

Map Scale:

Campbell, John. Map Use and Analysis. p.77

Actual distances on the surface of the earth are fairly simple to conceive due to our experience with them. A person might have a commute of 15 miles to work, the nearest professional basketball arena might be 150 miles away, or during an American football game, it is known that the players play on a field of 100 yards in length. Knowing that a half-inch measurement on a map could, dependent on the specific map scale, portray any of these ground distances or even any other distance is not as simple.

The scale of a map is the **ratio** between map distances and earth distances. This scale association is represented in one of three manners: (1) in a word statement, (2) in an arithmetic ratio (representative fraction), or (3) in a graphic symbol.

A word statement of map scale presents a quick conception of size connections, except it is in an appearance that is awkward to employ in many operations. For example, a word statement could say that one map is at a scale of 1 inch to 1 mile, while another is at a scale of 1 inch to 2 miles. The second map will then display a great deal less detail than the first since 2 miles are depicted instead of 1 mile by every inch.

A representative-fraction scale is the ratio between the map distance and the ground distance between equal points. This scale is exhibited as either a true ratio, like 1:100,000, or as a fraction, like $1/100,000$. Both manners of representation possess the same meaning. For this example, one unit of distance on the map represents 100,000 of the same units on the surface of the earth. The representative-fraction scale is without units. In other words, the ratio between the values of distance on the map and the values of the distance on the earth will remain the same, despite if the measurements are given in feet, miles, meters, kilometers, or any other unit of distance. Another way of putting it is that both portions of the ratio are always given in the same units of measurement. A distance of 1 centimeter on a map with a scale of 1:100,000 is equal to 100,000 cm on the earth's surface, or one inch on the same map is equal to 100,000 inches on the ground. To give a scale of 1:100,000 and that 1 inch on the map is equal to 100,000 feet on the earth, or any other mixed measurement would not be correct. Although, an accurate word statement of the scale of a map with an RF of 1:100,000 would be "1 centimeter is equal to 100,000 centimeters" or "1 centimeter is equal to 1 kilometer".

A graphic scale is a line drawn on a map and subdivided into units suitable to the scale of the map. A graphic scale permits a distance measured on the map to be stated directly in the accurate earth distance by relating it to the scale. In addition, the graphic scale permits the transfer of a desired earth distance right onto the map. Graphic scales on a single map frequently include a number of scale units. This method permits measurements to be taken instantly in the preferred units without the need of changing from one unit of measure to another.