

# Tsunami!

## What Is a Tsunami?

A tsunami (tsu-NAH-mee) is a series of powerful undersea waves. It is usually caused by an underwater earthquake, landslide, or volcano. Any of these disturbances will send out circular waves, like the ripples in a pond when you toss in a pebble. Tsunami waves, though, are incredibly powerful and quick-moving. They can travel faster than a jet—about 600 to 900 kilometres an hour. The first of this series of waves may not be the largest. The danger from these waves can last for several hours after the first wave arrives at the shore.


## Deadly Waves

Tsunamis do not cause any damage until they hit land. In 1946, an earthquake in Alaska generated a wave that travelled more than 4000 kilometres to Hawaii. Sailors on a ship anchored off Hawaii were looking toward the harbour when they saw a huge wave rise out of the water. As they watched in horror, the wave crashed onto the shore. It inundated the coast, snapping palm trees as if they were toothpicks, carrying boats several metres inland, and reducing the timber in buildings to the size of metre sticks.

Yet the sailors had not even felt the wave pass under their ship! They didn't feel it because most of the wave was underwater. When it hit the shallow ground near the shore, the faster water behind piled up into a massive wall of water.

In 1964, an earthquake in Prince William Sound, Alaska, triggered a massive tsunami that travelled throughout the Pacific.



 Ring of Fire. This area is known as the Ring of Fire because of the frequency of earthquakes and volcanic eruptions in the region.

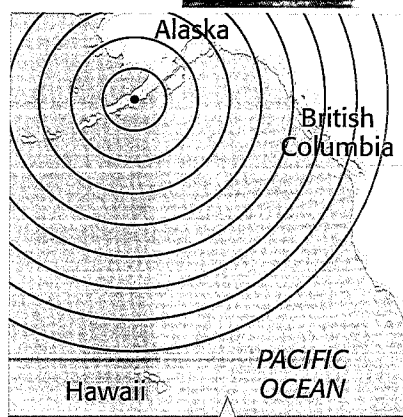
Most tsunamis occur in active volcanic regions, such as the Pacific Ocean.

Enormous waves crashed against Vancouver Island and travelled up one inlet to the city of Port Alberni—just four hours after the earthquake occurred. The first wave caused massive flooding in Port Alberni. Log booms broke loose and were scattered about the area. An hour later, a far more destructive wave hit. This second wave caused extensive damage by swamping many boats. It also picked up homes and cars, hurling them further inland.

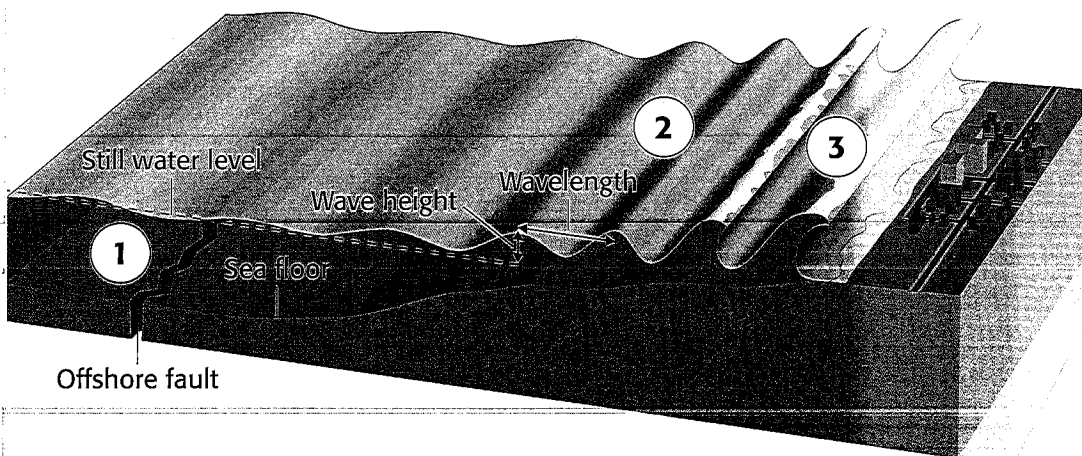
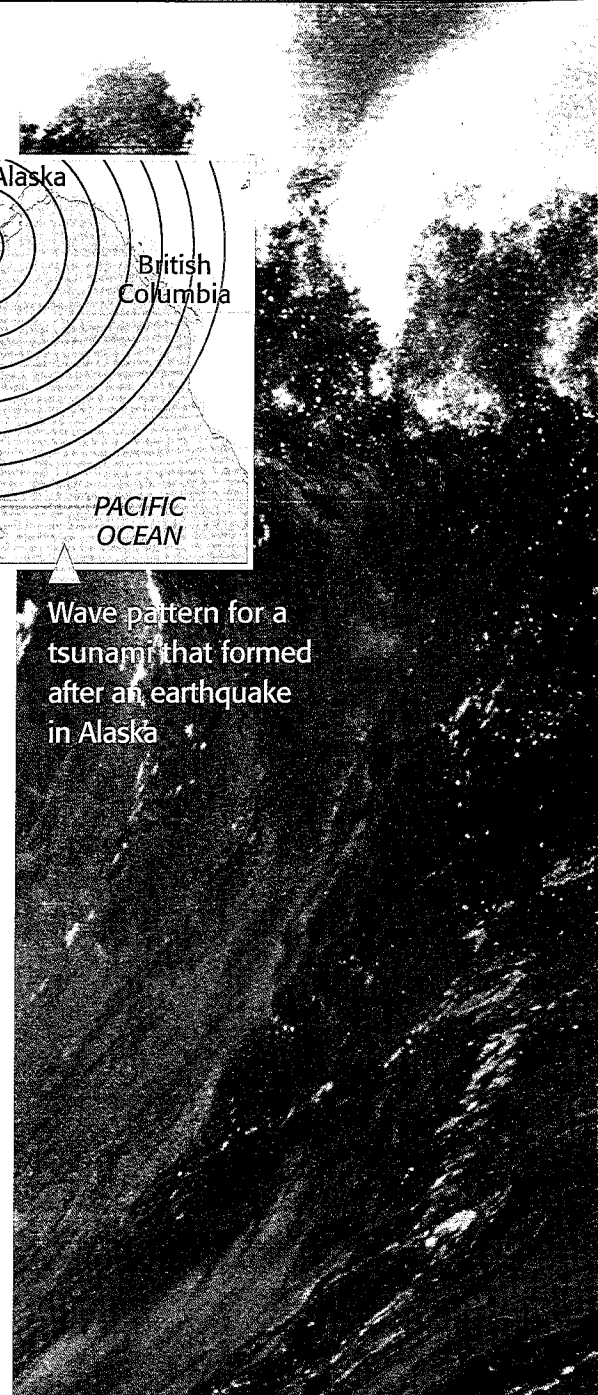
Some tsunamis can be deadly, as well as destructive. When the volcano on the island of Krakatoa, Indonesia, erupted in 1883, it created waves that were 35 metres high. The waves crashed against the islands of Java and Sumatra. More than 36 000 people died.

## Detection

Tsunamis cannot be prevented, but islands and coastal areas around the Pacific now have a warning system. Instruments called **seismographs** pick up disturbances in the ocean. Tide gauges attached to buoys measure the speed of waves and then relay information to research centres via satellites. If scientists detect a fast-moving wave, they can warn people in its path to evacuate the area.

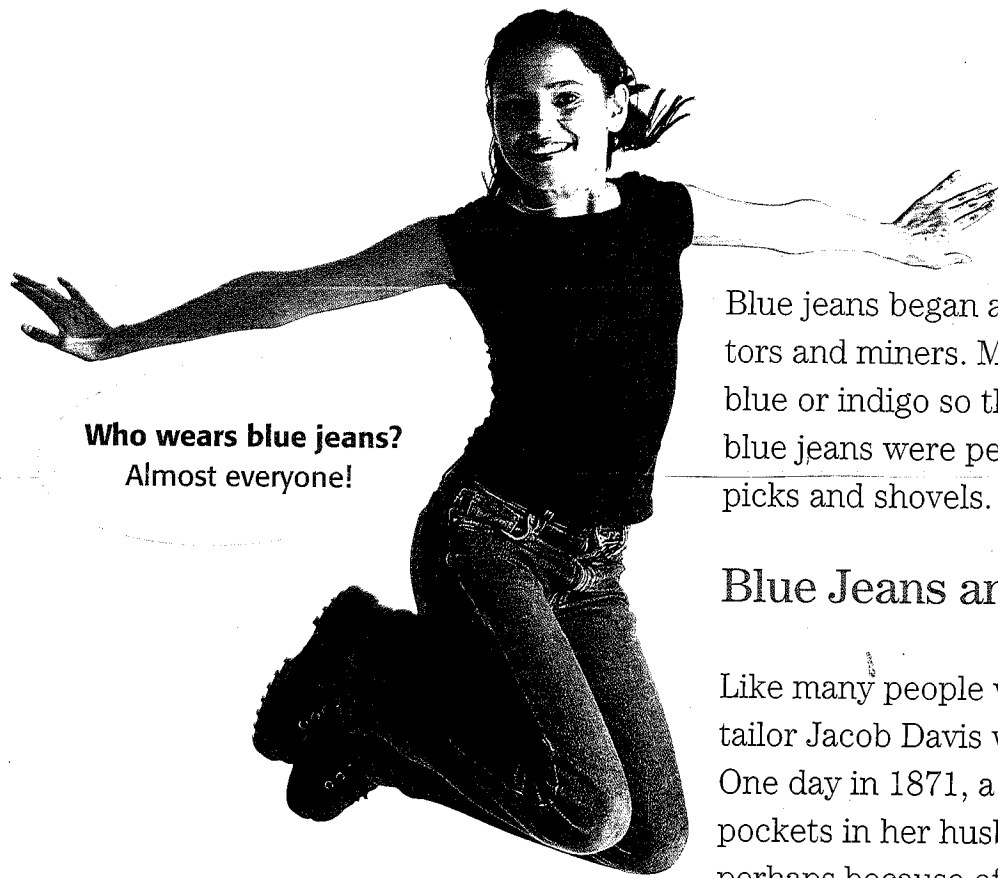


Wave pattern for a tsunami that formed after an earthquake in Alaska



## How a Tsunami Forms

1. An underwater earthquake, landslide, or volcano creates a series of powerful waves.
2. The waves move rapidly outward. As the waves approach shore, they get bigger (wave height increases). At the same time, the distance between the waves gets smaller (wavelength decreases).
3. When the deepest part of a wave nears shore, it slows down. Water behind the wave rushes forward, forming a massive wall of water that then collapses onto the shore.



**Who wears blue jeans?**  
Almost everyone!

Blue jeans began as tough work clothes for prospectors and miners. Made of sturdy fabric and dyed deep blue or indigo so they wouldn't show dirt and stains, blue jeans were perfect for men who worked with picks and shovels.

## Blue Jeans and Frontiers

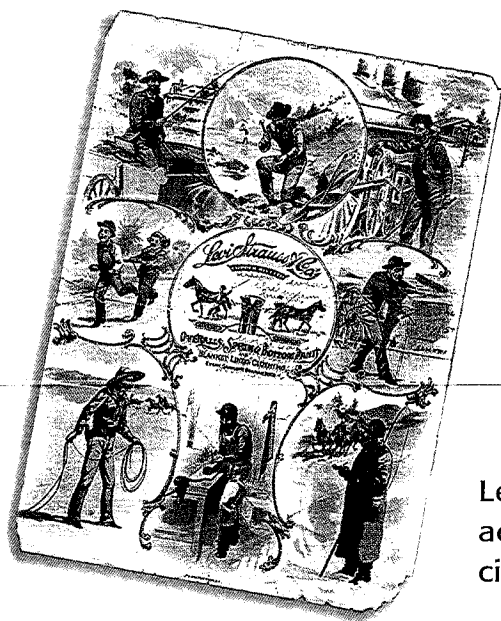
Like many people who lived on the frontier, Nevada tailor Jacob Davis was a resourceful problem solver. One day in 1871, a customer complained that the pockets in her husband's pants were always tearing, perhaps because of the gold nuggets he carried. Davis looked around his shop for something stronger than thread to hold the pockets in place. Some copper rivets—fasteners for horse blankets—were lying on the table. "The thought struck me to fasten the pockets with rivets," Davis later said. "I had never thought of it before." Davis soon began making workpants that were reinforced with rivets.

Prospectors and miners soon heard of the tough new pants, and Davis was kept busy making them. He wanted to apply for a patent for his invention, but he didn't have enough money. He contacted the man he bought his cloth from, Levi Strauss. Strauss agreed to be his partner. They received the patent, and Levi Strauss & Co. began manufacturing the reinforced workpants using blue denim fabric.

## Blue Jeans Become Popular

For the next 80 years, men who worked outdoors bought most of the blue jeans. Then in the 1950s and 1960s, jeans began to appear often in movies,

# The Story of Blue Jeans



Levi Strauss & Co.  
advertisement,  
circa 1899

advertisements, and magazines. People connected them with youth, independence, and rebellion. Young men and women liked the way they looked and felt, and manufacturers hurried to create different styles. Soon, people were adding beads, coloured thread, and paint to make their jeans stand out. Designers began using blue jeans and denim in high fashion.

In the 1960s, making jeans used a lot of energy and strong chemicals. Today, new energy-saving processes are used. Scientists have developed dyes that use fewer strong chemicals. They are even working on a “bug wash” that uses bacteria, instead of chemicals, to turn the fabric dark blue!

Blue jeans are part of our culture. They come in all shapes and styles. Books and songs are written about them. Rock bands and perfumes have been named after them. Recently, a pair of blue jeans from the 1870s sold in an auction for \$75 000!

Today, almost everyone in Canada has a favourite pair. Look around you. How many people are wearing jeans? What’s your favourite style?

**1871**

Jacob Davis invents the idea to use rivets on pant pockets

**1873**

Levi Strauss and Jacob Davis receive a patent for riveted pants.

**1930s**

Popular western movies show cowboys wearing jeans.



**1954**

Marlon Brando wears blue jeans in the movie *The Wild One*.

**1970s**

Some blue jeans are beaded, embroidered, and painted.

**1980s**

Designer blue jeans appear.

**2000**

The Levi Strauss Museum opens in Buttenheim, Germany.