**Overview**

Students discuss different kinds of landforms and the need for maps that show changes in elevation. Then they learn to read a contour map.

For the complete activity with media resources, visit: [http://www.nationalgeographic.org/activity/introduction-to-contour-maps/](http://www.nationalgeographic.org/activity/introduction-to-contour-maps/)

**Directions**

1. Brainstorm a list of common landforms.
   
   Ask students to name some common landforms, such as hills, mountains, valleys, and plateaus. Sketch simple line drawings of each on the board. Ask: *What is the main difference between hilly or mountainous terrain and flat terrain?* Students should point out the differences in height. Explain to students that those differences are elevation changes. Tell students that in hilly and mountainous areas, the elevation of the land changes within the area—sometimes very quickly. In the flatter areas, elevation doesn’t change as much. Introduce the term relief. Explain to students that relief is the amount of elevation change in the land surface within a
given area.

2. Introduce contour maps.
Explain to students that a contour map is another name for a topographic map, or a map that shows the elevation of land on a flat paper surface. Ask: *Why might this be useful?* Elicit from students that contour maps are a convenient way to visualize flat and steep terrain, especially for hikers or other people navigating with maps. Remind students that an acronym is a word formed from the first letters of other words. Ask students if they have ever heard the acronym DOGSTAILS. Write the acronym on the board and explain to students that most topographic maps include these map essentials:
- **Date**: when the map was made
- **Orientation**: direction (north arrow or compass rose)
- **Grid**: lines that cross to form squares
- **Scale**: map distance
- **Title**: what, where, and when
- **Author**: who made the map
- **Index**: the part of the grid where specific information can be located
- **Legend**: what the symbols mean
- **Sources**: who provided information for the map

3. Read a contour map of your area.
Use the Nat Geo Topo! Explorer website to find and display a contour map of your area. Point out the contour lines. Explain to students that these are imaginary lines that join points of equal elevation, and that they allow you to read the shape of the Earth’s surface. Tell students that by reading contour lines, they can measure the steepness of a hill, the height of a mountain, and even the depth of a lake or ocean. Have students pinpoint a place where the contour lines are close together. Explain that the close lines mean the elevation is changing rapidly; those are steep places. Then have students pinpoint a place where the contour lines are far apart. Explain that the space indicates the elevation is not changing much; those are flat places. If the local relief is relatively flat, emphasize variation rather than extremes between steep and flat. Have students read the contour lines at the bottom and top of the highest place in your area. Have them subtract the lowest number from the highest to figure out the height of that landform.
4. Use symbols to identify other features on the contour map of your area.
Display the USGS Topographic Map Symbols PDF for students. Review some of the most common symbols. Then ask students to use those symbols to identify other human-made features on the contour map of your area. Have students identify each of the human-made features below and its symbol.

- their own or another school
- other buildings
- roads
- railroads
- bridges

Encourage students to use what they learned about symbols to identify natural features and their symbols too.

OBJECTIVES

Subjects & Disciplines

- Geography
  - Physical Geography

Learning Objectives

Students will:

- list some common landforms
- explain what information contour maps provide and why it is useful
- read a contour map

Teaching Approach

- Learning-for-use

Teaching Methods

- Brainstorming
Skills Summary

This activity targets the following skills:

- Critical Thinking Skills
  - Understanding
- Geographic Skills
  - Acquiring Geographic Information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

- **Standard 1:**
  How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

Preparation

What You’ll Need

MATERIALS YOU PROVIDE

- Contour maps of your local area
- Pencils
- Pens

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, Projector

PHYSICAL SPACE
You can either use the Nat Geo Topo! Explorer to find a contour map of your area for this activity, or you can supply your own contour map.

**BACKGROUND & VOCABULARY**

### Background Information

Earth’s surface has many different kinds of landforms that vary widely in height and elevation. Contour maps show the elevations of these surface features, which allows you to look at a two-dimensional map to visualize the Earth in three dimensions.

### Prior Knowledge

### Recommended Prior Activities

- Make a Contour Map

### Vocabulary

<table>
<thead>
<tr>
<th>Term</th>
<th>Part of Speech</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>contour line</td>
<td>noun</td>
<td>line joining points of equal elevation.</td>
</tr>
<tr>
<td>contour map</td>
<td>noun</td>
<td>representation of an area's elevation points or slopes.</td>
</tr>
<tr>
<td>elevation</td>
<td>noun</td>
<td>height above or below sea level.</td>
</tr>
<tr>
<td>grid</td>
<td>noun</td>
<td>horizontal and vertical lines used to locate objects in relation to one another on a map.</td>
</tr>
<tr>
<td>landform</td>
<td>noun</td>
<td>specific natural feature on the Earth's surface.</td>
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<td>Term</td>
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<td>------------</td>
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<tr>
<td>legend</td>
<td>noun</td>
<td>explanation of symbols and abbreviations used on a map, also known as a key.</td>
</tr>
<tr>
<td>map scale</td>
<td>noun</td>
<td>relationship between distance on a map and distance on the ground.</td>
</tr>
<tr>
<td>orientation</td>
<td>noun</td>
<td>an object or person's position in relation to true north.</td>
</tr>
<tr>
<td>relief</td>
<td>noun</td>
<td>the difference in elevation between areas of a specific region.</td>
</tr>
<tr>
<td>terrain</td>
<td>noun</td>
<td>topographic features of an area.</td>
</tr>
<tr>
<td>topographic map</td>
<td>noun</td>
<td>map showing natural and human-made features of the land, and marked by contour lines showing elevation.</td>
</tr>
</tbody>
</table>

**For Further Exploration**

**Websites**

- [USGS: The National Map](https://landsat.usgs.gov/)