Scale Diagrams
Foundations 11

Name: Notes
Block: ___ Date: _____

Scale: Ratio that compares the size of a diagram or model or image to the original size of the object
Ex. 1cm : 1km on a map

Scale Factor: The number by which each dimension of an original figure or object is multiplied to produce an enlarged or reduced version

$$\text{Scale Factor} = k = \frac{\text{image / model}}{\text{actual}}$$

When the factor is:
- <1: smaller than original
- >1: bigger than original
- (=1: Same size as original)

**Ways to Write Scale Factors**

Ratio: 1cm : 20cm

Fraction: $\frac{1}{20}$

Decimal : 0.05

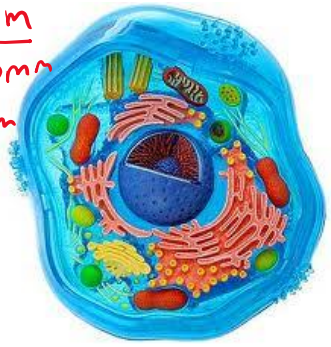
Percent: 5%

**Calculating Scale Factor**

Ex. The diameter of an animal cell is actually 0.25 mm. If the diameter of the animal cell is drawn as 3.5 cm, what scale factor was used to draw the scale diagram?

$k = \frac{\text{diagram}}{\text{original}}$ } must have the same units

$0.25\text{ mm} \times \frac{1\text{cm}}{10\text{mm}} = 0.025\text{cm}$



$= \frac{3.5\text{cm}}{0.025\text{cm}} = 140$ (Decimal)

Fraction $\frac{140}{1}$

Ratio 140:1

Percent 14000%

Ex. The actual thickness of a book is 3.5 cm. What would be the diagram depth if a scale of 0.9 were used?

$K = \frac{\text{diag}}{\text{orig}}$

$\frac{0.9}{1} = \frac{x}{3.5}$

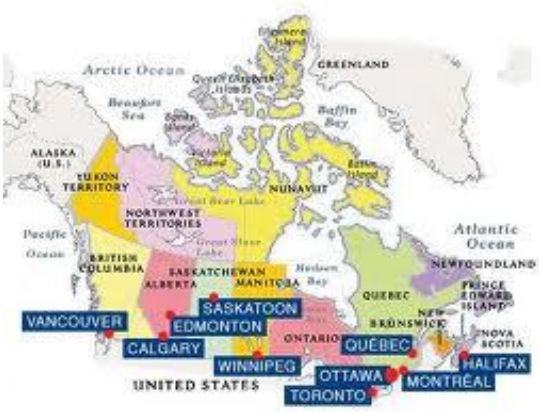
$0.9 \times 3.5 = 3.15$ cm thick

Ex. The distance between two cities on a map is 5.4 cm (on diag). The map was made using a scale of 1 cm to 300 km. What is the actual distance between the two cities?

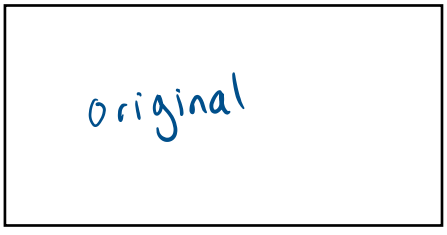
$\frac{1\text{ cm}}{300\text{ km}} = \frac{5.4\text{ cm}}{x}$

$\frac{300\text{ km} \times 5.4\text{ cm}}{1\text{ cm}} = 1620\text{ km}$

The cities are actually 1620 km apart.




Ex. A diagram of the rectangle below has a scale factor of 1:2. What are the new dimensions for the rectangle?




$K = \frac{\text{diag}}{\text{original}}$

$\frac{1}{2} = \frac{x}{2\text{ cm}}$ (width) $x = 1$ cm

$\frac{1}{2} = \frac{y}{5\text{ cm}}$ (length) $y = 2.5$ cm

The new dimensions are 1 cm x 2.5 cm.