

Can humans survive at high altitudes?

Humans can survive at high altitudes. However, if you go to a high altitude, your body needs to adjust properly by getting used to it slowly or you could get very sick and even die. There are many people who live and work at high altitudes. For example, over 3 million people live in Quito, Ecuador—the highest capital city on Earth (elevation 9,350 ft/2,850 m). But their bodies are used to being very high.

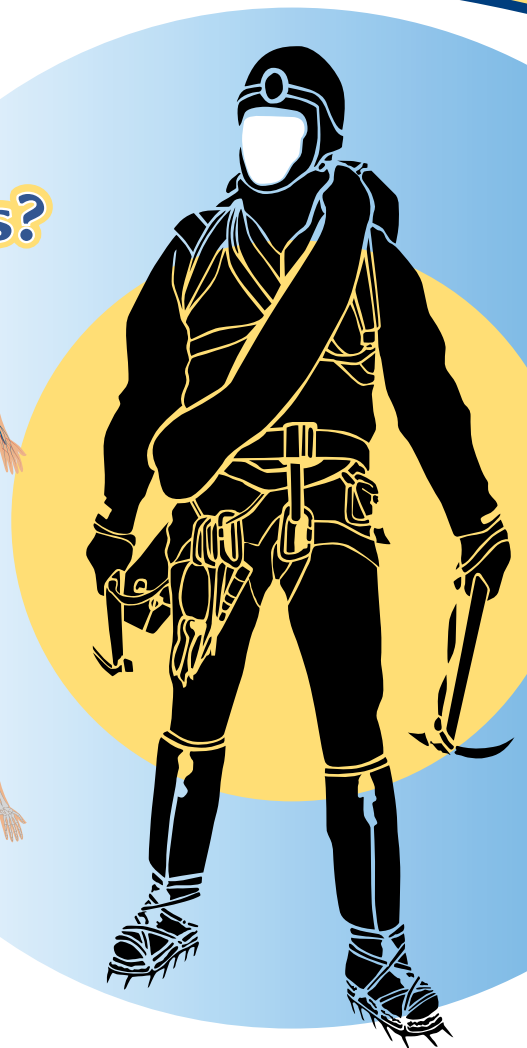
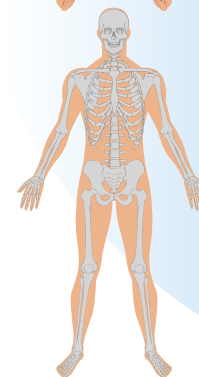
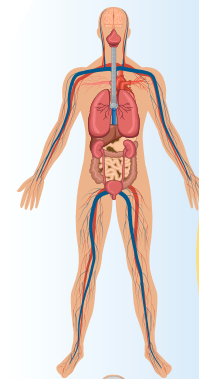
When you go to a high elevation there is less air pressure. The lower air pressure makes air less dense (thinner) and so there is less oxygen in the air you breathe. At the top of Mount Everest there is only $\frac{1}{3}$ of the oxygen available as there is at sea level.

For people who go on vacation to high altitude ski resorts, it takes a while (usually at least 3 days) for their bodies to get used to the height. Yet still about one out of every five of them gets symptoms of altitude sickness that are severe enough to interfere with their activities.

Mount Everest is the highest place on Earth. It rises an unbelievable 29,035 feet (8850 m) above sea level. It's so high that if you were standing at sea level and could transport yourself instantly to the top of the mountain, you would pass out and probably be dead within 30 minutes. Most climbers take between 40 and 60 days to get used to the high elevations in the Everest region.

If you tried to climb Mount Everest you would most likely experience many of these symptoms of high altitude sickness: pounding headaches, difficulty sleeping, dizziness, shortness of breath, nausea, fatigue, loss of appetite, lack of coordination, and excessive coughing (at times severe enough to crack a rib). People often lose 15 to 25 pounds and also get a sunburn and frostbite.

Researchers at Montana State University (MSU) are studying health and fitness and how to enhance people's athletic performance in conditions such as high altitude. Follow several climbers from MSU on the Everest Education Expedition to Mount Everest at www.montana.eduleverest.



Try this!

1. It is so hard to walk in the “death zone” of Everest (the region above 26,246 ft/8,000 m) that it takes most climbers up to 12 hours to walk from the South Col to the summit (1.07 miles/1.72 km). Have an adult help you figure out a route that is one mile (use Google Maps on the Internet to figure out a place to walk that is a mile from your house, or walk four laps around a running track, etc.). Estimate how long it will take you to walk a mile, then time how long it actually takes you to walk one mile. Have an adult help you calculate how many miles per hour you were walking.

Estimate _____

Actual time _____

Miles per hour _____

2. Here are three types of high altitude:

- High altitude: 5,000 to 11,500 feet or 1,500 to 3,500 m — Because of the large number of people who ascend (go up) rapidly to 8000 to 11,500 ft for activities such as skiing and climbing, high-altitude illness is common in this altitude range.
- Very high altitude: 11,500 to 18,000 feet or 3,500 to 5,500 m — Severe altitude illness occurs most commonly in this range.
- Extreme altitude: above 18,000 feet/5,500 m — No permanent human habitation occurs above 18,000 ft.

Can you think of a place near where you live that is in each of these categories? Use an atlas, map or the Internet to try and figure out a place close to you for each type of altitude.

High altitude _____

Very high altitude _____

Extreme altitude _____