

GLACIERS

Warm Up

Have you ever heard of “glaciers”?

Most of us haven’t seen a glacier.

Did you know that Mount Everest and the Himalayan Mountains are home to thousands of glaciers that are important not only to the mountains and the people that live there but to everyone on Earth?

Look at this picture to understand how glaciers are formed.

A glacier's life cycle

1. BIRTH

Snowfall and snow compression at the top of the glacier cause ice accumulation

2. FROM SNOW TO ICE

Snowflakes are rounded and compressed by pressure until they become glacial ice

3. TRIBUTARIES

Smaller glaciers join the flow, causing the main glacier to grow in size

4. OUTFLOW AREA

The glacier loses ice and consistency because of the melting and evaporation

5. MELTING

The water from the melted stream flows out of the glacier through channels and tunnels

6. BREAKAGE

Ice blocks become detached at the front of the glacier and form icebergs

Vocabulary

alpine regions: mountainous regions especially those around the Alps (mountains in Europe)

accumulated: piled up or collected especially little by little

survives: continues to live or exist

compressed: flattened by pressure

compact: densely packed

base: the lowest part

overlying: lying on top

deformed: not having a natural shape or form

relentless: persistent, continuous, or never stopping

carved: cut out

dome: round shaped on top

sediment: a thick substance that sinks to the bottom of a liquid

fan out: to spread out

How are glaciers formed?

A glacier forms when snow collects over time, turns to ice, and begins to flow outwards and downwards under the pressure of its own weight.

In polar and high-altitude alpine regions, glaciers generally collect more snow than they lose from melting or evaporation. If the accumulated snow survives one melting season, it forms a denser, more compressed layer called firn.



Firn

The snow and firn are further compressed by more snow that falls on it. The buried layers of snow slowly grow together to form a thick sheet of ice. Each year's new snowfall continues to compact the underlying layers. In time, dense glaciers form.

Forward movement

Under the pressure of its own weight, a glacier will begin to move, or flow, outwards and downwards.

Valley glaciers flow down valleys, and continental ice sheets flow outward in all directions.

An ice sheet is a mass of glacial land ice extending more than 50,000 square kilometres. Ice sheets once covered much of the Northern Hemisphere. Now, the Earth has just two ice sheets: one covers most of Greenland, the largest island in the world, and the other spreads all the way across the Antarctic continent. Ice sheets are constantly in motion, spreading out under their own weight in broad domes.

A glacier may slide on a thin layer of water at its base. This water may come from glacial melting due to the pressure of the overlying ice, or from water that has worked its way through cracks in the glacier. Glaciers can also readily slide on soft sediment.

The sheer weight of a thick layer of ice, or the force of gravity on the ice mass, causes glaciers to flow. Ice is a soft material, in comparison to rock, and is more easily deformed by the relentless pressure of its own weight. Ice may flow down mountain

valleys, fan out across plains, or in some locations, spread out onto the sea.

Glacier caves form within the ice of a glacier. Glacier caves are often carved out by water running through or under the glacier's ice.

adapted from <https://nsidc.org/learn/parts-cryosphere/glaciers/science-glaciers#:~:text=In%20polar%20and%20high%2Daltitude,more%20compressed%20layer%20called%20firn.>

- A. Choose the most appropriate answers.
1. What is the term used for the denser, more compressed layer formed when accumulated snow survives one melt season?
 - a. Ice layer
 - b. Firn
 - c. Glacier bed
 - d. Avalanche
 2. How do glaciers form due to the accumulation of snow and firn layers?
 - a. By evaporation

- b. By compression
 - c. By melting
 - d. By sliding
3. What is an ice sheet, and how large must it be to be considered one?
- a. A small glacier; less than 10,000 square kilometres
 - b. A mass of glacial land ice; more than 50,000 square kilometres
 - c. A type of firn layer about 500 square kilometres
 - d. A layer of compressed snow less than 10,000 square kilometres
4. What role does water play in the sliding movement of glaciers?
- a. It causes glaciers to evaporate
 - b. It forms glacier caves
 - c. It creates cracks in the glacier
 - d. A glacier can slide on a thin layer of water at its base
5. How does the sheer weight of a thick layer of ice contribute to the flow of glaciers?
- a. By causing sinking
 - b. By causing earthquakes

- c. By deforming the ice under pressure
- d. By increasing the rate of evaporation

B. Answer the questions

1. How does a glacier form?
2. What is the role of firn in the formation of glaciers?
3. What causes the forward movement or flow of a glacier?
4. Where are the two remaining ice sheets on Earth located?
5. How can glaciers slide, and what are the factors that contribute to their flow?

C. Think and Answer

1. Can you think of one reason why glaciers are important for mankind?
2. You must have heard of these terms: 'global warming', 'greenhouse gases', and climate change—what connection can they have with glaciers receding today?

D. Some words have more than one meaning. For example:

I was *right* that the bed should be placed on the *right* side of the room

right in the first instance means *true or correct as a fact* and in the second instance refers to a *direction*.

Tick the correct meaning of the word as used in the given sentence.

1. I bought a **bow** and arrow from the fair. (a weapon for shooting arrows/to bend your body towards someone as a mark of respect)
2. We **left** as soon as the play ended. (went away/a direction)
3. The **band** played a song that I liked. (a musical group/
a thin, flat strip of material put around something to fasten or strengthen)
4. Tanya cannot **bear** to lose. (to tolerate or endure something/a large mammal with a thick coat of fur).
5. The **cut** was deep, but she recovered quickly. (a wound or injury caused by a

sharp object/to divide or separate something with a sharp tool.

E. Use words from 'vocabulary' to complete these sentences.

1. The mountain climber explored the _____ regions and saw snow-capped mountains.
2. The toy car was _____ when it fell from the table.
3. The backpack was _____, it fit easily into the overhead compartment of the train.
4. The branch of the tree broke because of the weight of the _____ snow after the snowstorm.
5. Pramod has _____ many pebbles. He collects them all the time.
6. The pedestal for the _____ of the statue is made of copper.
- 7 A plant can _____ if it is watered carefully and gets enough sunlight.

8. When it is _____, clay can be used to make earthen vessels.
9. Meera _____ her initials on a piece of chalk.
10. The _____ rain flooded the fields.

F. Make sentences with the words given under 'Vocabulary'.