The Tide Turns

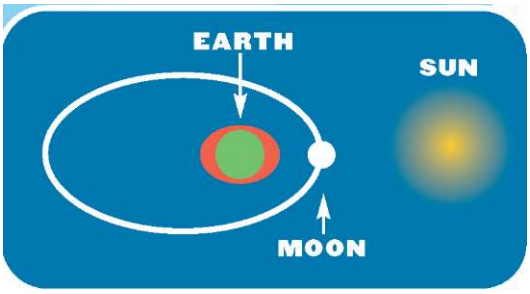
Up and down, up and down, day in, day out. That's the rise and fall of the tides, which we observe at the water's edge. You might think the tides would get seasick. What causes this variation in the waterline, which occurs in most places twice daily?

YOU ARE THE MOON AND THE SUN TO ME

If the earth could talk, that's what it might say to the tides. Picture this: You have the earth turning on its axis every 24 hours all the while it is making its yearly orbit around the sun. Meanwhile, the moon is orbiting the earth.

Because the moon is the closest body in space to the earth, its gravity pulls on the earth. High tide occurs when the moon is directly above a particular part of the coastline. At the same time, a smaller high tide occurs in the part of the world directly opposite, because the moon's pull on the opposite side is not as strong. The moon's orbit around the earth is an oval, not a circle. So the tide is highest when the moon is closest.

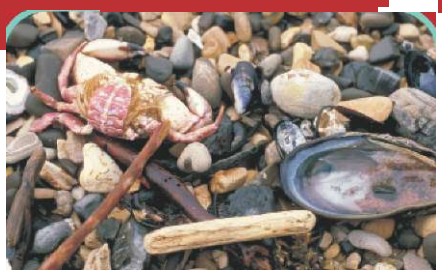
The sun, too, has an effect on the tides, but much smaller. However, when the sun, the moon, and the earth are lined up at the times of the new moon and the full moon, there are higher-than-usual tides.



Living on the Edge

One creature's means of survival becomes another creature's outdoor living museum exhibit. Imagine this: rocky shore, significant difference between high and low tides, an area rich in sea life. At high tide, an area of coastline is swept by waves and fed by the tide of a cool ocean rich in nutrients. At low tide, it becomes a rocky saltwater pool cut off from the ocean. But ocean plants have been growing there, and they make the perfect home for creatures that can survive in this two-part world of the tide pool.

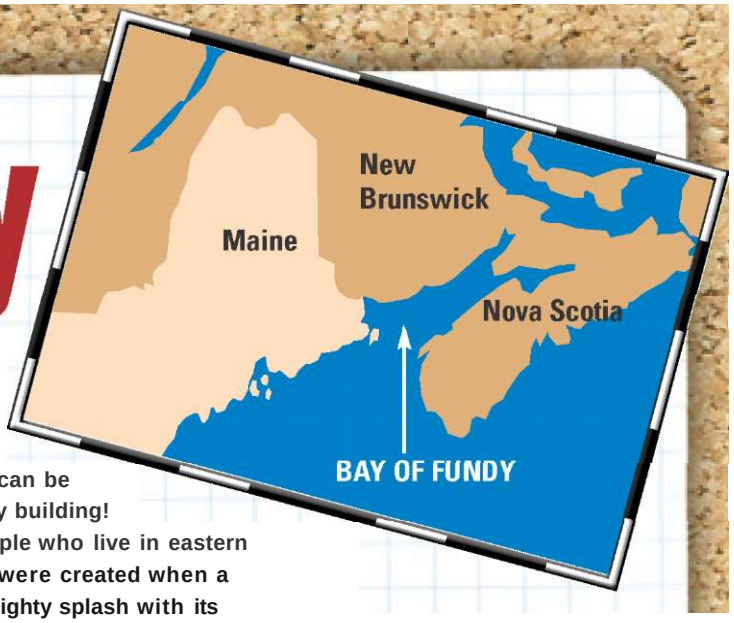
All the animals have found their own ways of adapting to their unusual habitat. Barnacles and anemones attach themselves to rocks and wait for the return of the waves to bring them food. Snails and sea stars clamp down on the rocks to keep from drying out at low tide, but at high tide, they hunt for their food. Sea slugs and tide pool fishes are usually the most active hunters.



If you have access to a tide pool and want to explore it, here are some important pointers:

- Find out ahead of time exactly where the tide pool is.
- Pick up a field guide so you can find out what creatures you might see.
- Explore only at the lowest tides. (You can check this on a tide table—see Activity 1.)
- Wear long pants and old sneakers with a good tread.
- Walk softly and don't carry a stick.
- Try to find a pool where at least some of the animals are feeding.
- Decide not to collect sea creatures.
- Watch the ocean for a random huge wave and for the incoming tide.

Fun in Fundy



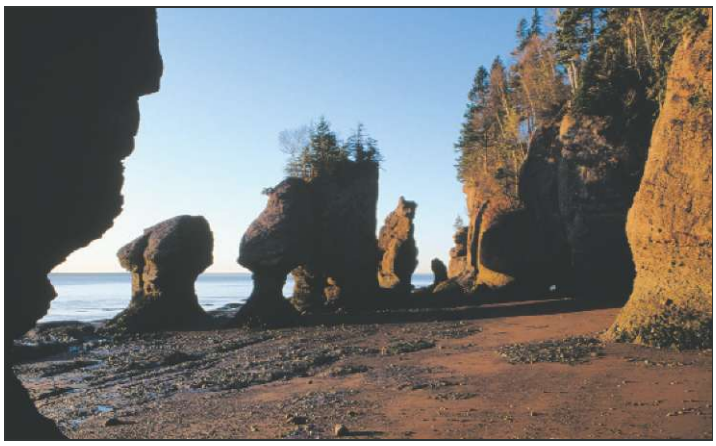
You have to take tides seriously wherever you are along the seacoast, but especially at the Bay of Fundy, which lies off the coast of eastern Canada between the provinces of New Brunswick and Nova Scotia. The difference between high and low tide there can be as much as 431/2 feet (13.25 m), as high as a four-story building! According to the traditional lore of the Micmac, a people who live in eastern Canada, the awesome tidewaters of the Bay of Fundy were created when a giant whale who angered the god Glooscap made a mighty splash with its enormous tail. Today, scientists believe the bay was created some 350 million years ago, about 100 million years before dinosaurs roamed the earth.

Twice every day, billions of tons of seawater roll in and out of the bay, an amount estimated to be the same as the daily flow of all the freshwat' of the world.

Why does this happen? Because of the bay's overall shape and the, its bottom, as it narrows and becomes shallower, the water coming in TroiT ocean has nowhere to go but up. Also, a kind of rocking motion of the wat which happens in all similarly enclosed bodies of water—acts along with tide.

Because of the enormous exchange of water, the Bay of Fundy is espec rich in nutrients that marine life depends on. Plankton, tiny plants and anil that float on the water, provide food for a large variety of ocean life, from s creatures to some of the enormous whales. The ecosystem of the bay is or the world's richest, along with the Great Barrier Reef off the coast of Austi and the Brazilian rain forest.

As with any other ecosystem, civilization threatens to destroy the rich l of the bay. Overfishing, pollution, and land development could upset naturi careful balance. The Canadian government has to weigh the immediate ne of the fishing and tourism industries with the long-lasting effects of the practices they spawn.



Activities

TIE DOWN THOSE TIDES TIDE tables are schedules of high and low tides, and they have been made up for many locations around the globe. Pick a spot you like—maybe your hometown, if it is along the coast, or someplace you'd like to go for a seashore vacation. Go to discoveryschool.com to find hundreds of places.

You can get readings from 2 days to 16 weeks. Study them and see the patterns. Do high and low tides occur at the same time each day? A number of factors—from the sun and the moon's exact locations to the shape of the coastline to waves to weather—make tides hard to predict. But try to figure out when the best time would be for lounging on the beach, for fishing off a pier or in a small boat, for exploring a tide pool, and for doing other things.

OCEAN SCRAPBOOK Make your own ocean scrapbook. Include anything oceanic that interests you and organize it any way you like.