FLOOD!

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Newmark LEARNING

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IN DEEP WATER

It was a monster storm—one that just wouldn't quit. On April 4, 1977, more than 38 centimeters (15 inches) of rain fell in an area of the Ohio River Basin[1] over about thirty hours.

Heavy summer rains in 2010 caused Pakistan's worst flooding in eighty years.

Almost forty years later, Joe Callis remembered the storm as if it had just happened. "It rained through the night like water pouring out of a bucket. When daylight came, all you could hear was water. In every direction, water was cascading down the hillsides and across the ground. Whole sections of road washed downriver. Cars and buildings floated away." Twenty-two lives were lost in the Great Flood of 1977. Damages topped $400 million.

▲ In 2012, Hurricane Sandy caused deadly flooding along the East Coast of the United States.

▼ damage from the 1977 Ohio flood

FLOOD BASICS

A flood is a large amount of water that washes over land that is normally dry. According to FEMA[2], the water must cover two or more acres (about two football fields). The water may come from a natural body of water, such as an ocean, lake, or river. It may come from a canal or other body of water made by people. Wherever a flood comes from, look out—water is on the way!

1. Ohio River Basin—an area of the Midwest covering parts of fourteen states through which the Ohio River flows
2. FEMA (Federal Emergency Management Agency)—the government agency that handles emergencies

FAST, HEAVY RAINFALL

Rain is the most common cause of river floods. Rain from some storms can soak the ground, so the soil can't take in more water. What happens if a second rainstorm follows? The water moves over the land as runoff. It flows toward the closest river. The water rises in the now full river until it overflows the river's banks.

Rivers often flood in early spring. The ground may be too frozen to soak up runoff. Another spring danger is flooding from snowmelt. Sudden high temperatures can melt mountain snow. The water rushes downhill, overfilling streams and rivers. Flooding can happen in other seasons, too.

The 1931 Yangtze River flood made news around the world. It was among the twentieth century's worst natural disasters.

Three Gorges Dam

China's Yangtze River has flooded many times. A 1931 flood caused by rainstorms killed more than 100,000 people. Bad flooding happened again in 1954 and 1998. The Three Gorges Dam, completed in 2009, helps control flooding.

IN A FLASH

A thunderstorm that produces heavy rain can cause flooding in a matter of minutes. This type of flood, called a flash flood, often catches people by surprise. "Flash floods are very dangerous," says Professor Tom Galarneau of the University of Arizona. "The water rises very fast. It can wash away large objects like boulders, cars, and even buildings."

TSUNAMIS

Bad flooding can also happen along coasts. Tsunamis are a cause of coastal flooding. They are often triggered by earthquakes. When an earthquake makes the seafloor move quickly, a large amount of water may be forced upward. Waves race across the ocean and may become taller as they reach land. The International Tsunami Information Center says that tsunamis can "smash into land with waves as high as 30 meters (100 feet) or more."

The wild waves can carry off houses, cars, boats, and trash. People can be hit by moving objects or can drown in the rushing water.

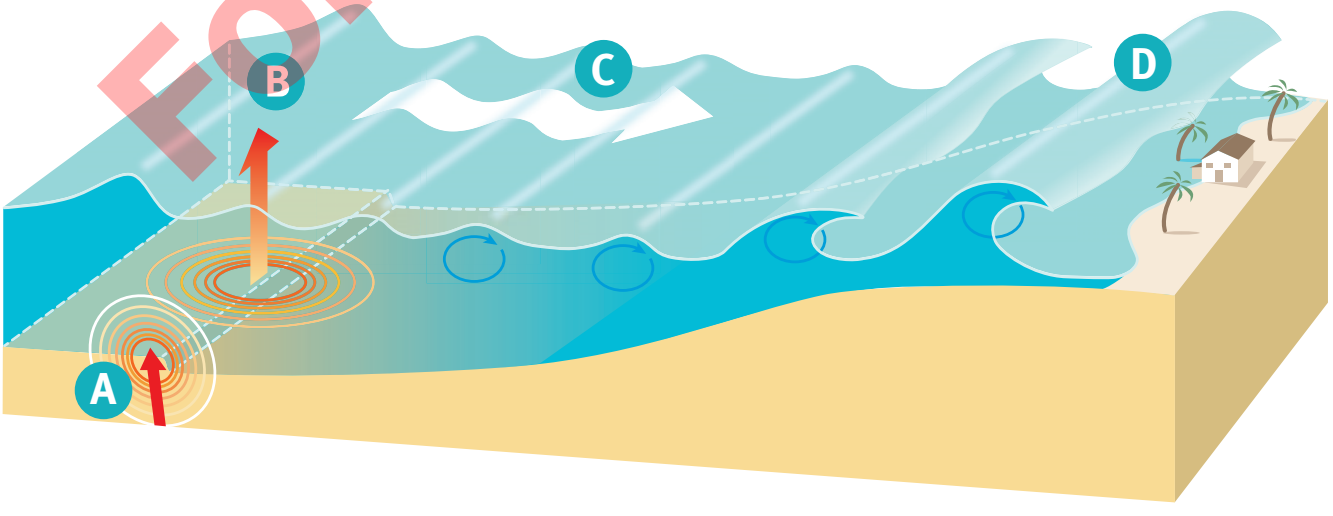
HOW A TSUNAMI FORMS

A: **The edges of Earth's crust suddenly shift, causing an earthquake.**

B: **Ocean water is forced upward.**

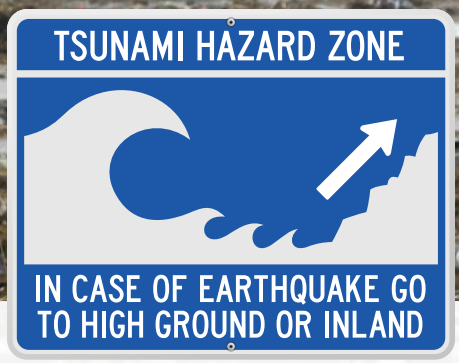
C: **Energy moving through the water creates powerful waves that move toward the coast.**

D: **The higher seafloor, which is closer to the coast, forces the water upward. High waves hit the shore, usually like a fast-rising tide.**



EYEWITNESS ACCOUNT

A terrible tsunami struck the coast of Japan in 2011. Yoshie Osaka was driving at the time, 4.8 kilometers (3 miles) inland. A radio report said the water would not reach her. She later recalled, "The water came fast and strong. Before I knew it, the water was lifting cars, including mine." Yoshie escaped through a car window, and some people helped her get to safety.



SURVIVING A TSUNAMI

Toshitaka Katada is a professor in Japan. He created a program to teach children how to survive a tsunami. They learn to decide when to go to higher ground. They do not wait for an adult to tell them. In 2011, the program helped save 3,000 students in the town of Kamaishi.