

## The Monsters at Mavericks

So now you know what a wave is, how it forms, and how it moves. You're probably still curious, though, about how the waves at Mavericks get so huge.

The first part of the answer has to do with time. Remember that the Mavericks Surf Contest takes place in winter. That's no accident. It's the time of year when big storms brew over the Pacific Ocean. Those storms have powerful winds. That means they make waves packed with energy. The waves travel thousands of kilometers to the California coast.

The second part of the answer has to do with the seafloor. Below Mavericks lie rocky ledges, or step-like layers of stone. These ledges play a key role. To understand how, picture yourself holding a magnifying glass in the sun. The lens focuses the light to a point. Well, the rocks at Mavericks focus wave energy in a similar way.

As a result, the waves climb to higher crests than before. Then they plunge to lower troughs. That creates the massive waves that make Mavericks a surfers' paradise.

## Walls of Water

Awesome though they are, the waves at Mavericks are small compared to some others. Take **rogue waves**, for instance. They are huge waves that appear out of nowhere.

Rogue waves can be more than 20 meters (66 feet)! Sailors who have survived them talked about seeing huge walls of water. For a long time, people thought the sailors were telling tall tales.

Opinions have changed recently. Modern satellites took images of rogue waves in action. Sailors even snapped pictures of a few, such as the one below.

Now there's no doubt: Rogue waves are real. We just don't know exactly what causes them. They may form when two or more waves get stacked on top of one another.

I have never seen a rogue wave, and that's just fine with me. On a sailing trip once, we were pounded by two-story waves. That experience was enough to renew my respect for the power of waves! Of course, we still have not talked about the most terrifying waves of all.



© KASSTEN PEERSEN

**Sea Monster.** A Danish sailor took this photo of a rogue wave in the North Sea.

## Killer Waves

For raw power, no waves can beat tsunamis. A tsunami is an incredibly powerful wave. It differs from a regular wave in two ways.

First, a tsunami isn't formed by wind. It results from a major underwater event. That could be an earthquake or volcanic eruption. So a tsunami has a huge amount of energy.

Second, ordinary waves travel near the surface. They don't affect the water underneath them. Not tsunamis. They affect all the water from the seafloor to the surface. That makes them far more powerful than everyday waves.

Tsunamis can be huge. The wavelength can be many kilometers. Tsunamis are fast, too. They can zip through the water at 800 kilometers (500 miles) an hour. That's as fast as a modern passenger jet!

Add all that power and speed together, then imagine it slamming onto a shore. The result can be large waves that cause huge damage.

Over the ages, tsunamis have killed countless people. In fact, a group of powerful tsunamis caused one of the worst disasters in modern times.

On December 26, 2004, a strong earthquake shook Indonesia. The quake triggered a series of tsunamis. Killer waves plowed into the shores of 14 countries. The waves killed more than 200,000 people.

Killer waves in Southeast Asia are a far cry from a surfing contest in California. Yet both fascinate me. Each shows, in very different ways, the amazing power of waves.

## Wordwise

**crest:** highest point of a wave

**oceanographer:** scientist who studies the ocean

**rogue wave:** huge wave that suddenly appears

**trough:** lowest point of a wave

**tsunami:** powerful wave caused by an underwater earthquake or volcano

**wavelength:** distance between two crests

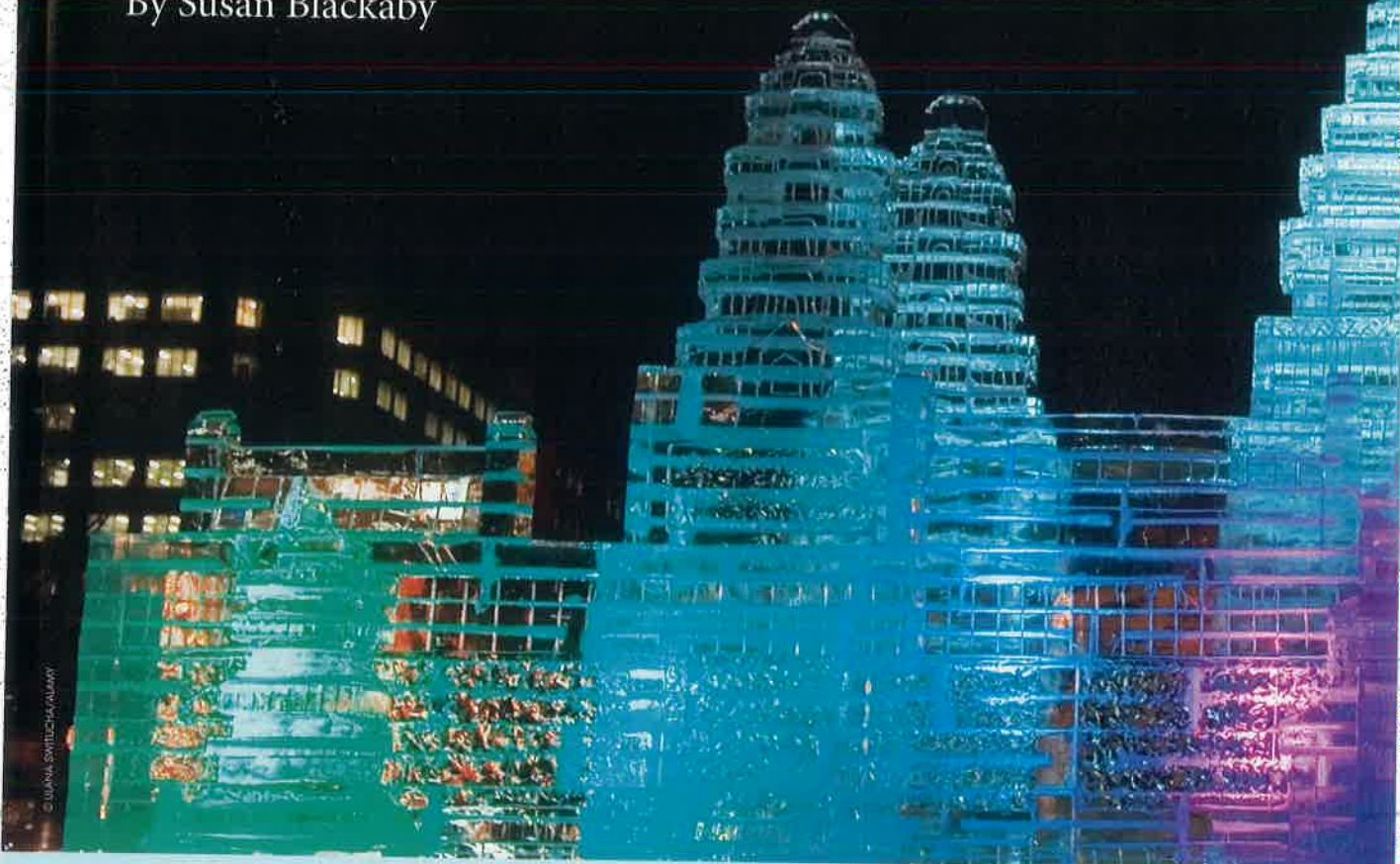
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**Wrecked by Water.** In December 2004, a powerful tsunami destroyed this hotel in Thailand.

# Sapporo's Winter Festival

By Susan Blackaby



**T**hink of the bone-tingling chill of early February. Many people choose to stay indoors with a mug of hot chocolate where it is snug and warm.

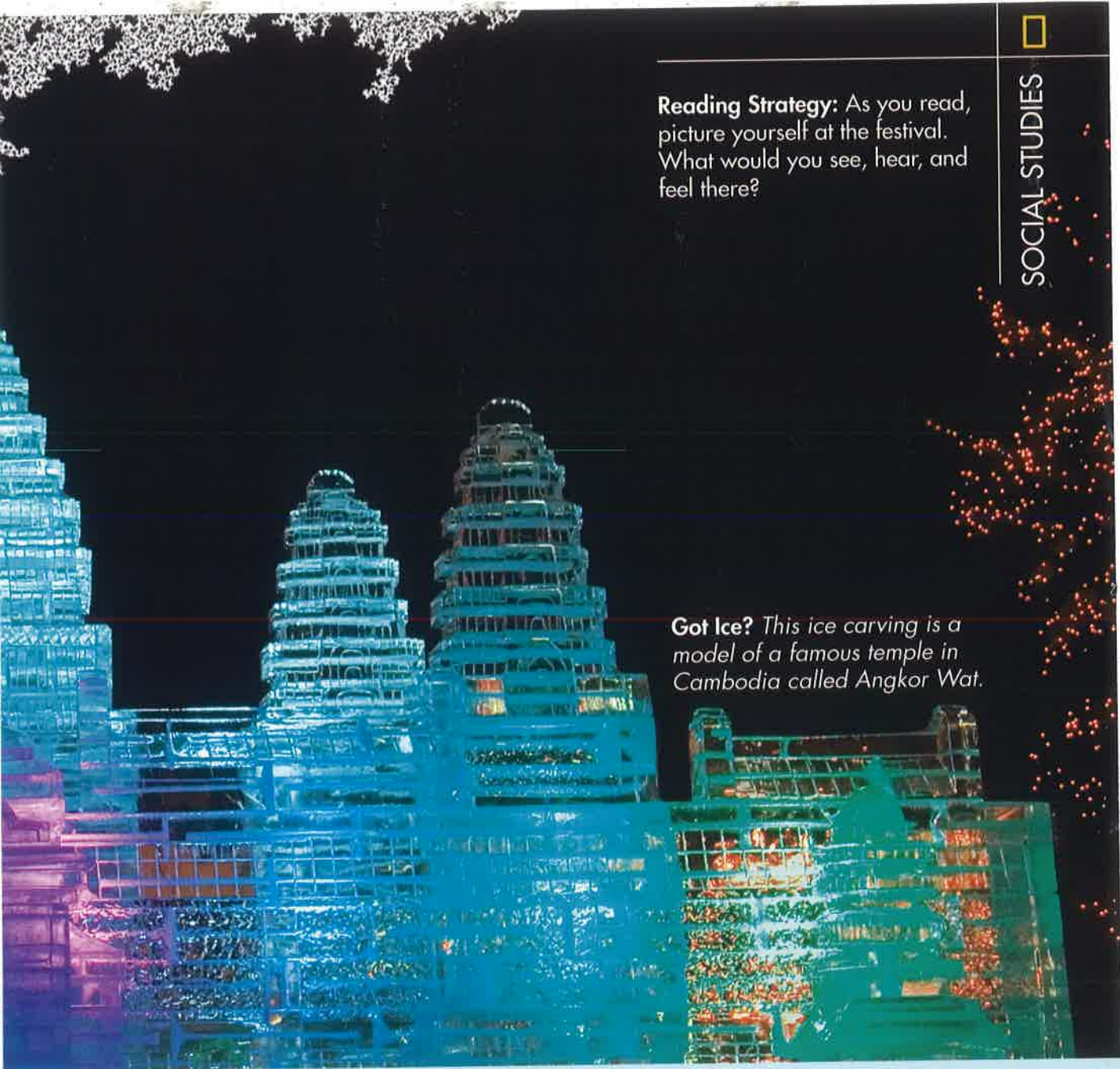
Yet in Sapporo, Japan, people can't wait to bundle up and go outside. Some of them can't wait to start shoveling snow! This is not the kind of snow shoveling that clears the sidewalk. This is the kind of snow shoveling that turns a city into a celebration. It is the start of something special—*Yuki Matsuri*, the yearly Sapporo Snow Festival.

## Get Ready, Get Set, Snow!

Weeks before the festival begins, trucks bring loads of snow into the city. Workers build frames to hold the snow. Scaffolds rise. Structures take shape. Thousands of other workers make ice slides, outdoor cafes, dizzy mazes, and stages. Everything is made from blocks of ice and heaps of snow.

The festival itself starts in February. That's when the snow sculptors and ice carvers come to town. Judges choose the artists based on their designs and skills. Only the very best get to compete.

**Reading Strategy:** As you read, picture yourself at the festival. What would you see, hear, and feel there?



**Got Ice?** This ice carving is a model of a famous temple in Cambodia called Angkor Wat.

## Rules and Tools

Patricia Leguen was one of the lucky artists chosen. She represented Canada at the 2001 Festival. She says, "It is an honor to be invited to Sapporo. The competition is so exhausting, but it is so fun! Our guide showed us where we would be working.

"Then the guide said, 'Today you will see 2 million people.' And we did! I couldn't believe how many people came out to watch us work."

Snow sculptors work very hard. Leguen says, "you have to shovel two or three tons of snow before your idea starts to take shape."

## Teamwork

Like the other sculptors, Leguen worked with a team. Each team has one leader and two helpers. The block of snow they use is a square. It is 3 meters (10 feet) tall, wide, and long. The teams work 11 or 12 hours a day for four days.

Carefully, each team chips away at the block of snow. They use hand tools such as chisels and hatchets. Slowly, the designs start to form.

The end result is worth the long hours and sore muscles. An amazing design shimmers in the winter sun. The snow is as smooth and rich and cool as marble. It just doesn't last as long!

## Carving Ice

In another part of the city, ice carvers compete, too. They stack up blocks of clear ice. Teams use chainsaws and grinding tools, shovels and spoons. They chip away at the glassy surface. Shard by shard, towering statues come to life.

Many of the ice carvers are famous in the cooking world. There, they chisel elegant designs in ice to use as decorations at parties. However, ice carving at a competition like this is very different. The size of the carving is much bigger. The hours are much longer. The weather is much, much colder.

Creating an ice sculpture takes talent. It takes an understanding of science. It takes strength. All the work pays off. Ice carvings are spectacular! They sparkle like diamonds. They dazzle the eye and boggle the mind.

## Celebrating Winter

This worldwide celebration started out as something very small. In 1950, the citizens of Sapporo were stuck in the middle of a long, hard winter. They were bored. They were tired of staying inside. They needed some excitement to brighten things up! They decided to do something about it.

The town held a one-day celebration. Everyone ventured outside. They met at a park in the center of the city. There, people enjoyed lively music and dog races. They danced and watched movies.

## Bring on the Fun!

Some high-school students got into the spirit of the celebration. They built things out of snow. Instead of the snowmen people were used to seeing, they built six snow sculptures. Those big sculptures were the start of something great. The Sapporo Snow Festival was born. From then on, the festival became a yearly event.

In 1955, soldiers from a nearby military base joined the fun. They trucked in tons and tons of snow. They packed the snow into sturdy frames to make giant blocks. They built platforms and set up ladders.

The soldiers built huge monuments out of the snow. They crafted giant statues. The snow sculptures got people's attention. People around the world took notice. These sculptures helped turn a small fair into an international event.

More than 50 years have passed since the first chilly gathering. Today, the Sapporo Snow Festival is a wintry inspiration for artists, carvers, and visitors. For seven special days each February, the city is a winter wonderland.

Millions of people come to see the snow sculptures and ice carvings. They bundle up to brave freezing temperatures. They can't wait to celebrate the season—and the snow.

**Tools of the Trade.** *People build scaffolds to keep the snow in place while they work. They use tall ladders to reach the top of the sculptures.*



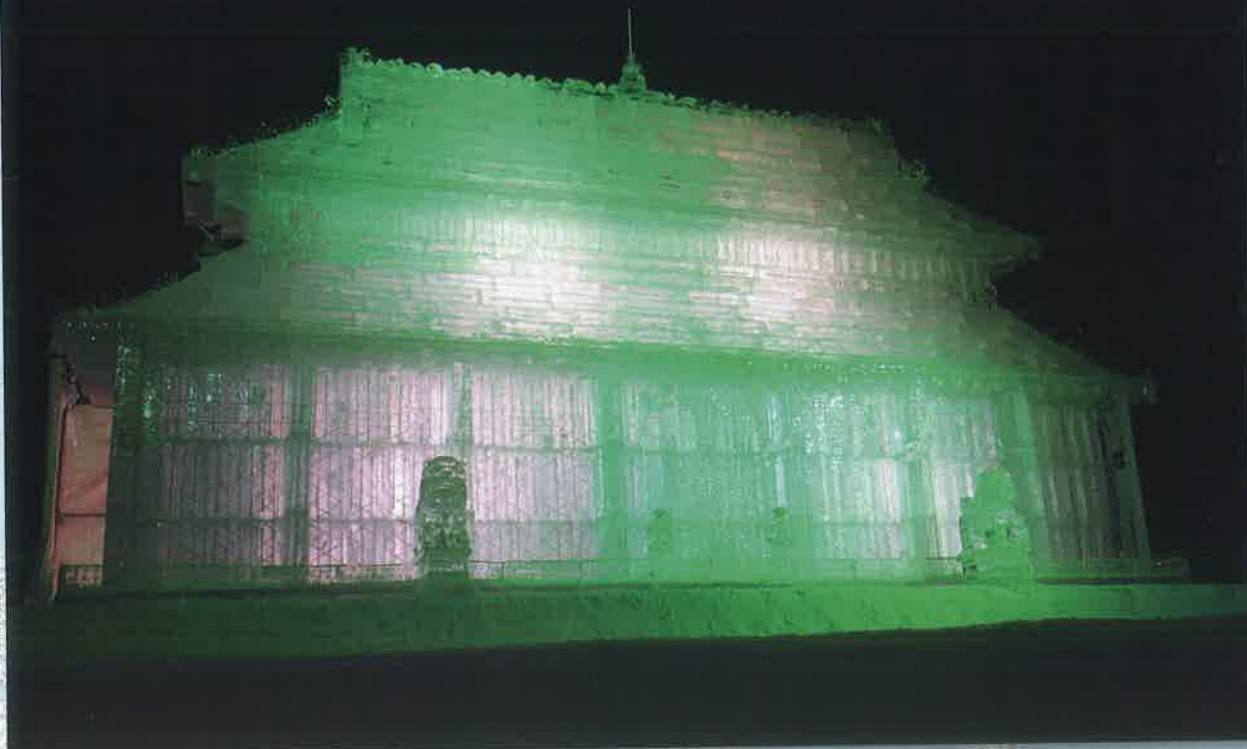
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**Frozen in Time.** *This snow sculpture brings dinosaurs to life. Notice how small the visitors are, compared to the sculpture.*



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**Building Blocks.** *This sculpture of a Japanese temple took more than 1,200 blocks of ice to create.*



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# Coming in January

**Nature's Solutions:** Can a swimsuit made like sharkskin help you swim faster? That's one example of how engineers are turning to nature for ideas.

**Icebergs:** Find out how these floating mountains of ice form, and learn why scientists keep a careful eye on them.

**Gold Fever:** See how gold has driven people to move mountains, conquer countries, and risk their lives just to own it.

**Seahorses:** They look like horses. The males have babies. They make clicking sounds. Learn more about these quirky fish.



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