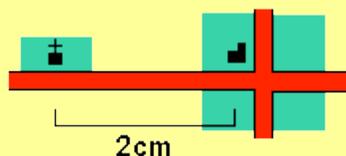


Geography Exploration: An Introduction to Map Scale using Google Earth

To represent geographic features on a map, the features must be **reduced in size**. The extent of this reduction is expressed as the **map's scale**. Map scale is a mathematical method for expressing how *map distance compares to ground distance*, the distance on the surface of the earth. Because a map's scale determines how features are represented on the map, it also affects the overall interpretation of the map.

Maps are always made 'to scale', meaning that each and every paper map has a map scale. In each case, the scale represents the *ratio of a distance on the map to the actual distance on the ground*. For example, if 2 cm on a map



represents 1 km on the ground...



the scale would be 2 cm = 1 km, computed as...

$$\begin{aligned} \frac{\text{Distance on the Map}}{\text{Distance on the Ground}} &= \frac{2 \text{ cm}}{1 \text{ km}} = \frac{2 \text{ cm}}{100\,000 \text{ cm}} \\ &= \frac{1}{50\,000} \\ &= \mathbf{1/50\,000 \text{ Scale}} \end{aligned}$$

Understanding the scale of a map is important if you need to know the size of the land features represented on the map or the relative distances between them.

For example, if you have a map scale of 1:63,360, one unit of measure on the map equals 63,360 units of the same measure in the real world. If 1 is in inches, so are 63,360. In other words, one inch on the map equals 63,360 inches on the earth.

Learning Objectives:

Upon successful completion of this lab, students will be able to:

- understand the *concept* of map scale
- understand how distances on a map relate to distances measured on earth

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Introduction to Map Scale:

This exercise was developed using Google Earth.

Teacher Prep time: 15 minutes

Teachers need to be familiar with the most recent Google Earth version and have Google Earth installed and functional.

Class Time Requirement: 20 to 30 minutes

Materials needed: Computer with Internet connection

Classroom Instructions:

Google Earth does not report the scale of the map directly. You have to turn the scale legend on. To do so click on '**View**' in the menu bar and select '**Scale legend**'. This will enable you to see the map scale on the bottom left corner of the map. As you zoom in and out on a map **the scale will change** as appropriate.



Notice that when you zoom in you can see features on the map that cannot be seen when the map is zoomed to the full extent. What the discussion in this section demonstrates is what has been called 'scale versus detail relationships'. The nature of these relationships can be better understood by reviewing the table below.

Type of Map	Surface Area	Detail
Large-scale	Small	Large
Small-Scale	Large	Small

To better understand the concept of scale, have your students complete the following brief exercise:

- 1) Open Google Earth
- 2) Click on the '**Search**' tab and have your students enter their State:



- 3) Ask the students to describe four of five major natural and or human made features they see on the screen:

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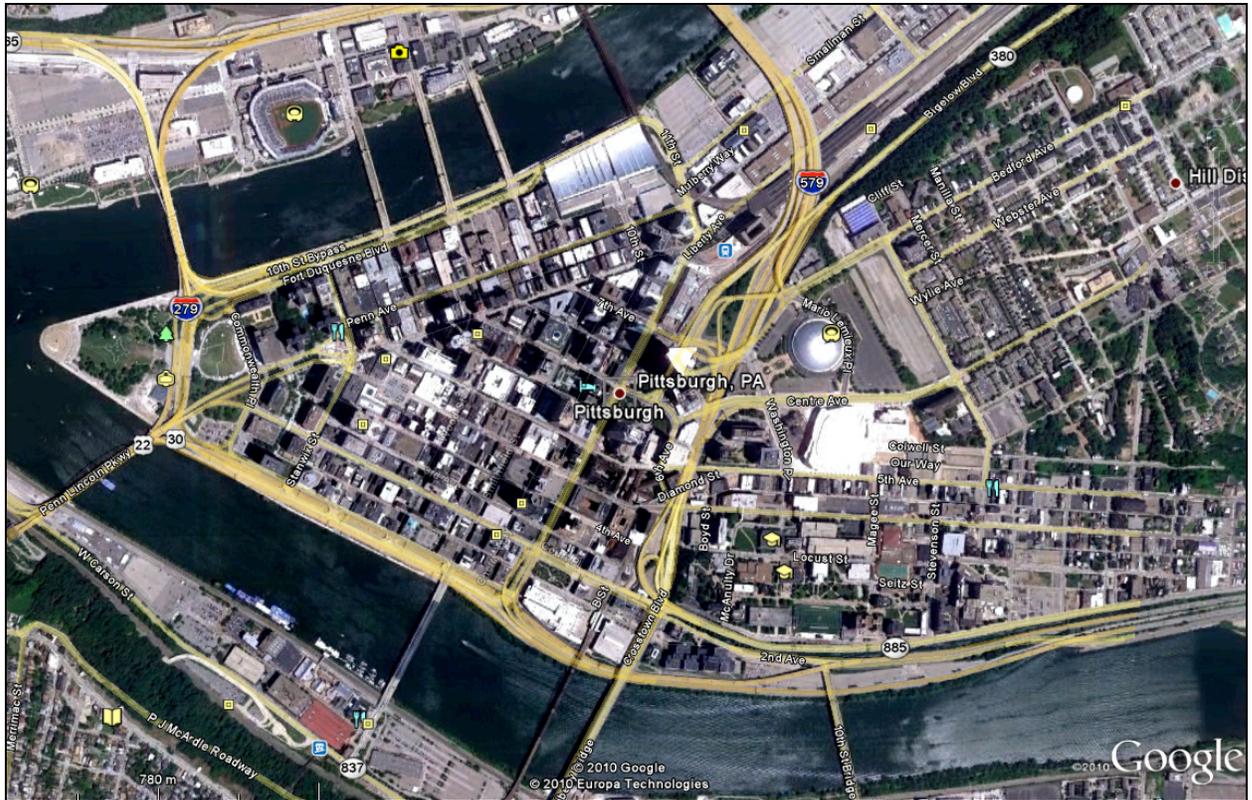


- 1) Can the students find their hometown with this scale? They would probably have a difficult time. Ask them to explain why. Their answers should involve the use of the map's scale.
- 2) In the **'Search'** tab, have the student type in their hometown. Now ask the students to describe four or five natural and human – made features they can see. Have the students use the table below to answer the following questions:

Type of Map	Surface Area	Detail
Large-scale	Small	Large
Small-Scale	Large	Small

- a) Which 'map' shows more area?
- b) Which 'map' shows the most detail?

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- c) At what scale is their hometown visible?
- d) At what scale is their school visible?

Compare answers and ask for an explanation where students have different answers.