

## Lesson 2

# Introduction to Maps



### Key Terms

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bar scale  
contrast  
elevation  
intermittent  
landforms  
legend  
man-made  
marginal information  
orient  
prominent  
relief  
terrain  
topographic maps

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### WHAT YOU WILL LEARN TO DO

- Use map reading skills

### LINKED CORE ABILITIES

- Apply critical thinking techniques

### SKILLS AND KNOWLEDGE YOU WILL GAIN ALONG THE WAY

- Identify symbols, colors, and features on standard road maps
- Identify locations on a city and state map
- Communicate directions to specified sites using a city and state map
- Define key words contained in this lesson

## Introduction

Have you ever found yourself on the wrong road or in the wrong neighborhood? If you asked for directions in this situation, were you told, “Go right,” or “Turn left”? After following these directions for a few blocks, the question arises, “Turn right . . . where?” These types of situations call for map reading skills.

Knowing how to read and understand maps are valuable skills that can strengthen your awareness of the world around you. Your effective use of maps requires a basic understanding of them, their scales, symbols, and colors. This lesson introduces you to this information and explains how to orient a map by matching manmade or natural features with map symbols.

Maps are in common use throughout the world today. For instance, when a family takes a vacation, a map is used to guide the driver from one city to another. The airline pilot and the sea captain use special charts or maps from which to navigate. Rarely do experienced navigators become lost because they apply their map reading abilities to read, understand, and use maps effectively.

## Definition of a Map and Map Reading

A map is a line drawing of a portion of the earth’s surface, drawn to scale as seen from above. Obviously any attempt to plot each feature to its exact shape and scale would result in a map too big to read. Therefore, maps are drawn “to scale” with each set measurement on the scale representing a set amount of the earth’s surface.

In general, maps provide information about the existence and location of man-made and natural features; show distance, **elevation**, and different types of landforms; and depict man-made and natural features by the use of symbols, lines, colors, and forms or shapes.

There are many different types of maps. However, the most common types are:

- **city or state road maps**
- **geographic maps/atlasses**
- **topographic maps**

City or state road maps, also known as tourist maps, provide information on street names, important buildings, route numbers, distance, transportation centers. In many cases, they include the location of recreational or historical areas, as well.

Geographic maps show an overall view of the mapped area in relation to climate, population, **relief**, vegetation, and hydrography (water features) (see Figure 1.2.1). An atlas is a collection of geographic maps of regions, countries, continents, or the world. These maps are generally not as accurate as city or state maps. And compared to **topographic maps**, their accuracy is significantly inferior, therefore, they should be used for general information only.

### Key Note Term

**elevation** – height above sea level or the earth’s surface

### Key Note Term

**relief** – the shape of land formations on the earth’s surface

**topographic map** – a map that shows relief and the position of natural and man-made features

Figure 1.2.1:  
A Geographical Map –  
Mexico's Population  
Distribution.

Courtesy of  
MapQuest.com, Inc.



### Key Note Term

**terrain** – a region or tract of land; the character (or topography) of a tract of land

**landform** – a natural or man-made feature on the earth's surface

**marginal information** – instructions placed around the outer edge of a map

Topographic maps show **terrain** and **landforms** in a manner which can be measured. They also show the horizontal positions and elevations of these features. Elevation on these maps is normally indicated by vertical contour lines (see Figure 1.3.1). Topographic maps are the ones most commonly used in the military. Beginning with the next lesson, you will examine topographic maps in detail and will use them throughout the remainder of this unit so that you can begin to understand how to read and use them.

### Road Maps

You can compare a map to any piece of equipment—before you use it, you must first read the instructions. Most mapmakers place the instructions on a map (known as the **marginal information**) around the outer edge of a map. All maps are not the same, so it is necessary to read the marginal information carefully every time you use a different map (see Figure 1.2.2). The following discussion describes and illustrates the most commonly used elements of marginal information that are found on road maps.

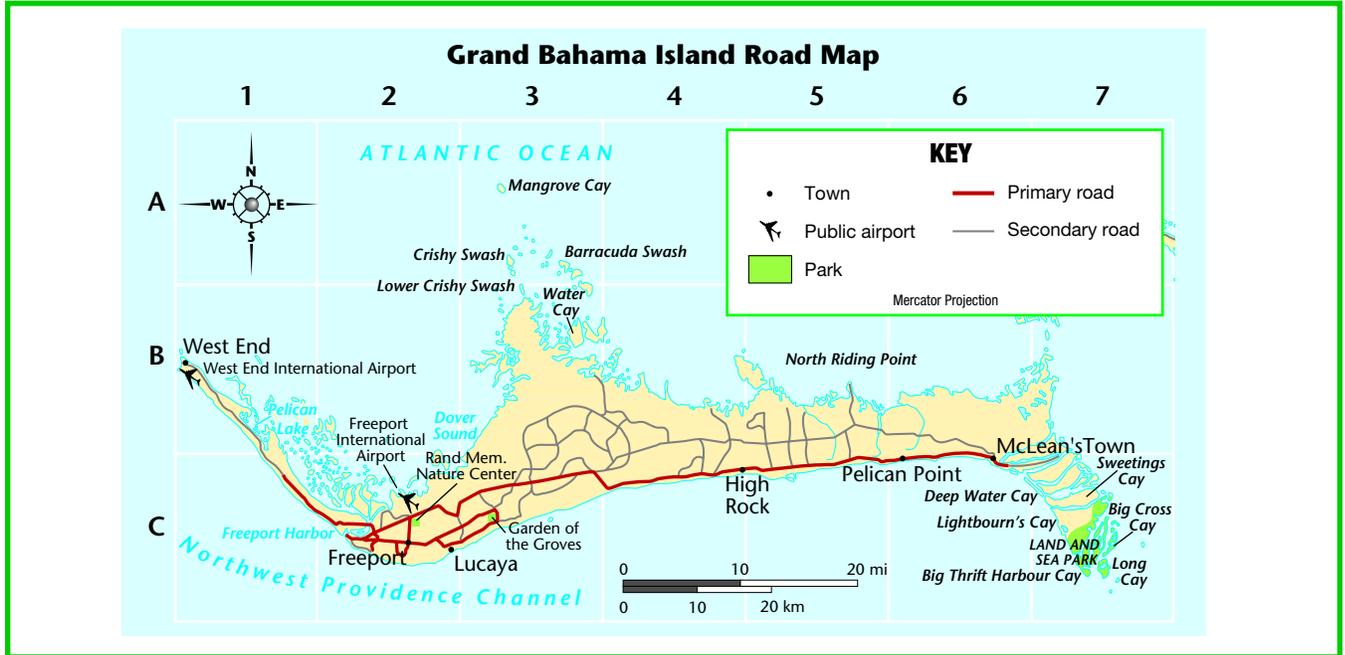


Figure 1.2.2: A road map.

Courtesy of MapQuest.com, Inc.

- **Sheet or Map Name.** Whenever possible, a map is named after the most prominent cultural or geographic feature in that area (for example, Orlando or the Official Transportation Map for the State of Florida). Although the most prominent feature on the map may be a state or other large geographical region (for example the Mid-Atlantic States), the map sheet normally contains numerous inserts of smaller sections in order to show them in more detail. These inserts can be found around the margin or on the reverse side of the map sheet.
- **Bar Scales.** Bar scales are special rulers used to measure ground distance on a map. Although these scales may vary with each road map, the most common units of measurement are miles and kilometers. Figure 1.2.3 shows an example of a scale used on the Official Transportation Map for the State of Florida.

### Key Note Term

**prominent** – very noticeable or conspicuous; well-known

**bar scale** – a ruler used to measure actual ground distances by converting distances on a map

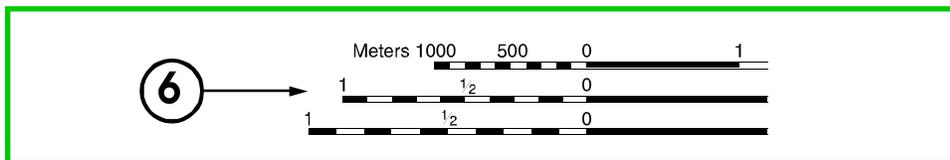


Figure 1.2.3: An example of a bar scale.

Courtesy of CACI and the US Army.

- **Printing Note.** This note indicates the agency responsible for printing the map. The printing date determines when the map was printed, not when the information was obtained.
- **Legend.** The legend is part of the mapmaker's dictionary. It is a shorthand method of illustrating and identifying mapped features using symbols to show some of the more prominent features on the map. These symbols are not the same on every road map.

### Key Note Term

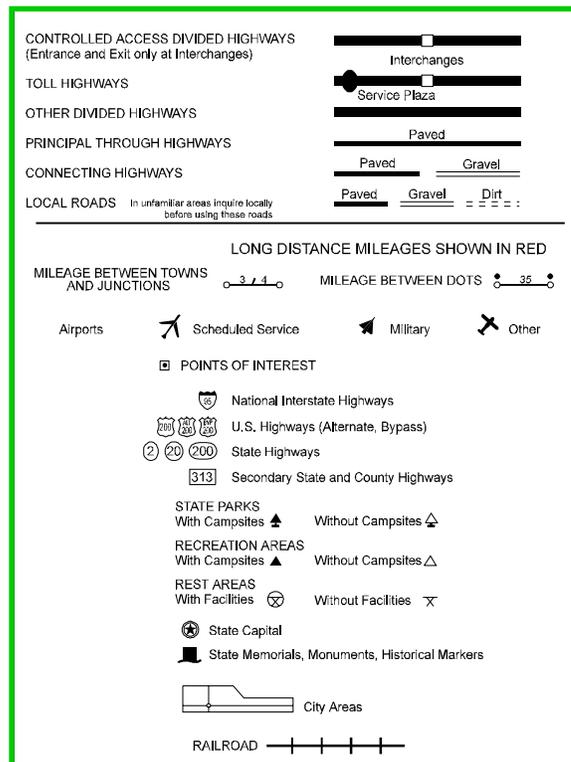
**legend** – an explanatory description on a chart, map, or other illustration

## Map Symbols

Because all features on a map cannot represent their true position and shape, mapmakers must use symbols to represent these features. These symbols are made to look as closely as possible to the actual features themselves as they are seen from above. The legend indicates the meanings of the symbols that are used on a map. A few of the commonly used symbols that you will find on road maps are identified in Figure 1.2.4.

Figure 1.2.4: Commonly used map symbols.

Courtesy of CACI and the US Army.



- **Roads.** Indicated by parallel or solid lines. Thickness and color of these symbols indicate the road size.
- **Interchanges.** Indicated by a heavy solid line for major access roads and parallel lines for intersecting secondary roads. Legends also illustrate full, partial, and no access at these interchanges.
- **Railroads.** Commonly shown by single or parallel lines with horizontal tick marks.
- **Buildings.** Symbols for buildings may vary from map to map according to the purpose of the map or building. Schools and churches are commonly represented by a solid square with a flag or cross affixed. Hospitals may be shown by a cross. Universities and colleges may sometimes have a special symbol as a point of interest.
- **Points of Interest.** Indicated by a special marking and its name; for example, a historical marker.
- **Airports.** Normally shown by a picture of an airplane.

- **Water Features.** Normally shown in blue and take the approximate shape of the feature.
- **Special Features.** Significant natural features (forests, recreational areas, national monuments, and so on), military reservations, or Indian reservations are normally highlighted with a specific color and do not have a standard shape. Many road maps also have a chart indicating the services that are available at the recreational areas and parks shown on the map.

You may also find the following symbols on road maps that can provide helpful information to you when using the map.

- **Route Markers.** Represented by a shield or some other shape containing the number of the road in its center. Although the map may show these route markers with white numbers and/or letters on a black shield or shape, the actual colors of the signs as seen on the highway are indicated in the previous bulleted list.
- **Interstate Highways.** There are a number of interstate highway types, and these are generally shown as:
  - **Principal Routes.** Red, white, and blue signs with one- or two-digit numbers. East-west routes have even numbers (I-4 or I-70), whereas north-south routes have odd numbers (I-5 or I-95).
  - **Loop or Belt Routes.** Red, white, and blue signs with three-digit numbers; the first number is always even (I-295). These routes circle or bypass major cities.
  - **Spur Routes.** Red, white, and blue signs with three-digit numbers; the first number is always odd (I-580). These routes lead into major cities.
  - **Business Routes.** Green signs marking routes from principal, loop, or belt highways that go to or through cities.
- **Boundary Symbols.** Shown as broken or **intermittent** lines that vary in pattern to denote different boundaries.
- **Mileage Markers.** Shown between towns and road junctions or between dots with the mileage indicated in red or black. State and regional maps also show long distance mileage between major cities by printing that information in red (with red directional arrows), and centering it between the two cities. An example of this long distance mileage indicator may appear as follows:

TAMPA  
199 Miles  
320 Kilometers  
WEST PALM BEACH

- **Official Highway Mileages.** This chart shows the actual ground mileage between the major cities that are located on the map.
- **City/Street Names.** This information lists alphabetically (wherever space permits on the map—including on the reverse side of it—and printed adjacent to its corresponding feature) the names of cities on state and regional maps and the names of streets on city maps. Beside each city or street listing is a letter/number code (for example, D-9). Along the outer edge of the margin are letters ranging from “A” to “P” (or beyond) and numbers ranging from “1” to “15” (or beyond). Note that the letter “I” is usually omitted so as not to be mistaken for the number “1.”

The following example shows how to locate features on a road map using this letter/number code.

### Key Note Term

**intermittent** – alternately stopping and starting; coming at intervals

### Note

For this example, the map sheet will have the letters along the vertical (left and right) edges of the margin and the numbers along the horizontal (top and bottom) edges.

To find the feature at D-9, use a finger on one hand to locate the letter “D”—it should be close to the top left or top right edges of the map. Next, use a finger on your other hand to locate the number “9” across the top or bottom margin. Now, move both fingers in from the margins toward the map. Where they meet is the general location of the feature. Street names may still be hard to find on a cluttered map, but you have narrowed the search to a specific area.

### Map Colors

- **Special Traffic Regulations/Traffic Control Devices.** This section contains some of the traffic regulations and/or signs (control devices) used within the state that may be different from other states within the region.

### Note

It is the motorist’s responsibility to know the regulations and meanings of all control devices within the region in which he/she is driving. Ignorance is not an acceptable excuse under the law.

### Key Note Term

**contrast** – to show differences when compared

**man-made** – manufactured, created, or constructed by man, rather than formed by nature

Colors on a road map provide **contrast** to map features, making them easier to identify. Map symbols are usually printed in different colors with each color identifying a class of features. However, colors may vary from one map to another. When used differently, mapmakers indicate these colors and their uses in the marginal information.

The following describes the basic colors used on most road maps and the features they represent. Occasionally, mapmakers may use other colors to indicate special information.

- **Black.** Indicates the majority of **man-made** features: buildings or roads.
- **Blue.** Identifies water features: lakes, swamps, or rivers.
- **Brown.** Identifies elevation and relief features: mountain ranges.
- **Green.** Identifies vegetation: woods, grassland, brush, orchards, or vineyards.
- **Red.** Classifies man-made features: populated areas, main roads, special features, or boundaries on older maps.

### Orienting a Map

Finding your way requires the ability to read and interpret a map, compare it to the features on the ground, and move to the desired location. One method of comparing your map to the ground is to **orient** it so that the map symbols fit the location of the features as they appear on the ground. A properly oriented map can also indicate direction; that is, after you have it correctly oriented to the ground, the top of it will usually point toward the north.

### Key Note Term

**orient** – to align or position oneself (or a map) in relationship to one’s surroundings

The following situation shows you how to orient a map without using a compass.

While participating in a bike rally, Barry traveled off the main road and became lost. He knew for certain he was lost when he came upon the main entrance to North Fork State Park on his right. Across from this entrance was a small bridge which crossed the North Fork River. Because Barry had a route map for this bike rally, he took the following steps to orient it.

- 1. Barry determined his location using at least two known points. He chose to use the man-made features of the bridge and the park entrance and the natural feature of the river.**
- 2. Next, he located these same features on his map. With the map in a horizontal position, he rotated it until the symbol for the river was pointed in the same direction as (or aligned with) the river in front of him.**
- 3. Barry then checked to ensure that the park entrance was correctly aligned with its actual location. From where he was located, the park entrance was on the right side of the road. He checked to see if the map symbol for the park entrance was also on the right side of the road.**

With his map properly oriented, he realized what direction he had to take to rejoin the bike rally.

In many cases, orienting a map may mean turning it upside down or holding it with one of its edges pointing toward you. Holding a map like this may make it harder for you to read street names or other symbols, but it properly aligns the features on the ground with those on the map. After you know where you are (by using the two or more known points discussed in the above story), keep the map oriented until you are at your destination or in an area familiar to you.

The next time you are on a trip to a place where you have never been before, try this method. It works! You will be able to navigate your way to your destination much more easily.

## **Care of Maps**

Because you may have to keep a map for a long time, exercise care when using it. Three important considerations in the care of maps are:

- **Properly refold it after each use.**
- **Use a pencil if it becomes necessary to mark on it so that you can easily erase those marks.**
- **Avoid spilling liquids on it.**

## **Global Positioning System**

The Global Positioning System (GPS) is a high-tech worldwide radio-navigation system formed from a network of 24 satellites and their ground stations. GPS provides more precise and efficient methods of surveying and mapmaking. Today,

GPS makes it possible to accomplish the same work in a fraction of the time. Mapping is the science of using GPS to pinpoint locations and then create maps of any location in the world, including both natural and man-made features.

### **Conclusion**

Maps permit you to see an area of the earth's surface with the key features of that area properly positioned. They can take the guesswork out of traveling to new locations preventing wasted time and effort. Therefore, make the most of your trips—know how to read and understand your maps beforehand. Even the best maps are useless if you do not know how to properly use them.

### **Lesson Review**

1. What information do maps provide?
2. Explain what a map's marginal information is.
3. What do the different colors on a map represent?
4. Describe how to orient a map without using a compass.