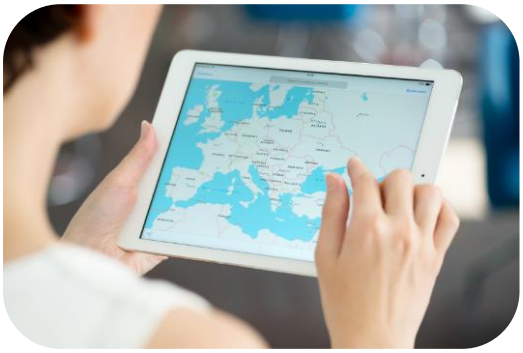
Mapping Earth's Surface

Section 3: Maps and Computers



Computers have revolutionized map-making. Mapmakers can store, process, and display data electronically. They can digitize data or convert locations of map points to numbers. They can automatically make maps that would take a person hours to draw in the past. They can produce maps from many data sources, such as satellites and the global (GPS). **Global Positioning System or GPS** is a method of finding the latitude, longitude, and elevation of points on Earth's surface by using a network of satellites. Satellite images are pictures of the Earth's surface made up of thousands of tiny dots called **pixels**. Each pixel contains information on a small part of the Earth's surface. **Surveying** is the process where mapmakers determine distances and elevations using instruments and the principles of geometry.

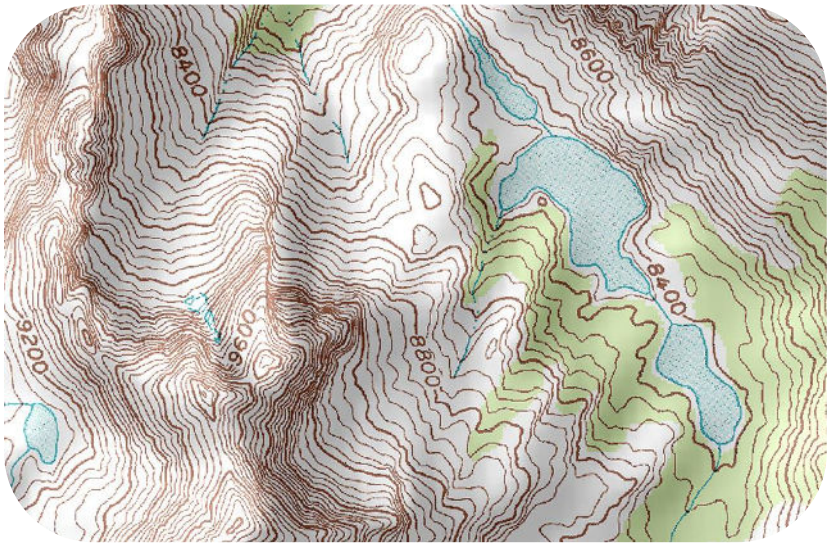
Topographic maps have many uses in science and engineering. A **topographic map** shows an area's surface features using symbols to portray the land as if you were looking at it from above. It offers information on the ground's elevation, relief, and slope. To read a topographic map, you must understand the map's scale, symbols, and contour lines. To represent elevation, relief, and slope on a topographic map, mapmakers use **contour lines** that connect points of equal height. Contour lines are always drawn on maps, as seen above. If you were hiking and using a map with contour lines, you could follow along one without gaining or losing elevation.

The difference in elevation between one contour line and the next is always the same on a given map. This difference is called the **contour interval.** The **contour interval** is essential when contouring or drawing lines on a grid of numbers connecting equal-value points. In addition, contouring helps determine the shape of an area. Contour lines that are closely spaced indicate steep slopes, while widely spaced contour lines indicate a gradual slope. **Index contours** are darker lines than the others and are labeled with the elevation above sea level in round units.

Mapping Earth's Surface

Section 3: Maps and Computers Continued

Contour lines never divide or cross one another, although on cliffs, they appear to run together. Contour lines are farther apart on gentle slopes than on steep slopes. They never stop in the middle of a map/grid. Instead, they either form a closed loop or run off the edge of the map/grid. The contour interval always stays the same on a given map. Elevations on one side of a contour line are higher than the elevations on the other side of the line.



Review:

1. How does GPS work?
2. What is surveying?
3. Contouring helps determine what?