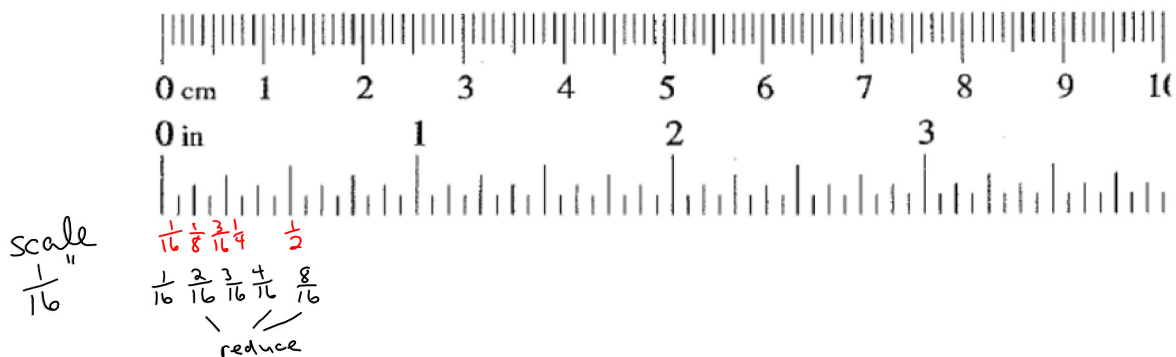MAAPC20S Measurement Lesson 1

Lesson One – Imperial Measures of Length

There are two main measurement systems used today in Canada:

- <u>Système Internationale d'unités</u> (SI) or the <u>Metric System</u> (millimetre, centimetre, metre, kilometre)
- <u>Imperial System</u> (inches, feet, yard, mile)

Imperial and Metric Ruler

Imperial – each inch is broken down into $\frac{1}{16}$ in, with other units of measure being $\frac{1}{8}$ in, $\frac{1}{4}$ in, $\frac{1}{2}$ in
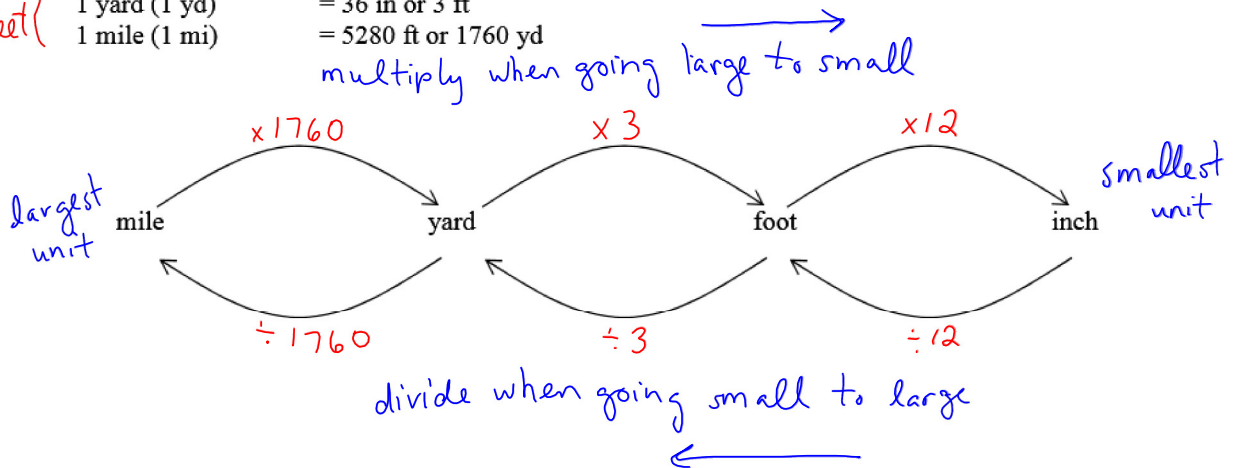
scale $\frac{1}{16}''$

$\frac{1}{16}$ $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{1}{2}$

$\frac{1}{16}$ $\frac{2}{16}$ $\frac{3}{16}$ $\frac{4}{16}$ $\frac{8}{16}$

reduce

Metric – each centimeter is broken down into 10 millimetres.

Imperial:

on formula sheet

1 foot (1 ft or 1')	= 12 inches (12 in or 12")
1 yard (1 yd)	= 36 in or 3 ft
1 mile (1 mi)	= 5280 ft or 1760 yd

multiply when going large to small

×1760   ×3   ×12

largest unit   mile   yard   foot   inch   smallest unit

÷1760   ÷3   ÷12

divide when going small to large

1

L1 Imperial Units of Measurement.notebook

MAAPC20S   Measurement   Lesson 1
Metric:

1 cm   = 10 mm
1 m   = 100 cm
1 km   = 1000 m

×1000   ×100   ×10

km   m   cm   mm

÷1000   ÷100   ÷10
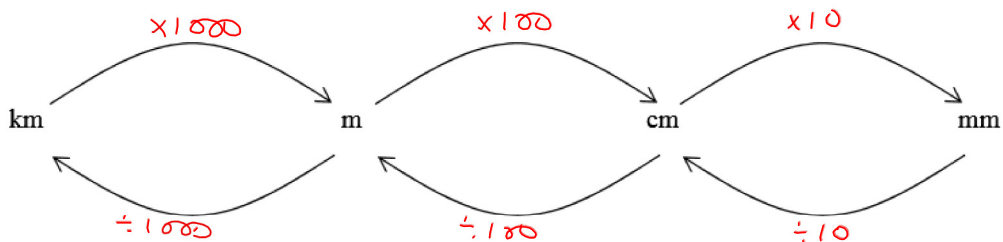
Estimation: Determine the most suitable units in both the imperial and metric systems for measuring the following:

	Metric	Imperial
Your height	m and/or cm	ft and inches
Distance from Winnipeg to Steinbach	km	miles
Height of Pop Can	cm	in
Length of a Sheet of Curling Ice	m	yds
Diameter of a Dime	mm	in
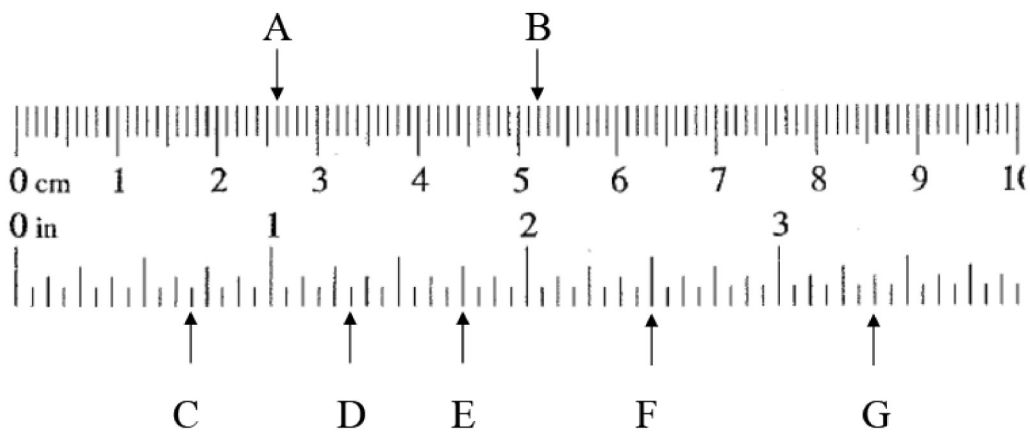
A = 26mm or 2.6cm

B = 52mm or 5.2cm

C = $\frac{11}{16}$"

D = $1\frac{5}{16}$"

E = $1\frac{3}{4}$"

F = $2\frac{1}{2}$"

G = $3\frac{3}{8}$"

2

L1 Imperial Units of Measurement.notebook

Example 1 – Converting Between Imperial Units

Convert 5 yards to feet

$$5 \text{ yds} \times 3\text{ft/yd} = 15 \text{ ft}$$

or

$$\frac{1 \text{ yd}}{3\text{ft}} = \frac{5 \text{yds}}{x \text{ ft}}$$

cross multiply $\quad 1 \text{yd} \cdot x\text{ft} = 5\text{yds} \cdot 3\text{ft}$

$$x\text{ft} = \frac{5 \text{yds} \cdot 3\text{ft}}{1 \text{yd}}$$

$$x = 15 \text{ ft}$$

Convert 51 inches to yards, feet and inches

to ft and inches

12 inches → in 1 foot

$$\frac{51}{12} = 4\frac{3}{12} \text{ ft} \quad \text{← mixed fraction}$$

$$4 \text{ ft} \cdot 3 \text{ in}$$

ft to yds

$$3\text{ft in} \to \frac{4}{3} = 1\frac{1}{3}$$
(1 yd)
1 yd   1 ft

$$\therefore \; 1 \text{ yd} \quad 1\text{ft} \quad 3 \text{ in}$$

(3 ft) 2 in + (7 ft) 11 in

10 ft   13 in
+1   −12
11 ft   1 in

12 in = 1 ft

∴ 13 in = 1 ft 1 in

---

3 mi − 250 ft   ← need to be in same units to subtract

mi → ft   1 mi = 5280 ft   ← from formula sheet

$$3 \text{ mi} \times 5280 \text{ ft/mi} = 15\,840 \text{ ft}$$

15 840 ft − 250 ft
15 590 ft

3

L1 Imperial Units of Measurement.notebook

Example 2 – Solving Problems Involving Converting Between Units

Ben buys baseboard for a bedroom. The perimeter of the bedroom, excluding closets and doorway, is 37 ft.

  a) What length of baseboard is needed, in yards and feet?

  b) The baseboard material is sold by the yard. It costs $5.99/yd. What is the cost of material before taxes?

a) $\dfrac{37}{3} = 12\frac{1}{3}$ yds

3 ft in → 1 yd

12 yds   1 ft

∴ Ben needs 13 yds

b) 13 yds × $5.99/yd = $77.87

Tyrell has 4 yd. of cord to make friendship bracelets. Each bracelet needs 8 in. of cord. How many bracelets can Tyrell make?

1 yd = 36 in   ← from formula sheet

∴ 4 yd · 36 in/yd = 144 in

144 ÷ 8 = 18 bracelets

Example 3 – Solving a Problem Involving Scale Diagrams

On the map with a scale of 1:4 750 000, the distance between Seward and Anchorage in Alaska is 1 ¾ in. What is the distance between these two towns to the nearest mile?

1 in = 4 750 000 in

∴ 1.75 × 4 7500 000 = 8 312 500 in

8 312 500 in · $\dfrac{1 ft}{12 in}$ · $\dfrac{1 yd}{3 ft}$ · $\dfrac{1 mile}{1760 yds}$ = 131 miles

(see video for setting up ratios so units cancel/divide out)

OR

1 mile = 1760 × 3 × 12
      = 63 360 in

∴ $\dfrac{8 312 500}{63 360}$ = 131 miles

pg. 12
2 a, c, e, g, i,
3 a, c, e, g, i
4 a, c, e, g, i
6, 7, 10

4