

A Tour of Hawaii's Volcanoes

For our science fair project, Carlos, Peggy, and I decided to build a volcano. We got the tallest bottle we could find and dumped in some baking soda. Then we molded a mountain of clay around it. We left a small opening at the top of the bottle for the volcano's mouth, or vent. Then we put drops of red food coloring into some vinegar and poured the mixture into the bottle. It mixed with the baking soda, just like a real volcano! When we won first place, Mr. Kline, our principal, informed us we would be rewarded with a trip to the Hawaiian Islands. He would be our pilot and guide.

As we flew over the Pacific Ocean, I surveyed a chain of eight islands below. I knew volcanoes had formed them. Columns of magma had shot up from a hot spot under the ocean floor. The lava had cooled, forming mountains whose tops stuck out of the ocean. The mountaintops had formed the Hawaiian Islands.

"We're landing on the island of Maui," said Mr. Kline, as he brought the plane down.

Carlos sat low in his seat. "I hope none of these volcanoes erupt while we're here!" he said.

"Most volcanoes on the islands today are dormant, or inactive," I informed him. I had once written a report on Hawaii.

The plane landed in a valley surrounded by high mountains. We started to hike one of the trails leading to the island's highest point. "Haleakala is more than ten thousand feet tall," said Mr. Kline, puffing as we walked up the rocky trail. "We won't have time to reach the summit by foot today. We will have to see it from the air."

"Is this really a volcano?" asked Peggy.

"Yes," said Mr. Kline. "Hawaii's volcanoes are shield volcanoes. Every volcano has a cone at its top made of lava and rocks that pile up when the volcano erupts. A shield volcano sends out flows of lava. It has a gently sloping, wide cone." Mr. Kline pointed to the large slabs of black rock that we walked on. "These rocks are made from lava that once flowed from the volcano's vent."

After we had hiked for a while, we returned to the plane. When we were in the air above the volcano, we were able to look down and see a wide hole that looked like a bowl. "That's Haleakala's crater, or vent," said Mr. Kline.

“Why isn’t it blowing melted rock and ash now?” asked Peggy.

“This volcano hasn’t erupted for a few hundred years,” said Mr. Kline. “We’ll have to go to the big island of Hawaii to see an active volcano.”

As we made our way south to the next site, I informed everyone, “The island called Hawaii was formed from five different volcanoes. Three of them are still active.”

Soon we landed on the southwestern coast of the island where visitors can easily view Mauna Loa. At 13,680 feet tall, it is the largest volcano on Earth. It erupts every few years, but it has not erupted since 1984. It did not erupt the day we visited it either.

Mr. Kline called to us to board the plane one last time. “We’ll finish our tour from the air.” As the plane headed south of Hawaii, he pointed and said, “There, more than three thousand feet below the surface of the ocean, is Hawaii’s youngest volcano, Loihi. Scientists think it will reach the surface of the ocean in about 250,000 years. It could become Hawaii’s newest island.”

“Are we ever going to see a volcano erupting?” I asked.

“Yes,” said Mr. Kline, smiling and turning the plane back toward Hawaii. “We’re flying over Kilauea today,” he said. “It sits next to Mauna Loa and is Hawaii’s most active volcano.”

We flew up a three-mile-wide channel of molten rock. When we got to the crater at Kilauea’s summit, Mr. Kline said, “Look closely at the walls of the crater.” We saw lava oozing from them. Then Mr. Kline flew over Kilauea’s cone. We saw smoldering rocks inside rock tubes and small streams of lava pouring between stones. The lava was slowly making its way toward the Pacific Ocean. “Lava from Kilauea has buried houses and covered roads,” he said as we continued to fly away. “It even destroyed the visitors’ center.”

Mr. Kline flew the plane toward San Francisco to return home, but I could not stop thinking about Kilauea. “That’s probably the only erupting volcano I’ll ever see,” I said. I knew I would never forget it.

Frozen Earth Movers

Imagine being in a boat along the coast of Alaska, about one hundred miles northwest of Juneau. Look out across Glacier Bay, and you will see icy masses called glaciers descending from the mountains down to the ocean. The glacial snow has a blue sparkle to it. Occasionally, a piece of glacier breaks off from the mass and falls into the water with a loud splash. The glaciers are a spectacular sight!

A glacier is any large, moving mass of snow and ice that stays frozen from year to year. It is a river of ice that moves in response to gravity. Glaciers cover 10 percent of Earth's surface. They occur on every continent except Australia. Together they store about three-quarters of all the freshwater in the world.

There are different types of glaciers. Large glaciers that cover vast areas of land and move outward in all directions are called ice sheets. Antarctica and Greenland are the only ice sheets in the world. The Antarctic ice sheet is larger than the United States and is more than 2.5 miles thick in some areas! Together, the Antarctic and Greenland ice sheets make up 99 percent of the world's glacial ice. Small ice sheets are called ice caps. Glaciers that move down mountains are called alpine glaciers. The largest alpine glaciers are found in Arctic Canada, Alaska, South America, and Asia. Glaciers that lie on level ground at the foot of mountain ranges are called piedmont glaciers. Those that lie on the ocean at the edge of an ice sheet, like on Antarctica, are called ice shelves.

How do glaciers form? In high places, summer heat does not always melt all the snow. The snow mass increases each year. As the weight of the snow increases, it begins to turn into ice. In time the ice crystals lose their sharp edges. The air space between the crystals becomes smaller as they pack more closely together. Denser, larger crystals develop at the bottom of the glacier. It is this density that gives glaciers a blue tone.

What makes glaciers move? They usually begin to move downward from the pressure of their own weight. The ice on the bottom of the glacier simply slides across the ground. Glaciers move as they shrink or grow in size. Streams of water flow from melting glaciers, and lakes may form. Sometimes, glaciers move down mountains right into the ocean. Ice is lost when big chunks break off and fall into the water. This process is called calving.

Glaciers change the land as they move across it. The dense ice scrapes the land, wearing away rocks and soil through erosion. Sometimes a glacier pushes rock and soil forward, much like a bulldozer moves dirt. Many U-shaped valleys and basins were carved this way. The moved earth is deposited on the sides or at the end of the glacier.

A lot of land was formed by glaciers at the end of the most recent ice age, more than ten thousand years ago. If you look closely around you, you might see piles of rocks that were placed there by glaciers. You can also see scratches in the surface of rocks. Glaciers also formed hills, ridges, and mounds. The glaciers gradually retreated due to melting.

Glaciers require a delicate balance in temperature to survive. They must receive enough snow to replace ice lost by melting or calving. If a glacier loses more mass than it gains in a given time period, it shrinks. Scientists estimate that the seas would rise by three hundred feet if all the world's glaciers melted. Currently, sea levels rise only about two millimeters per year. Some scientists are concerned that climate change will increase this rate.

Climate change is an increase in the average temperature of Earth. This is due to higher levels of greenhouse gases, such as carbon dioxide and methane, in the atmosphere. If the Earth's temperature continues to increase, some scientists predict that the oceans could rise about twelve inches by the year 2050. Others suggest that more snow could fall since warmer air holds more moisture. If this occurs, glaciers would remain in their delicate balance.

Although we are uncertain about the future of Earth's glaciers, scientists will continue to study them. Through study, we will learn more about the impact of the environment on their future. Perhaps we will discover important ways to preserve these vast resources of freshwater. In the meantime, these frozen earth movers will continue to shrink and grow. As they do, they will also continue to change the contours of Earth.

Vocabulary

FOCUS Review the selection vocabulary words from “What’s the Buzz?”

- | | |
|---------------------|------------------|
| artificial | intricate |
| branched | mild |
| clover | nectar |
| deliberately | offspring |
| foraging | rely |
| generalists | veil |
| industrial | vibration |

PRACTICE Read each sentence. Think about the meaning of the underlined word or words. Write the vocabulary word on the line that is similar in meaning.

1. The gentle tone of his mother’s voice calmed the little boy.

2. The bride wore a thin piece of fabric over her face at the beginning of the wedding ceremony.

3. The cows liked to eat the small, flowering plant found all over the pasture.

4. The football field was covered with man-made grass-like turf.

5. The pilot must depend on the control panel instruments in the plane.

6. The inside of the watch contained small and very complex parts that worked together.

7. Follow the main path, not the ones that are going off the main one.

8. The rapid movement back and forth caused the toy car's wheel to fall off.

9. The pig's young on Miller's farm are growing and healthy.

10. The butterflies love this flower's sweet liquid.

11. The boy walked with purpose to the library to find a book.

12. The squirrels were searching for nuts before winter.

13. The factory-produced cleaner was strong and effective.

14. Raccoons are omnivores and animals that can survive in a wide range of environments.

APPLY Read each sentence. Answer each question by explaining the definition in your own words.

15. You are putting together an intricate puzzle. What are you doing?

16. You deliberately delay cleaning your room. What is happening?

17. You are foraging in the pantry for a snack. What are you doing?

18. You must rely on your knowledge to answer the question. What does that mean?

Honey for Sale

Our family sells honey that we harvest from beehives on our family farm. We are well-known for our mild-tasting clover honey. It tastes wonderful in a cup of tea or on some bread in the morning for breakfast. It tastes so much better than any artificial sweetener, I can tell you that!

For years, we have relied on honeybees for more than just producing honey. We deliberately added honey bees to our farm to increase the production of plants. Since the bees are generalists, they will pollinate not only our clover, but other flowers as well. This means that they will pollinate the flowers that will become strawberries, pumpkins, and apples, too!

Now, I know that the honeybees are always deliberately looking for some sweet-smelling nectar to provide food for their own offspring. Lucky for us, their foraging helps our plants grow and produce more vegetables and fruit. So, our farm stand is always full by the end of summer and fall.

Before we had beehives on our farm, I feared bees and their stings. My dad told me that the bees did not want to sting me because they would die soon after. Still, whenever I heard that familiar vibration or buzzing sound, I would run away shrieking. Now, I have seen how much we rely on bees to increase the quantity of vegetables and fruits we produce. I understand how important they are to all plants and life on Earth.

Knowing all this, I even feel comfortable collecting the honey from the beehives. Of course, I wear a large hat with a netted veil and clothing that covers me from head to toe. I hear them buzzing all around, and it now reminds me of the mildly sweet flavor of honey in the neat six-sided honeycomb. I can even taste the difference between the honey on our farm and the honey made on large industrial farms. Let me tell you, there is no comparison. The taste of our farm's honey is much more interesting and enjoyable.

Because I am the honey expert on our family farm, I am in charge of creating a sign to describe our honey. I am not sure how to describe such intricate tastes in a simple picture, but I am thinking about it.

So, as I am thinking about the sign, I stare at the letters of the word HONEY. I try to picture what I know about honeybees and honey and connect them to the shapes of the letters. I start to imagine the O as a six-sided honeycomb. Then, I stare at the branched-letter Y and think about the flowers the bees visit. I want the sign to be easy to read. I do not want intricate details to take away from the main message.

I start by deciding what color to paint the large board I will use for my sign. I choose pale yellow to represent the mild flavor of the honey. The soft yellow color will also stand out when people go by our farm. I deliberately take my time as I paint so I can think about the design. I know I want the word HONEY to be large and center on the sign, but I am not sure what else I want to include on the sign.

I draw the big letters of HONEY on the sign in pencil after the yellow coat of paint is dry. I decide to use the hexagon shape for the O in honey, making the flat sides on the top and bottom, but it looks more like an industrial bolt than a honeycomb. So, I turn the shape on its side so the pointed sides meet at the top and bottom. Yes, that will work! I take out the black paint and make the letters thick and dark so they are easy to read.

As I lay the painted sign deliberately in the sun to dry, I think about how I can add details to make the sign show what makes our honey special. How can I describe the mildly sweet taste of our honey? How can I show that our honey is different from the industrially-made honey?

I think about the honey bees as they forage for nectar in the clover fields in the early spring, then the strawberry plants next, and then the apple trees. I paint pale-colored flowers at the bottom of the sign and add a few bees with dotted lines showing their busy work. I set the finished sign by the table with jars of our sweet clover honey. It's time to make some sales!

Making Inferences

FOCUS Readers get clues from the text and use their own prior knowledge to **make inferences** about characters and events in a story.

PRACTICE Read each sentence below. Make an inference about the character based on each sentence and write it on the line.

1. Alex looked at the large book with dread, checked how many pages it had, and sighed deeply.

Inference: _____

2. Taylor raced to the front door, knocked excitedly, and waited anxiously.

Inference: _____

3. Drew crossed his arms, stomped his foot, and shook his head.

Inference: _____

4. Chris looked at the framed photograph and sadly sunk into the chair.

Inference: _____

5. Chloe dribbled effortlessly across the court and smoothly shot the game-winning basket.

Inference: _____

APPLY Read the description of each character below. Then write a short paragraph describing how the character feels or acts without actually stating it.

6. a responsible student

7. a shopkeeper who is dishonest

8. a coach who is encouraging
