

Scale Introduction

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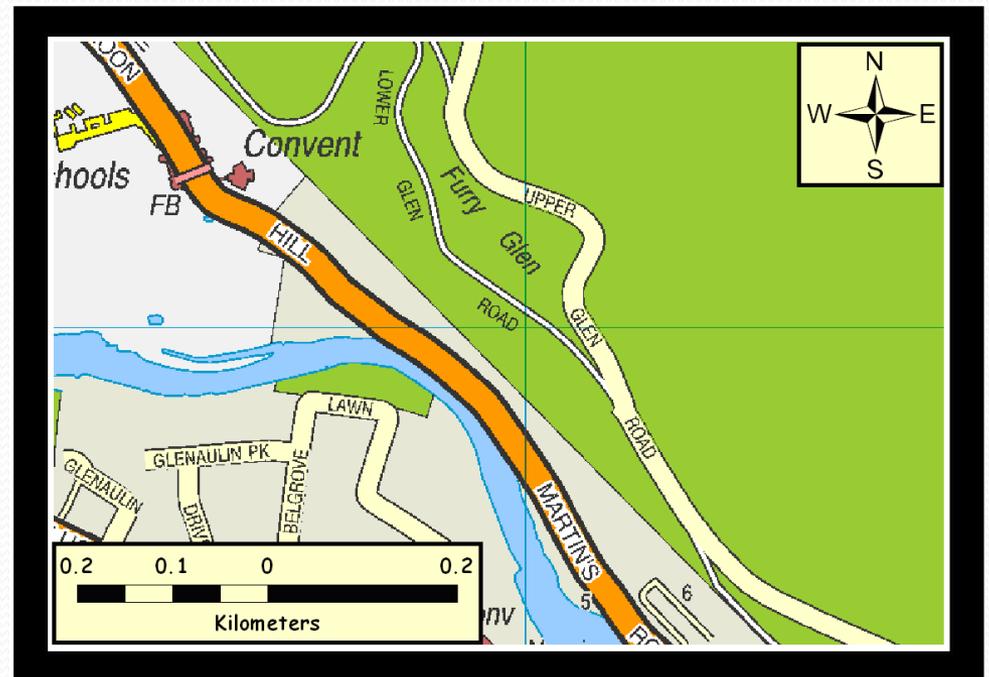
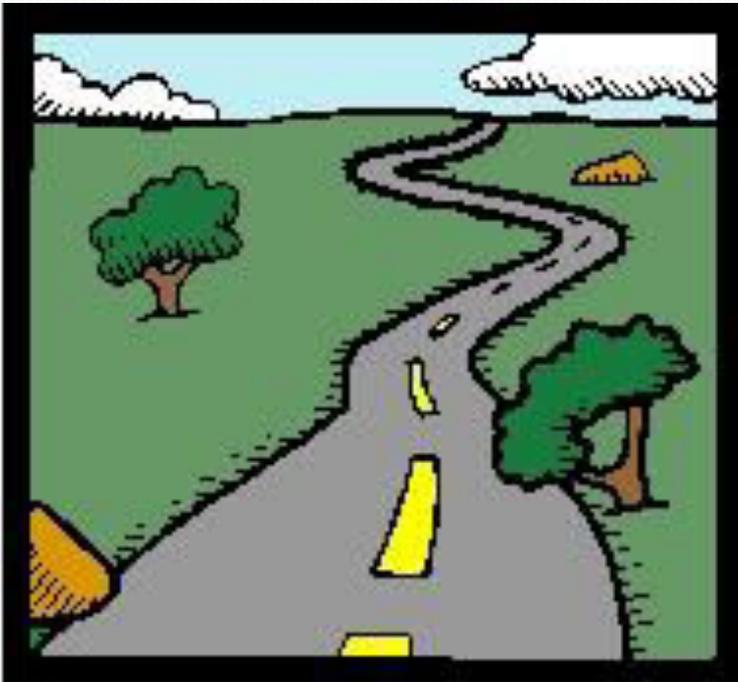
Dyal Singh College, University of Delhi(Nodal Centre)

What is Scale?

- A scale on a map is the relationship between the physical object and the feature that represents it on a map.
- An example of this would be the length of a road on the ground and the way that the road is represented on a map.

Map Scale – What is it?

- ▶ shows the relationship between the distance on a map and the actual distance on the Earth's surface
- ▶ a small distance on a map represents a much larger distance on the Earth
- ▶ there are 3 types of scale

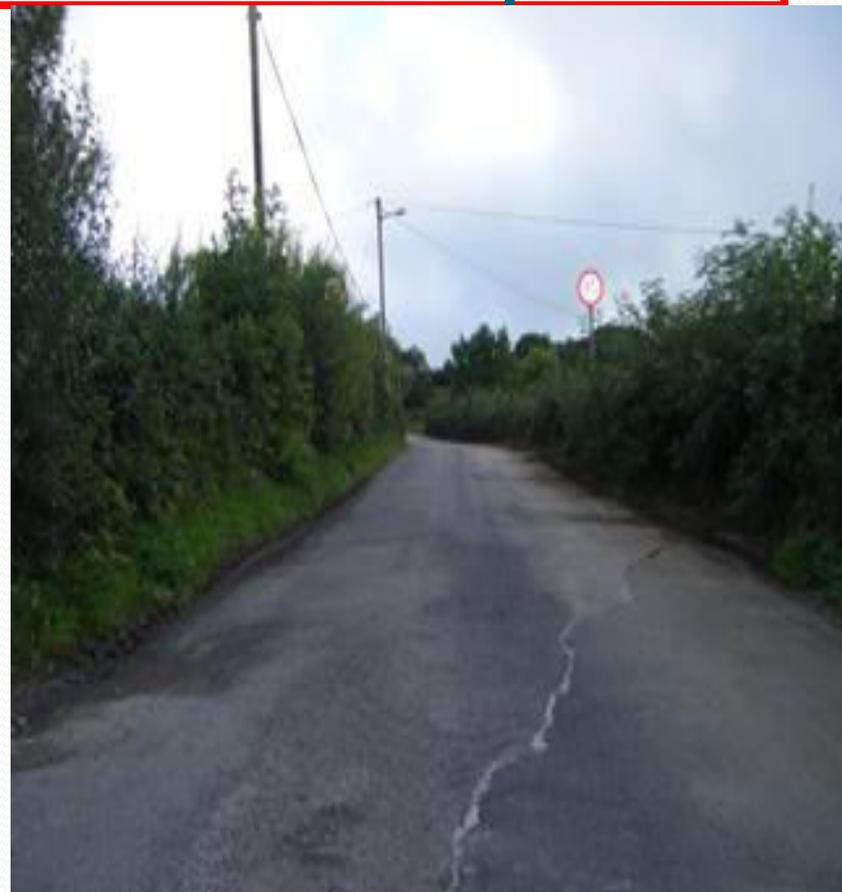


The Upper Glen Road, the first image, on the ground is displayed clearly on the map, the second image.

Representing features on Maps.



1cm on Map



4km in the real world

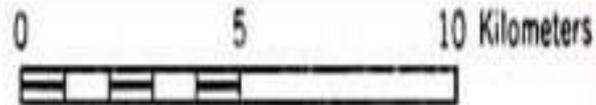
Three Types of Scale

- There are three different ways to write scale.

Word
Scale

• 1 cm = 250 km

Linear
Scale or
Bar Scale



Ratio
Scale
or
Representative
Fraction Scale

• 1:25 000 000

1. DIRECT STATEMENT

- ▶ uses words to describe the relationship between a distance on a map and a specific distance on the Earth's surface

1 cm to 10 km or 1 cm = 10 km

Map Scales

Word Scale

1 cm = 8 km

- A stated scale says exactly how much distance is represented by 1 cm, in this case, 8 km.
- It is the most useful scale for **calculating distances.**



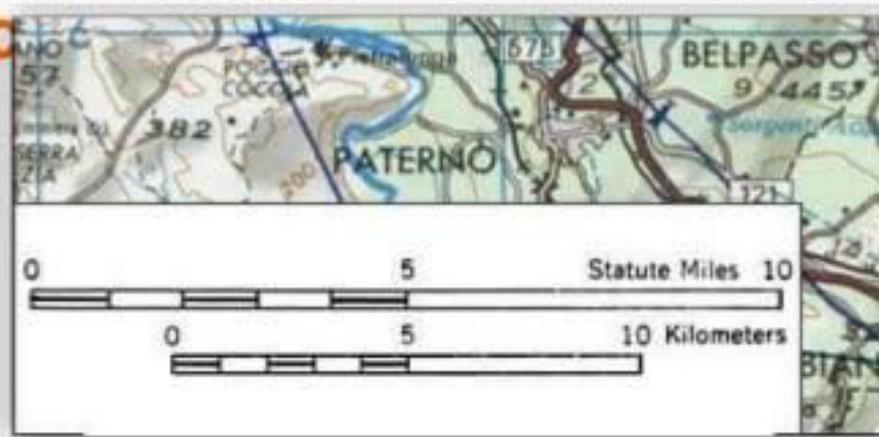
2. LINEAR SCALE

- ▶ a special **RULER** on the map that is divided into equal units of distance
- ▶ always includes the units of measurement on the Earth's surface
- ▶ using a piece of paper and pg 8 in COSA, how far is Edmonton from Calgary?

Map Scales

Linear Scale:

- A linear scale is usually present on most maps. It tells us how much **map distance** represents a certain real distance.
- For example, the scale shows the map distance that equals 10 kilometers in **real distance**.



3. REPRESENTATIVE FRACTION

- ▶ a ratio where one unit on the map equals a specific number of the same unit on the Earth's surface
- ▶ always done as a ratio or fraction of 1

1:50,000

- ▶ 1 cm on the map equals 50,000cm on the Earth

Few Properties about this ratio you should know

1 : 50 000

A diagram showing the ratio '1 : 50 000' at the top. Two arrows point downwards from the ratio to the two columns of text below. The left arrow points to the first column, and the right arrow points to the second column.

The First term of the Ratio:

- is always 1
- represents the same distance on the map
- represents the same unit of measurement as the second term of the ratio

The Second Term of the Ratio:

- represents the distance on the earth's surface
- represents the same unit of measurement as the first term of the ratio

▶ Example:

Scale is 1:50,000

Town A is 10cm from Town B

$$\begin{aligned} &1:50,000(10\text{cm}) \\ &= 500,000\text{cm} \end{aligned}$$

So Town A is 500,000cm (or 5km) from Town B

Conversions

- To determine the distance in **feet**, actual distance in inches / 12
- To determine the distance in **miles**, actual distance in inches / 63,360
- To determine the distance in **meters**, actual distance in centimeters / 100
- To determine the distance in **kilometers**, actual distance in centimeters / 100,000

English Measurements

- 1 mile = 5280 ft
- 1 mile = 63360 inches
- 1 foot = 12 inches

Metric Measurements

- 1 Kilometer (Km) = 1,000 meters (m)
- 1 Kilometer (Km) = 100,000 cm
- 1 Kilometer (Km) = 1,000,000 mm
- 1 meter = 100 centimeters (cm)
- 1 centimeter = 10 millimeters (mm)

SCALE CONVERSIONS

R.F to Direct Statement

- ▶ divide the second term by 100,000 to change cm to km

Example: 1:50,000cm (R.F.)

$$1 \text{ cm} = 50,000\text{cm} / 100,000$$

(CONVERSION)

$$1 \text{ cm} = 0.5\text{km} \quad (\text{DIRECT STATEMENT})$$

Direct Statement to R.F.

- ▶ Multiply the second term by 100,000 to change km to cm

Example: 1 cm : 2.5 km (DIRECT STATEMENT)

$$1 \text{ cm} = (2.5 \text{ km})(100,000)$$

(CONVERSION)

$$1 \text{ cm} = 250,000 \text{ cm} \quad (\text{R.F.})$$

Examples

- If a map has a scale of 1/24,000, a measured distance of 8.25 inches on the map represents an actual distance of 198,000 inches
 - $8.25 \times 24,000 = 198,000$ inches
 - $198,000 \text{ inches} / 12 = 16,500$ feet
 - $198,000 \text{ inches} / 63,360 = 3.1$ miles

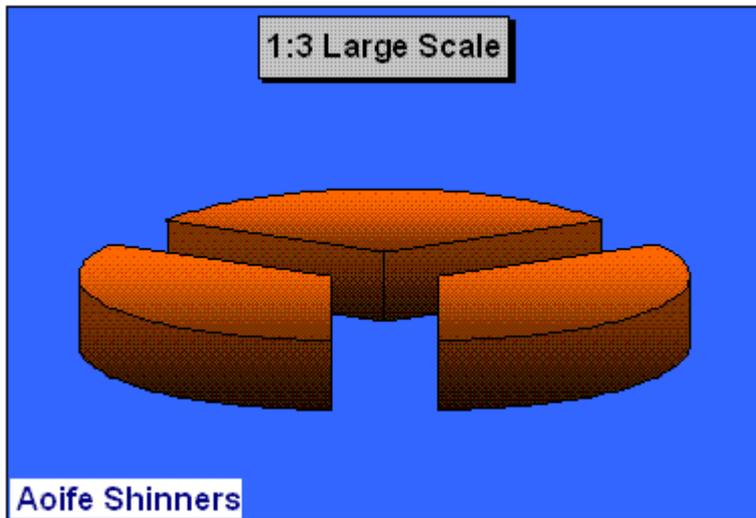
Examples

- If a map has a scale of 1/50,000, a measured distance of 22 centimeters on the map represents an actual distance of 1,100,000 cm
 - $22 \text{ cm} \times 50,000 = 1,100,000 \text{ cm}$
- To calculate the actual distance in meters and kilometers:
 - $1,100,000 \text{ cm} / 100 = 11,000$ meters
 - $1,100,000 \text{ cm} / 100,000 = 11$ kilometers

How to represent features correctly!

- If, for example, the length of a road is 1cm on a map and it measures 2500cm (or 0.025km) on the ground, the scale of the map is 1:2500.
- This would be called a large scale map as it can be represented as a very large fraction i.e. $1/2500$.
- A smaller scale map would be 1:450,000 as its fraction is much smaller $1/450,000$. 1cm on this map would represent 4.5km on the ground.

Large Scale Vs Small Scale

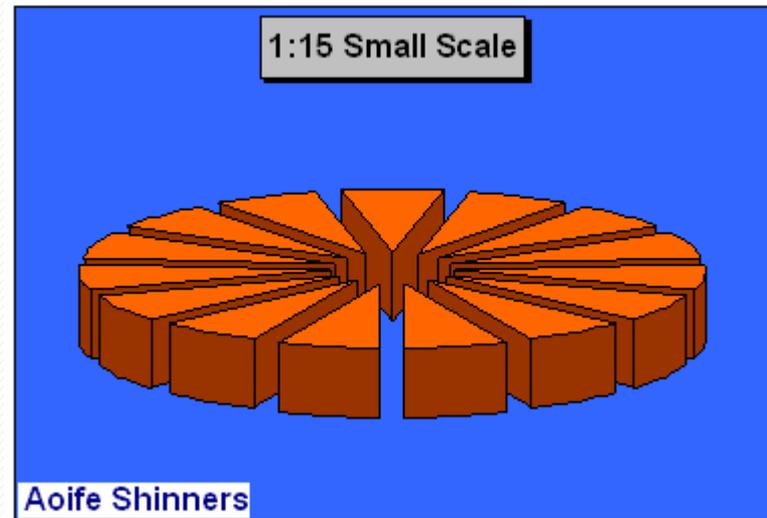


The slice of the first cake represents:

A large slice

A large fraction

A large amount of data and information on a map



The slice of the second cake represents:

A small slice

A small fraction

A small amount of data and information on a map

Small Scale



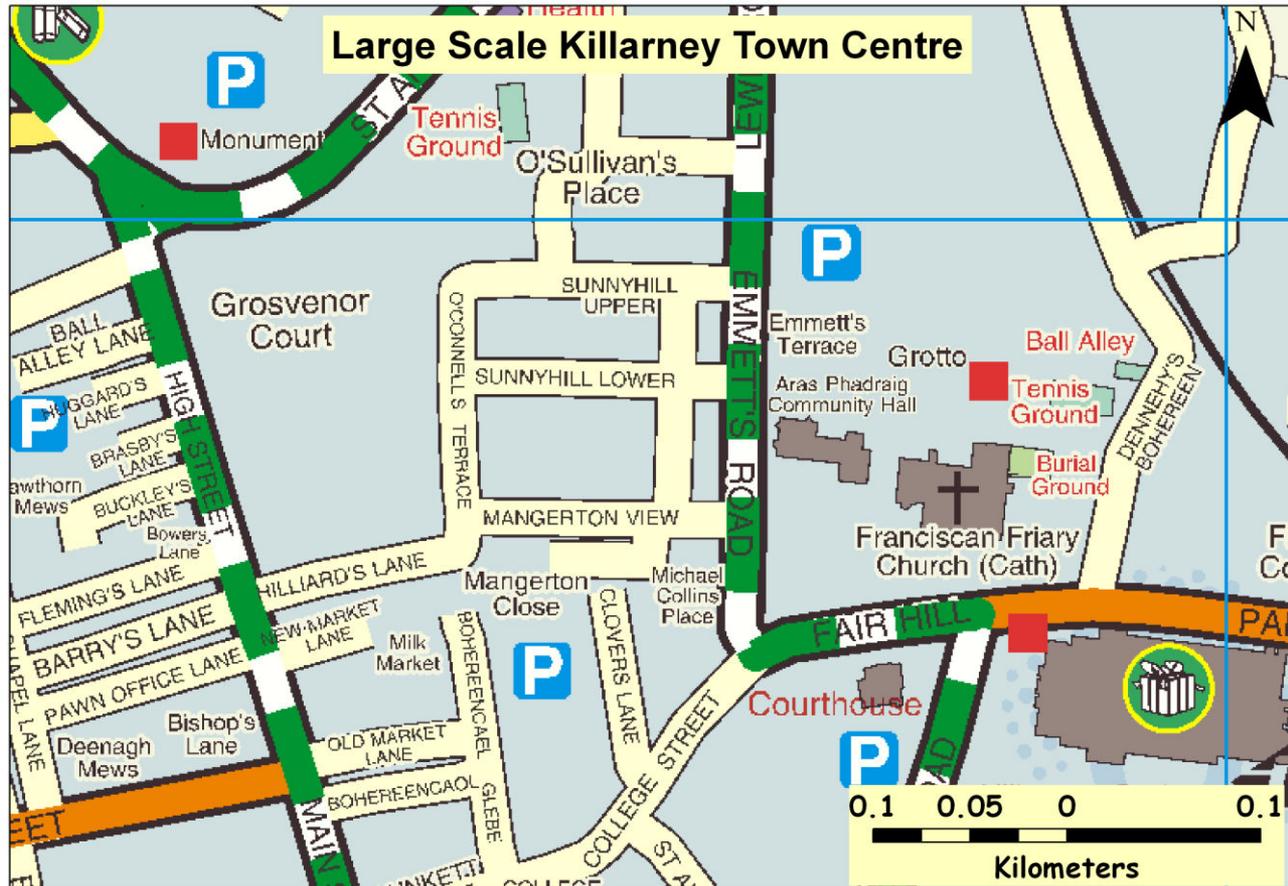
The small scale map above shows the town of Killarney and the surrounding area. It is an ideal map for somebody who wants to travel through and outside the town.

How does Small Scale Compare to a Large Scale Map?



The large scale map looks very hard to read as it contains an awful lot of detail and information. Large scale is best for concentrating on a small area like Killarney

Large Scale



This type of map would be ideal if you wanted to see how to get from High Street to the train station. So, it is a good scale map to use if you wanted to have a lot of detail for a local neighbourhood.

The main points about large and small scale.

- It is important to note the following:
 - Large fraction=large scale=covering a small area.
 - Small fraction=small scale=covering a large area.

Activity 2

- Conversion of Statement Scale into Representative Fraction
 - 1.1 centimeter to 7 meters
 - 2.3 inches to 75 yards
- Conversion of Representative Fraction into Statement Scale
 1. 1:500 (centimeter to meters)
 2. 1:31,680 (inches to mile)