

# Exploring Earth's Surface

## Reading Preview

### Key Concepts

- What does the topography of an area include?
- What are the main types of landforms?

### Key Terms

- topography • elevation
- relief • landform • plain
- mountain • mountain range
- plateau • landform region

### Target Reading Skill

#### Comparing and Contrasting

As you read, compare and contrast the characteristics of landforms by completing a table like the one below.

Characteristics of Landforms

Landform	Elevation	Relief
Plain	a. ?	Low
Mountain	b. ?	c. ?
d. ?	High	e. ?



← The compass used by Meriwether Lewis

## Lab zone Discover Activity

### What Is the Land Like Around Your School?

1. On a piece of paper, draw a small square to represent your school.
2. Choose a word that describes the type of land near your school, such as flat, hilly, or rolling. Write the word next to the square.
3. Use a magnetic compass to determine the direction of north. Assume that north is at the top of your piece of paper.
4. If you travel due north 1 kilometer from your school, what type of land do you find? Choose a word to describe the land in this area. Write that word to the north of the square.
5. Repeat Step 4 for areas located 1 kilometer east, south, and west of your school.

#### Think It Over

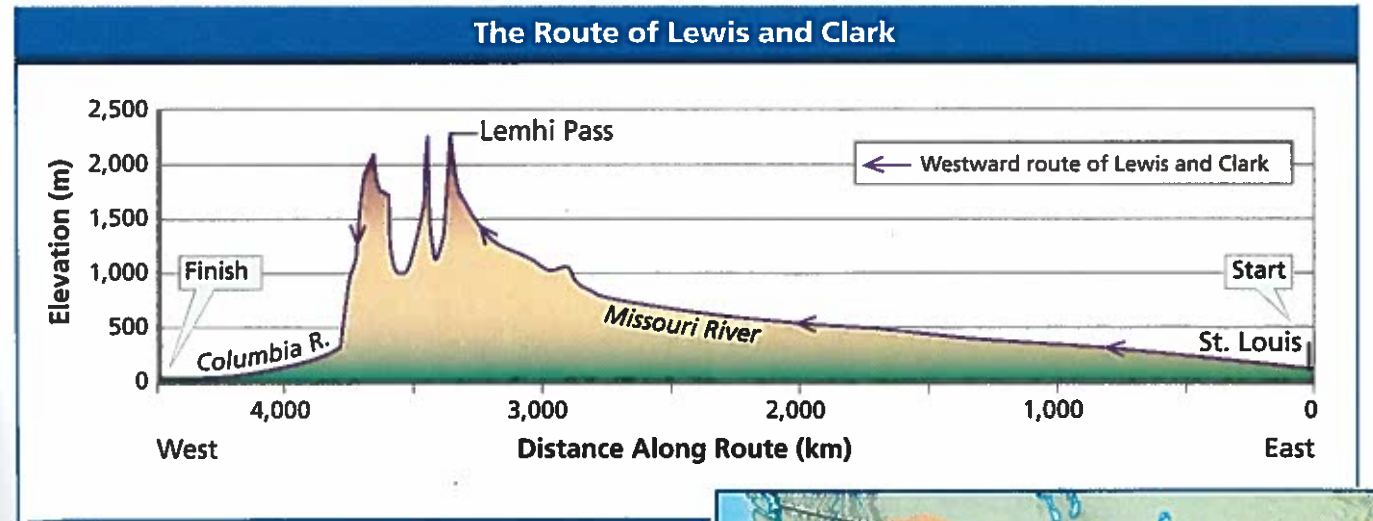
**Forming Operational Definitions** What phrase could you use to describe the land in your area?

In 1804, an expedition set out from St. Louis to explore the land between the Mississippi River and the Pacific Ocean. The United States had just purchased a part of this vast territory, called Louisiana, from France. Before the Louisiana Purchase, the United States stretched from the Atlantic coast westward to the Mississippi River. Few United States citizens had traveled west of the Mississippi. None had ever traveled over land all the way to the Pacific.

Led by Meriwether Lewis and William Clark, the expedition first traveled up the Missouri River. Then the group crossed the Rocky Mountains and followed the Columbia River to the Pacific Ocean. They returned by a similar route. The purpose of the expedition was to map America's interior.

On the journey to the Pacific, the Lewis and Clark expedition traveled more than 5,000 kilometers. As they traveled, Lewis and Clark observed many changes in topography.

**Topography** (tuh PAWG ruh fee) is the shape of the land. An area's topography may be flat, sloping, hilly, or mountainous.



**FIGURE 1** The route of the Lewis and Clark expedition crossed regions that differed greatly in elevation and relief. **Interpreting Graphs** How much elevation did Lewis and Clark gain between St. Louis and Lemhi Pass?

## Topography

The topography of an area includes the area's elevation, relief, and landforms. The desktop where you do homework probably has piles of books, papers, and other objects of different sizes and shapes. Your desktop has both elevation and relief!

**Elevation** The height above sea level of a point on Earth's surface is its **elevation**. When Lewis and Clark started in St. Louis, they were about 140 meters above sea level. By the time they reached Lemhi Pass in the Rocky Mountains, they were more than 2,200 meters above sea level. Look at Figure 1 to see the changes in elevation along Lewis and Clark's route.

**Relief** The difference in elevation between the highest and lowest parts of an area is its **relief**. Early in their journey, Lewis and Clark encountered flat or rolling land with low relief, or small differences in elevation. In the Rocky Mountains, they crossed huge mountains separated by deep valleys. These areas had high relief, or great differences in elevation.

**Landforms** If you followed the route of the Lewis and Clark expedition, you would see many different landforms. A **landform** is a feature of topography, such as a hill or valley, formed by the processes that shape Earth's surface. Different landforms have different combinations of elevation and relief.

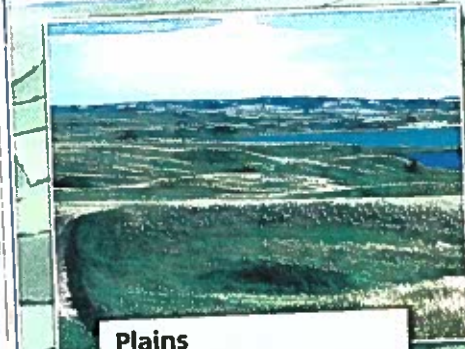


**Reading Checkpoint** What is the difference between elevation and relief?

FIGURE 2  
**Landforms**

Plains, mountains, and plateaus are just a few of the many landforms that make up the topography of Earth's surface.

**Forming Operational Definitions** Based on this illustration, how would you define "mountains"?



**Plains**  
Plains may occur along a continent's edges or in the interior.

### Types of Landforms

Landforms vary greatly in size and shape—from level plains extending as far as the eye can see, to low, rounded hills that you could climb on foot, to jagged mountains that would take you many days to walk around. **There are three main types of landforms: plains, mountains, and plateaus.**

**Plains** A plain is a landform made up of nearly flat or gently rolling land with low relief. A plain that lies along a seacoast is called a coastal plain. In North America, a coastal plain extends around the continent's eastern and southeastern shores. Coastal plains have both low elevation and low relief.

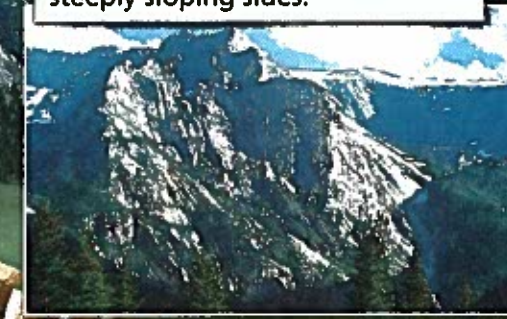
A plain that lies away from the coast is called an interior plain. Although interior plains have low relief, their elevation can vary. The broad interior plains of North America are called the Great Plains.

The Great Plains extend north from Texas into Canada. The Great Plains extend west to the Rocky Mountains from the states of North and South Dakota, Nebraska, Kansas, Oklahoma, and Texas. At the time of the Lewis and Clark expedition, the Great Plains were a vast grassland.

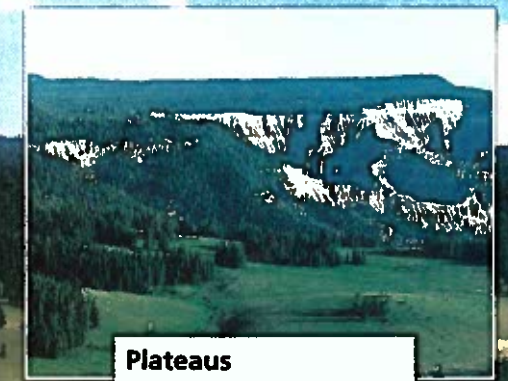


For: Links on landforms  
Visit: [www.SciLinks.org](http://www.SciLinks.org)  
Web Code: scn-0711

**Mountains**  
A mountain's base usually covers an area of at least several square kilometers, but its peak may rise to a point. Mountains often have steeply sloping sides.



**Plateaus**  
The top of a plateau forms a level surface.



**Mountains** A mountain is a landform with high elevation and high relief. Mountains usually occur as part of a mountain range. A **mountain range** is a group of mountains that are closely related in shape, structure, and age. After crossing the Great Plains, the Lewis and Clark expedition crossed a rugged mountain range in Idaho called the Bitterroot Mountains.

The different mountain ranges in a region make up a mountain system. The Bitterroot Mountains are one mountain range in the mountain system known as the Rocky Mountains.

Mountain ranges and mountain systems in a long, connected chain form a larger unit called a mountain belt. The Rocky Mountains are part of a great mountain belt that stretches down the western sides of North America and South America.

**Plateaus** A landform that has high elevation and a more or less level surface is called a **plateau**. A plateau is rarely perfectly smooth on top. Streams and rivers may cut into the plateau's surface. The Columbia Plateau in Washington State is an example. The Columbia River, which the Lewis and Clark expedition followed, slices through this plateau. The many layers of rock that make up the Columbia Plateau are stacked about 1,500 meters thick.

### Lab zone Skills Activity

#### Classifying

You take a direct flight across the United States from Walla Walla in Washington State to Washington, D.C. You have a window seat. Write a postcard to friends describing the major landforms that you see on your trip. Use Figure 3 to determine what the land is like along your route.



**FIGURE 3**  
The United States has many different landform regions.  
**Interpreting Maps** In what regions are Charleston, Santa Fe, and Topeka?

**Landform Regions** A large area of land where the topography is made up mainly of one type of landform is called a **landform region**. The Great Plains and Rocky Mountains are major landform regions. Other terms can be used to describe landform regions. For example, an upland is a region of high topography. A lowland is a region of plains with low elevation. A basin is lower than the mountains around it.

**Reading Checkpoint** What terms can be used to describe landform regions?

## Section 1 Assessment

**Target Reading Skill Comparing and Contrasting** Use the information in your table to help answer Question 2 below.

### Reviewing Key Concepts

1. a. **Defining** What is elevation?  
b. **Comparing and Contrasting** What is relief? How does it differ from elevation?  
c. **Calculating** What is the relief in an area where the highest point is 1,200 meters above sea level and the lowest point is 200 meters above sea level?
2. a. **Listing** What are the three main types of landforms?  
b. **Describing** What are the characteristics of a mountain?  
c. **Sequencing** Place these features in order from smallest to largest: mountain system, mountain range, mountain belt, mountain.

### Writing in Science

**Description** Look at Figure 3. Choose one of the landform regions on the map. Research the characteristics of your landform region using an encyclopedia or other reference. Write a description of the region, including characteristics such as elevation, relief, and the types of landforms found there.