

CHAPTER 8 Maps as Models of the Earth
SECTION 3 **Topographic Maps**

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What is a topographic map?
- How do topographic maps show the features of the Earth's surface?

What Is a Topographic Map?

If you were going hiking in the wilderness, you would want to take a compass and a map. Because there are no roads in the wilderness, you would not take a road map. Instead, you would take a topographic map.

A **topographic map** is a map that shows the surface features, or *topography*, of an area. Topographic maps show natural features, such as rivers and lakes. They show some features made by people, such as bridges. Topographic maps also show elevation. **Elevation** is the height of an object above the surface of the sea. The elevation at sea level is 0 m. ✓

CONTOUR LINES

How can a flat map show elevations? Contour lines are used to show elevation on a topographic map. **Contour lines** are lines on a map that connect points with the same elevation. Each contour line on a map shows a different elevation. Here are some rules for using contour lines:

- Contour lines never cross. All points on a contour line are at the same elevation.
- The space between contour lines depends on the slope of the ground. Contour lines that are close together show a steep slope. Contour lines that are far apart show a gentle slope.
- Contour lines that cross a valley or stream are V-shaped. The V points toward the area of higher elevation, or upstream.
- The tops of hills, mountains, and depressions (dips) are shown by closed circles. Depressions are marked with short, straight lines inside the circle. The lines point toward the center of the depression.

STUDY TIP

Learn New Words As you read, underline words that you don't know. When you figure out what the words mean, write the words and their definitions in your notebook.

READING CHECK

1. **Define** What is elevation?
height of an object
above the surface of the sea

Critical Thinking

2. **Explain** Why can two contour lines never cross?
At the point where
two contours would cross
would have to have two
different elevations which
is impossible.

SECTION 3 Topographic Maps *continued*

CONTOUR INTERVALS AND RELIEF

Each contour line represents a certain elevation. The difference in elevation between one contour line and the next is called the **contour interval**. For example, a map with a contour interval of 20 m has contour lines drawn at 0 m, 20 m, 40 m, and so on. The contour interval of a map is usually given in or near the map's legend. The contour interval on a map is based on the relief in the area. ✓

Relief is the difference in elevation between the highest and lowest points in the area on the map. Mountains have high relief. They are usually mapped with large contour intervals. Plains have low relief. They are usually mapped with small contour intervals.

✓ **READING CHECK**

3. Define What is a contour interval?

Difference between adjacent contour lines

↘ adjacent means Next to.

Math Focus

4. Calculate A map has index contours at 250 m, 500 m, and 750 m. What is the contour interval?

50 m

INDEX CONTOURS

The many contour lines on a map can make it hard to read. An index contour is used to make reading the map easier. An **index contour** is a darker, heavier contour line that is labeled with an elevation. In most maps, every fifth contour line is an index contour. For example, a map with a contour interval of 20 m may have index contours at 0 m, 100 m, 200 m, and so on.

COLORS

Topographic maps use colors and symbols to show different features of Earth's surface. Buildings, bridges, and railroads are shown by special symbols drawn in black. Contour lines are brown. Major roads are red. Bodies of water are blue. Wooded areas are shaded in green. Cities are shaded in gray or red. ✓

Topographic maps contain a lot of information. This information can be confusing at first. However, if you practice, you will be able to read topographic maps more easily. When you look at a topographic map, ask yourself these questions to help you read the map:

- What area does the map show?
- What is the contour interval of the map?
- What is the relief of the area in the map?
- What kinds of features are shown on the map?

The map on the next page is an example of a topographic map. Try to answer the four questions above for the map on the next page.

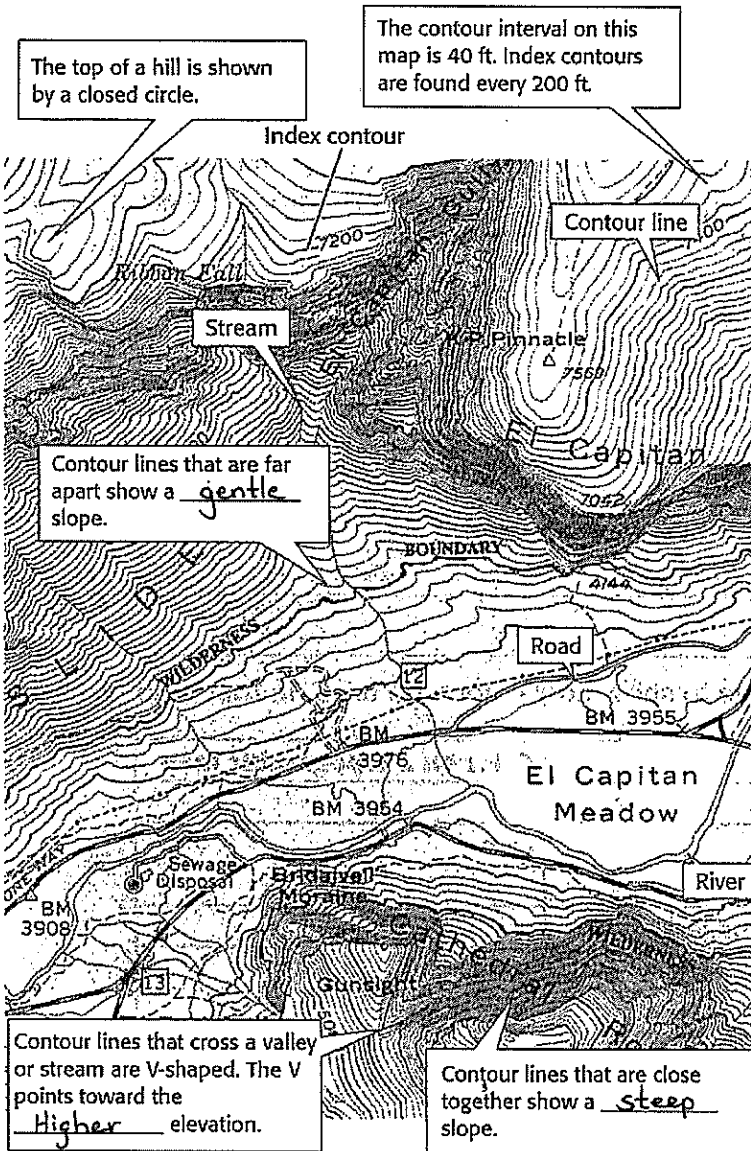
✓ **READING CHECK**

5. Identify How do topographic maps show information?

With colors and symbols

SECTION 3 Topographic Maps *continued*

Topographic Map of El Capitan



Building		Lake or pond	
Highway		Railroad track	
Trail		Stream	
Depression		Contour interval = 40 ft	

Say It

Compare How is this topographic map different from other maps that you have seen? How is it similar? In a small group, talk about the similarities and differences between topographic maps and other kinds of maps.

TAKE A LOOK

6. Identify Fill in the blanks in the figure to explain how to use contour lines.

Section 3 Review

SECTION VOCABULARY

<p>contour interval the difference in elevation between one contour line and the next</p> <p>contour lines lines which connect points on a map that are at the same elevation</p> <p>elevation the height of an object above the surface of the sea</p>	<p>index contour on a map, a darker, heavier contour line that is usually every fifth line and that indicates a change in elevation</p> <p>relief the difference between the highest and lowest elevations in a given area; the variations in elevation of a land surface</p> <p>topographic map a map that shows the surface features of Earth</p>
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1. **Define** What are contour lines?

Contour Lines are isolines that connect points of equal elevation

2. **Explain** What is the relationship between the relief of an area and the contour interval on a map of the area?

If the relief is high (bigger change) you will need a bigger contour interval

3. **Describe** Complete the table to show how colors are used on topographic maps.

Feature	Color on a topographic map
Contour lines	brown
Bodies of Water	blue
Major roads	Red
Buildings and bridges	Black
Wooded areas	green
Cities	gray or red

4. **Identify** Give three features that are shown on topographic maps.

mountain/hill, Streams/Rivers, Lakes/Ponds, Depressions, Escarpments/Cliffs

5. **Calculate** The highest point on a topographic map is marked as 345 m. The lowest contour line is at 200 m. What is the relief of the area in the map?

145m (345m - 200m)

6. **Describe** How is the top of a mountain shown on a topographic map?

The top of a mountain is shown by a closed loop