What is a Glacier?

Glaciers are made of ice

Think About It!

There are 204 glaciers in Canada and the United States. Where in these two countries do you think most of these glaciers are located?

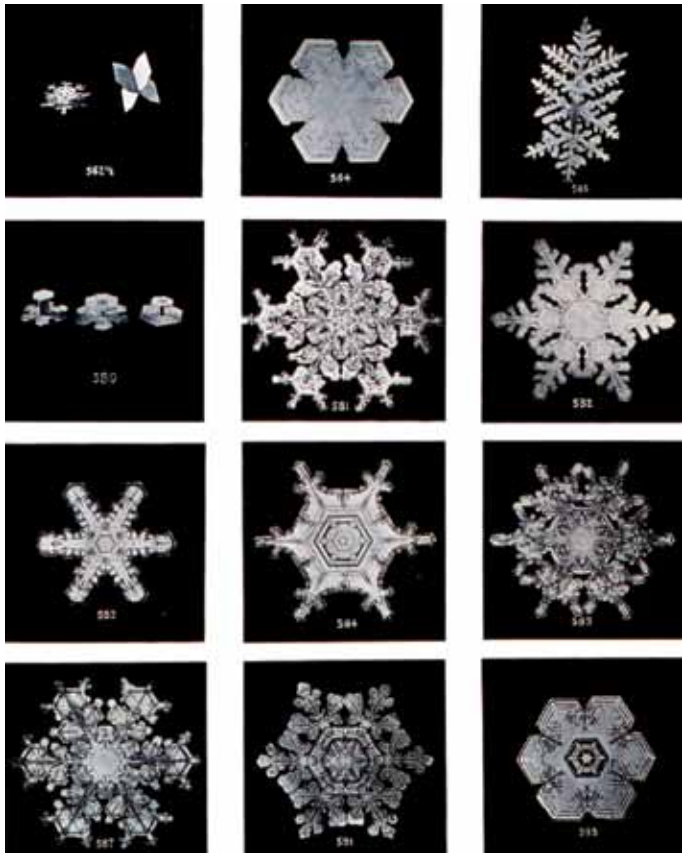
A **glacier** is a huge mass of moving ice that forms when snow remains over a period of many years to transform into ice. They form under the following conditions:

- When more snow falls than melts.
- The climate is cool enough year-round. Even though some of the snow melts or **evaporates** during the warm summer months, some snow stays all year.

Word Connection

evaporate—The process of a liquid changing into an invisible gas.

- The layers of snow build up over hundreds and thousands of years.
- When enough snow turns into glacial ice, the glacier flows downhill or outward under the force of gravity.



These are some of the first photographs ever made of snowflakes. They were taken over a hundred years ago by an amateur photographer named Wilson Bentley.

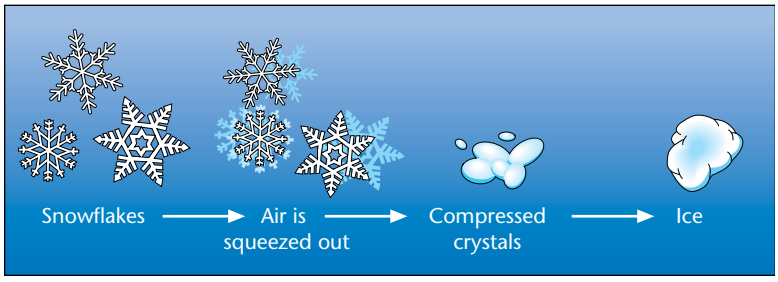
Snow Turns into Ice

There's more to a glacier than deep snow. Snowflakes are **crystals** made of frozen water. Between the frozen water there are air spaces. In fact, there can be more air in the spaces of a snowflake than there is water! That's why newly fallen snow is often light and fluffy.

Now think about what happens when you make a snowball. As you pack the snow together with your hands, the ball of snow becomes icier and harder—and, even though it may be smaller than it was to begin with, it becomes heavier as you add more snow. This happens because, as you pack the snow, you crush the crystals together, pushing out the air. The heat from your hands also melts some of the crystals. This melted water becomes ice when it gets cold and freezes again.

The same things happen as more snow piles up on a glacier. The layers of snow are **compressed** until almost all of the air is squeezed out. At the deepest layers, the snow crystals turn to ice.

From Snow to Ice



Our Geosphere Fact

Without air in it, the ice in the lower layers of a glacier looks blue instead of white. The snow and ice higher up still has air so it looks white.

Our Geosphere Fact

When most of the air is squeezed out of ice in a glacier, it becomes very hard; it takes a lot of heat to make this ice melt. In fact, scientists describe this kind of ice, in the deepest layers of glaciers, as a type of rock.

Glaciers Move!

A glacier isn't just a huge mass of ice and snow that never melts. Remember, in order to be considered a glacier, this ice must also move.

Think About It!

What does the glacier in this picture remind you of?

Some people think glaciers look like huge rivers of ice. Of course, if you visit a glacier, you won't see it flow, the way you could see a river flow. That's because glaciers usually move incredibly slowly—as slow as 2.5 to 5 centimeters (1-2 inches) a day.

Why do glaciers move? The answer is gravity and weight.

If the glacier is on a slope, especially a steep slope, the ice will move downhill over time. Even though ice is frozen water, there is so much weight in a glacier, that it moves very, very slowly, like candle wax that's just slightly warmed.

Another reason why the glacier moves is that some of the ice at the bottom melts. Wet ice is very slippery. The ice of the glacier slowly slides down this slick surface.

Glaciers generally move downhill, or **advance**. They may lose some snow and ice each year, during the warmer months, as a result of melting and evaporation. But, as long as more snow is added during the colder months than is lost in the warmer months, a glacier will continue to grow and advance.

The Retreat of a Glacier

A partially melted glacier reveals changes to the landscape.

If more snow and ice is lost than is replaced each year, a glacier will begin to shrink. Though it may still flow and move downhill, if more ice melts from the lower part of a glacier than is replaced from above, the glacier appears to **retreat**.

When a glacier retreats and melts away completely, you can really see how the landscape has changed.

Glossary

advance
To move forward.

compressed
Made smaller by squeezing.

crystal
A solid material with a pattern that repeats over and over. Minerals form as crystals.

glacier
A large, long-lasting mass of moving ice and snow. Glaciers move downhill or outward in all directions as a result of gravity and their immense weight; they retreat (shrink) as a result of melting.

retreat
To move backwards.

Credits

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