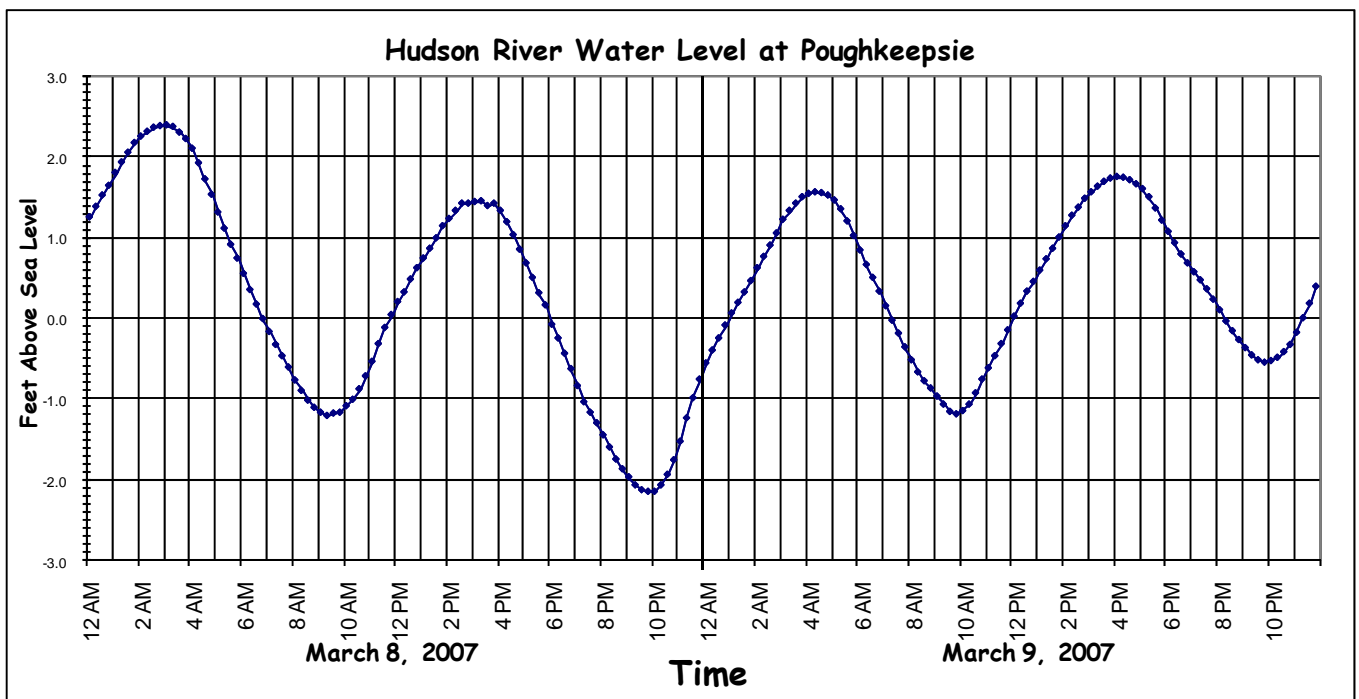


← In this picture, the tide is _____.

In this picture, → the tide is _____.



3. On the graph below, label each **high tide** and each **low tide**.



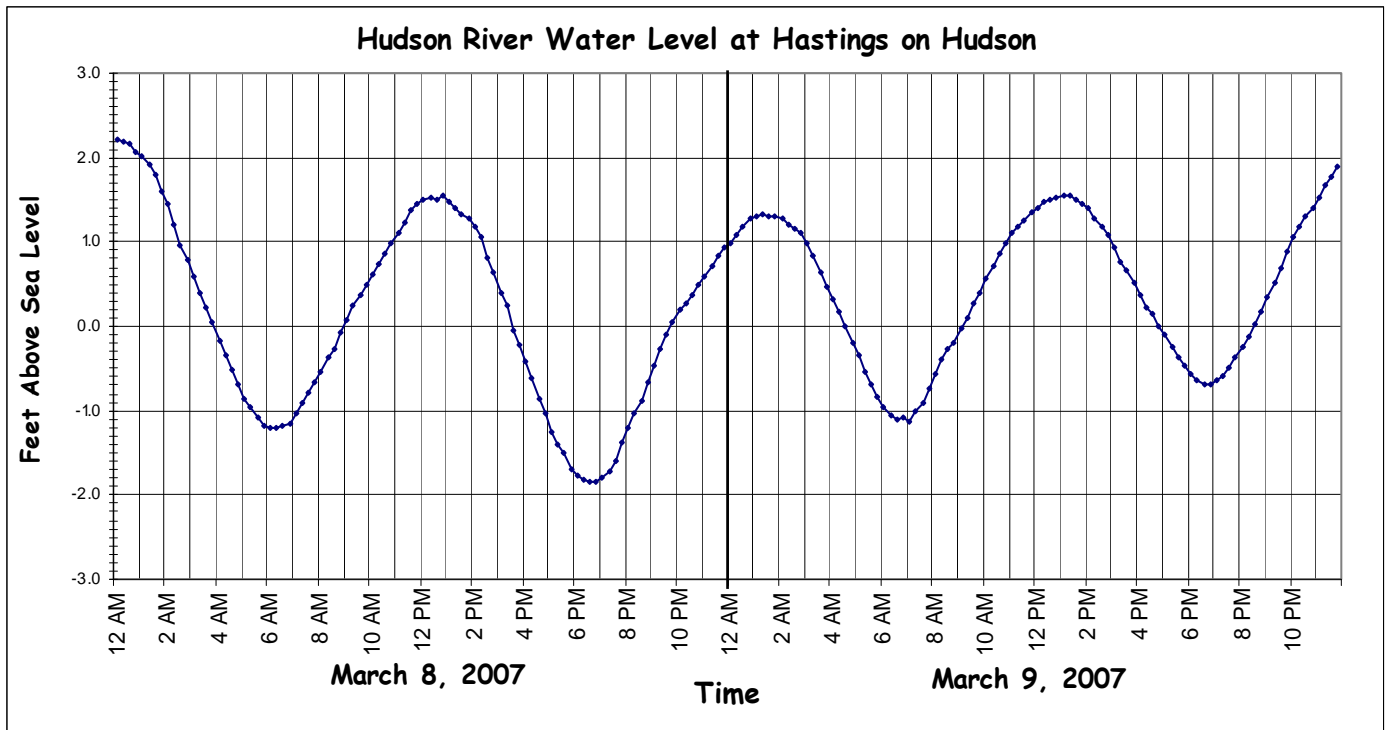
4. At 3 PM on March 8, is the tide at Poughkeepsie high or low?

5. At 10 AM on March 9, is the tide at Poughkeepsie high or low?

6. How many low tides occur each day at Poughkeepsie? How many high tides?



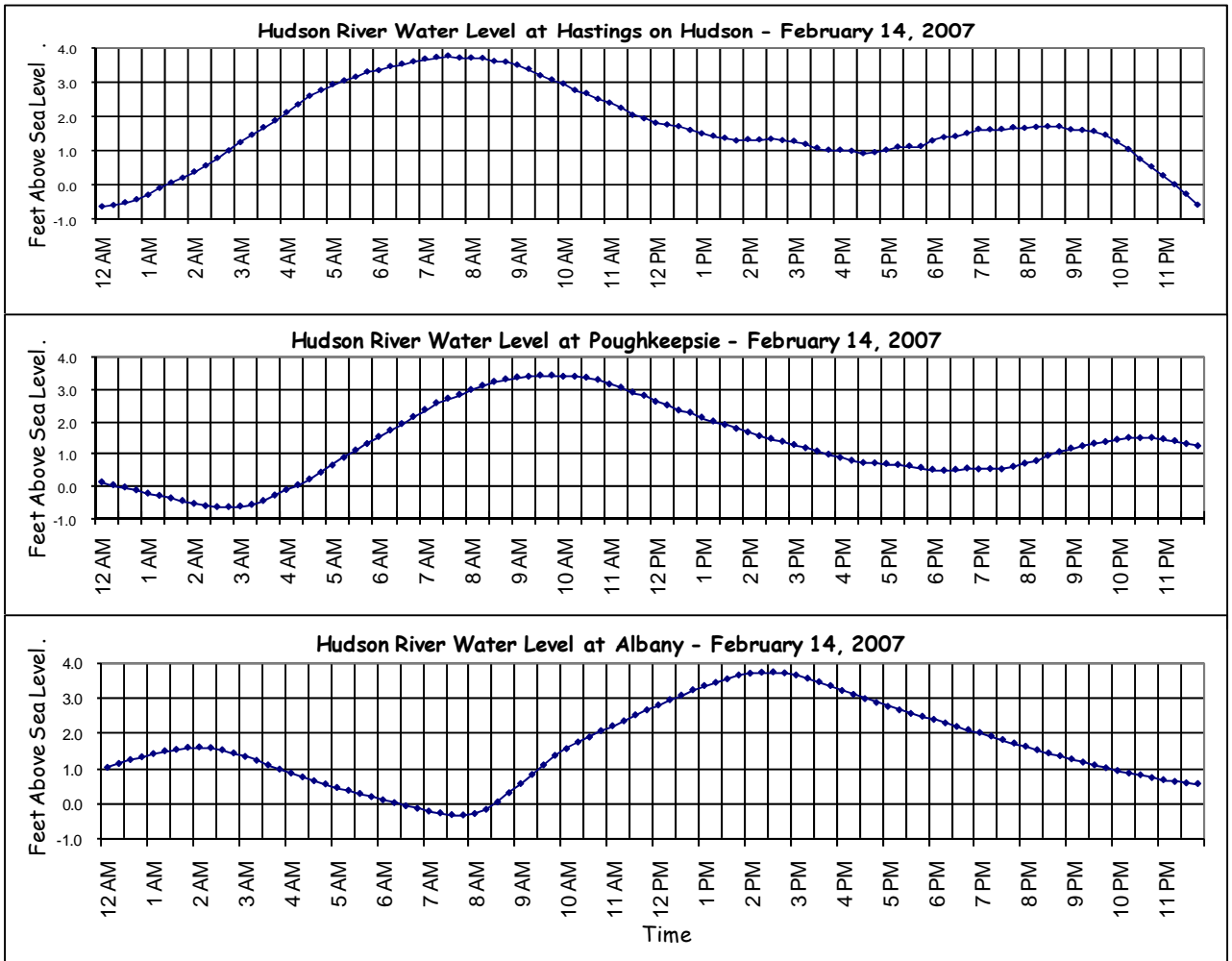
Tides occur in **cycles** - there is a pattern in the timing of high and low tides.



7. Early on March 8 at Hastings on Hudson, the tide was high at 12 AM (midnight). How long did it take for the water level to go down to the next low tide?
8. How much time went by between the morning low tide on March 9 and the afternoon high tide on that day?
9. How much time went by between the 12 AM high tide on March 8 and the next high tide that day?
10. How much time went by between the morning low tide on March 9 and the next low tide?
11. What time will the first high tide occur on March 10? The first low tide?



Lay a jump rope out on the ground. Give one end a quick up and down snap to make a hump move from one end of the rope to the other. "Snapped" by a rising tide in the ocean, a high tide moves up the Hudson the same way, as shown by the line graphs below. This high tide will reach towns along the river at different times.



12. At 7:30 AM on February 14, there was a very high tide in Hastings on Hudson. At the same time in Albany, was the tide high or low?
13. How long did it take this very high tide to go from Hastings to Albany?
14. In Poughkeepsie, how many feet did the river rise from 3 AM to 9:30 AM?
15. Catskill is halfway between Poughkeepsie and Albany. Based on times of the very high tide in Poughkeepsie and Albany, when will it reach Catskill?



16. Extra Credit Challenge Questions

So far, the graphs have shown normal tide conditions on the Hudson. However, weather - strong winds or heavy rains - may affect the tides.

Look at the line graph of water levels in Albany in late June and July, 2006.

(a) Explain what was going on in the Hudson during this period, and what caused it. As a hint, look at the graph showing river levels in Hadley during the same time period. Was the event shown in this graph connected to the event in Albany?

(b) Did whatever was happening change the cycles of the tides? How do you know?

