

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Climb to Cold\*

As you read the following story, look for data that will help you understand how elevation affects temperatures.

1. When you see a stop sign (STOP), find the location's name on the data table in your handout and write the elevation and temperature in the appropriate columns (*Note: Not all locations will have temperature data*).
2. Plot the elevation data on the line graph in your handout.

It was a once-in-a-lifetime experience. They had climbed other high peaks, but never the highest—Mount Everest. Hans, Blair, Ryan, Sariya, Brendan, and Isaac had been training for two years. They practiced roping together, breathing with oxygen tanks, and climbing difficult routes. They flew together to Alaska and reached the summit of Denali, also known as Mount McKinley. They flew to Tanzania and climbed to the top of Mount Kilimanjaro. And now they were on their way to New Delhi, India, the first destination of their next adventure: climbing Mount Everest on the border of Nepal and China.



Photo courtesy of Wikimedia.org

\*Adapted from BSCS. (1999). *Investigating weather systems*. Dubuque, IA: Kendall-Hunt Publishing.

When the plane landed in New Delhi, a city about 305 meters (or about 1,000 feet) above sea level, the climbing team got off the plane and took a taxi to the hotel. 

There they unloaded all their equipment for a final check before they took off to the wilds of Nepal. They had brought with them several state-of-the-art communication systems. They also planned to have a satellite Internet hookup for [posting] hour-by-hour reports of their climb so their families in the United States could check on their progress. Support teams from Kathmandu and the base camp would be in constant communication. They hoped this would make their expedition both successful and safe.

The group left the hotel one evening in search of some good Indian food. As they wound their way through the streets of New Delhi, they heard a loud commotion near a shop doorway. Suddenly a man ran out of the shop, pushing his way through the group of climbers.

Blair fell with a yell. “Oh no! I’ve hurt my ankle!” she exclaimed.

The climbers looked at Blair in dismay as her ankle swelled to twice its normal size. Blair tried but couldn’t put any weight on it.



Photo courtesy of BSCS

After helping her back to the hotel and getting her medical attention, they all met in Blair’s room.

“The doctor says you broke a bone in your ankle,” said Isaac. “It wouldn’t be safe for you to try to climb the mountain.” He looked sadly at Blair, whose dream of climbing Mount Everest had just ended.

She nodded her agreement. “You’re right,” she said. “Even if it healed in time, I would be too slow for the group. I’ll stay here in New Delhi with one of the satellite systems. You can send me information on your climb while I recuperate. Then I’ll fly home with you afterward.”

Sad to leave their teammate, the group took off the next day for Kathmandu, the capital city of Nepal, at an elevation of 1,287 meters (or 4,223 feet) above sea level. 

Kathmandu bustled with teams of climbers, all hoping to reach the summit of Mount Everest that May. The American team enjoyed the company of teams from France, Australia, China, and Japan. Together they shared a flight from Kathmandu to the town of Lukla at an elevation of 2,804 meters (9,200 feet) above sea level. 

They met their Nepalese Sherpas, who were experienced mountaineers. It was in Lukla that their journey on foot began.

Two weeks later, the weary group of climbers reached the Mount Everest Base Camp at an elevation of 5,364 meters

(17,600 feet) above sea level. 

They pitched tents on the snow, trying to avoid the muddy patches where the snow had melted. They spent several days resting and getting used to the altitude.



Photo courtesy of BSCS

During this time, climbers from many different expeditions often shared meals and entertainment.

After several nights of group dinners, however, Hans began to feel ill. So did a member from the Australian and Japanese teams. Afraid they might be too sick to climb, they went to the camp doctor.

“You’ve all caught a flu virus,” confirmed the doctor. “It isn’t a dangerous illness, but it will make you very weak. I can’t recommend climbing the great mountain at this time.”

Hans brought the disappointing information back to his teammates. He would need to stay at Base Camp to recuperate and didn’t think he would be strong enough to join his team later. The team left Hans with more satellite communication equipment so he could track their climb over the Internet.

Now, only Ryan, Sariya, Brendan, and Isaac were moving on to Camp 1, about 5,944 meters (19,500 feet) above sea level.  When they arrived, they set up their tents on the snow in their own area. This time they didn’t share meals in the mess tent with the other teams. The climbers also tried hard to stay warm and dry so that no one else would get sick.

Over the next several days, the team made treks to the next camp—Camp 2—further up the mountain at 6,401 meters (21,000 feet) above sea level.  Each night they returned to the lower camp until they were finally used to the altitude.

Then they moved on to the next camp—Camp 3—and set up their tents in the snow. They kept warm by drinking a lot of hot liquids. When they met in a tent to discuss the rest of the climb, their body heat in the small space made the temperature quite comfortable.

“The air will get thinner when we move on to Final Camp,” Brendan reminded the others. “Remember to talk to each other and check to see that everyone is all right.”

Then he distributed the oxygen tanks and demonstrated how to use them. “Some of you won’t need extra oxygen until Final Camp at 7,925 meters (26,000 feet) above sea level.  But all of you will need to use the tanks for the final push to the top. There’s only one third as much air at the summit, and that means there’s only one third as much oxygen as there is at sea level.”

Isaac was already feeling the effects of low oxygen. He had a severe headache that wouldn’t go away, and as the group climbed higher up the mountain, his headache got worse.

At Final Camp, even with extra oxygen, Isaac was miserable. He realized that it would be unwise for him to climb any higher.

“I’m not able to complete the climb,” Isaac said to his partners. “My headache isn’t getting any better, and I might put the rest of you in danger. I’m going to return to Camp 2 and wait for you there. I’ll take a computer with me so I can receive your Internet announcement when you reach the summit. Good luck!”

Then Isaac retreated to the lower camp.

In the middle of the night, by the light of their headlamps, the team of three climbers and their Sherpa guides began their final ascent to the top of Mount Everest.

Breathing was difficult even with their extra oxygen tanks. To conserve what little energy they had, the members of the team climbed as if in slow motion. The howling wind made communication among the climbers difficult.

As the Sun began to rise, the team could see the summit in the distance. Many jagged rock faces covered with ice and snow stood between them and their destination, but they continued to climb.

Finally, at about one o'clock in the afternoon, the three climbers reached the summit of Mount Everest, at 8,848 meters (29,028 feet) above sea level.  They hugged each other, looking more like [astronauts] on the Moon in their huge parkas and pants and with their oxygen masks covering their faces.

Then they took out their computer, and Sariya typed the following message: "We made it! It's now 1:07 p.m. on May 20. The temperature here at 8,848 meters above sea level is  $-26^{\circ}\text{F}$ .  The Sun is shining, and are we ever glad to be here!"



Photo courtesy of BSCS

At Camp 2, Isaac received the message. He checked his thermometer: it read  $0^{\circ}\text{F}$  at 6,401 meters (21,000 feet) above sea level. 

At Everest Base Camp, Hans was excited for his teammates. He checked the thermometer on his jacket and saw that the temperature was  $12^{\circ}\text{F}$  at 5,364 meters (17,598 feet) above sea level. 

The support people back at Kathmandu received Sariya's message, and they all cheered. Then they checked their thermometers. It was  $63^{\circ}\text{F}$  at 1,287 meters (4,222 feet) above sea level. 

In New Delhi, Blair was so happy for the three climbers and silently wished them a safe journey back down the mountain. She went outside her hotel, and used her thermometer to measure the air temperature at 305 meters (1,000 feet) above sea level. It was  $74^{\circ}\text{F}$ . 