Moving Plates Create Landscapes

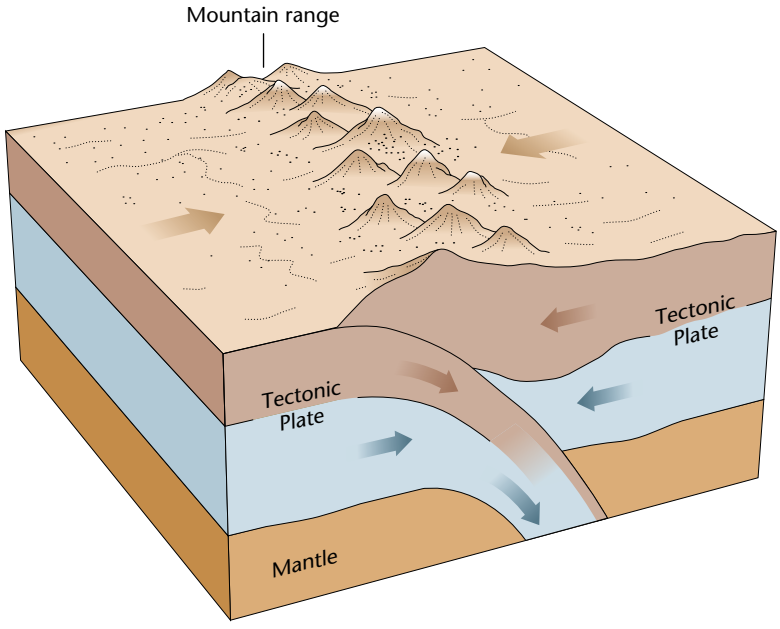
When you look at a mountain, it is hard to imagine that it did not always exist. How could something so large and majestic form? Do mountains ever change?

How Mountains Form

When the Earth's tectonic plates move they can do one of three things: collide, move away from each other, or slide past one another. These plate movements can create different landscapes, including mountains.

If the plates collide, mountains often form. Portions of the land above the plates may be **uplifted**, or thrust upwards, creating mountains.

This collision causes the crust to compress and crumple. This is similar to what happens to the hood of a car in a head-on collision. The folds in the hood resemble mountains and valleys. The European Alps, Appalachian Mountains, and Himalayan Mountains are all examples of places where tectonic plates have collided and formed **mountain chains**.



Two tectonic plates colliding, forming a mountain range.

The Alps.

How Mountains Break Down

Mountains are made of seemingly unbreakable rock. But like all rock, the forces of moving water, ice, and wind break them down over time. As soon as mountains form, they begin to erode. The Appalachian Mountains, for example, were much taller and more rugged 300 million years ago. And the Himalayan Mountains may be much shorter and more rounded 300 million years from now since the Indian and Eurasion plates will stop colliding in millions of years.

Moving water from rainfall and snowmelt weathers and erodes mountain rock. So does glacial ice, and wind. Rivers carry this sediment downstream to lakes and oceans. The sediment is eventually deposited along riverbanks, floodplains, and deltas. It even flows into the ocean and settles on the ocean floor, where it may eventually become new rock.

Eventually, over millions of years, the mountains around us today will no longer exist. But thanks to deep forces beneath the Earth, mountain building continues to occur, and new mountains are created.

Comparing Old and Young Mountain Ranges

Think About It!

Examine the pictures of the Appalachians and Himalayas. Then look where the Appalachians and Himalayas are located on Figure 3. Based on what you learned about how mountains form and break down, what clues do Figure 3 and the pictures give you about which mountain range is still growing?

A section of the Appalachian Mountains in the Great Smoky Mountains National Park, Tennessee and North Carolina.

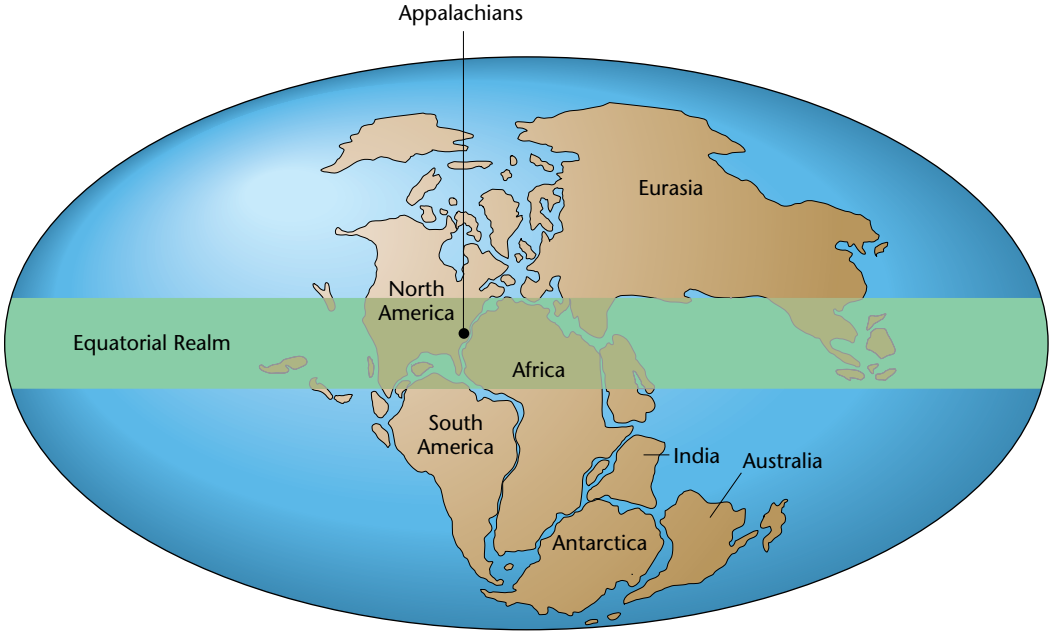
A section of the Himalayas, with Mt. Everest masked in clouds.

Figure 3: Current location of the Earth's tectonic plates.

The Himalayas are on the boundary of two tectonic plates. If you look closely at Figure 3, you will notice that the Himalayas are located where the Indian and Eurasian Plates meet. As you learned earlier, mountain ranges form along plate boundaries.

The Himalayas are a relatively young mountain range. They began forming 60 to 45 million years ago when the Indian Plate first collided with the Eurasian Plate. They form the highest mountain range on land in the world. Mt. Everest, the tallest mountain on any continent, is 8,848 km (29,029 ft) tall! And the Himalayas are still growing! As the Indian Plate continues to collide with the Eurasian Plate, the Himalayas continue to push upward 5-10 cm (2-4 in) per year.

The Appalachians are not on the boundary of two plates. If you look closely at Figure 3, you should see that the Appalachians are located on the right side of the North American Plate. How can a mountain range be located within a plate inside of the boundary? A look into Earth's past explains this.



Appalachians formed as the plates that later became North America and Africa collided during the formation of Pangaea, approximately 350 million years ago.

Think About It!

Some people think that tall mountains are older because they get taller by the building up of rocks and sediment on top of the mountains. What do you think?

The story of the Appalachians began when the supercontinent **Pangaea** formed approximately 350 million years ago. During that time, two plates collided. The collision pushed up the Earth's crust to form the Appalachian mountain chain and then the plates fused together. At that time the Appalachians were much taller than they are today.

When Pangaea began to break up about 200 million years ago, the plates began moving toward their current locations (see Figure 3). That many millions of years of weathering and erosion have reduced the Appalachians to about half their original height and much more gentle appearance than the Himalayas.

Glossary

mountain chain
A group of mountains clustered together.

Pangaea
One landmass or supercontinent of the Earth's plates that existed about 250 million years ago.

uplift
To thrust upwards. The process of raising a portion of the Earth's crust when tectonic plates collide.

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