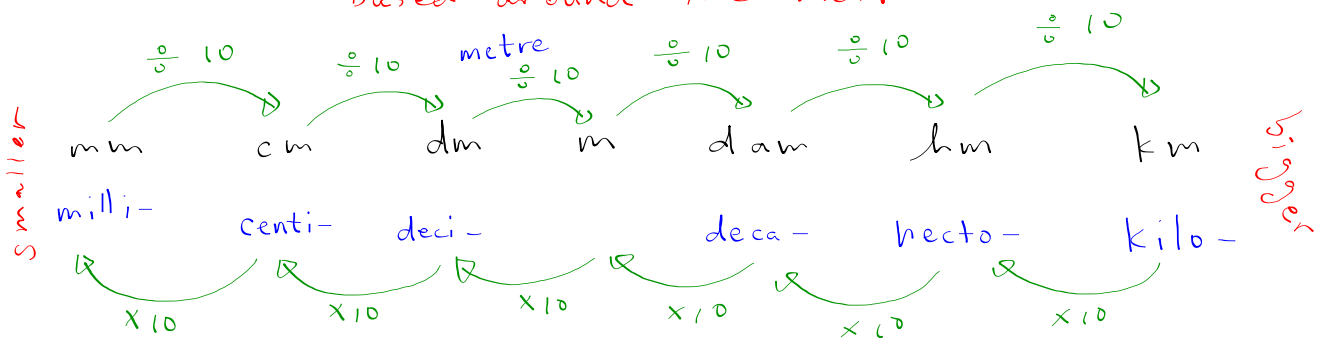


Lesson 8 : Unit Conversions (ex. cm \rightarrow mm)

The Metric System:

↳ an arbitrary yet convenient way of measuring things

→ based around the metre



ex₁ Convert:

$$3 \text{ cm} = \underline{0.003} \text{ dam} \quad 3 \overset{\div}{\div}{\div} 10 \overset{\div}{\div} 10 \overset{\div}{\div} 10$$

$$\text{ex}_2 \quad 6.7 \text{ km} = \underline{67000} \text{ dm} \quad 6.7 \times 10 \times 10 \times 10 \times 10$$

Convert the following units (express the result in scientific notation as well):

(a) 300 mm = 0.0003 km

(b) 67 hm = 67 000 dm

(c) 7.3 cm = 0.0073 dam

(d) 0.3 m = 0.0003 km

(e) 0.476 hm = 4760 cm

(f) 7890865446 cm = 7890865.446 dam

BONUS!

0.0003 = 3×10^{-4} km

6.7×10^4 dm

7.3×10^{-3} dam

3×10^{-4} km

4.76×10^3 cm

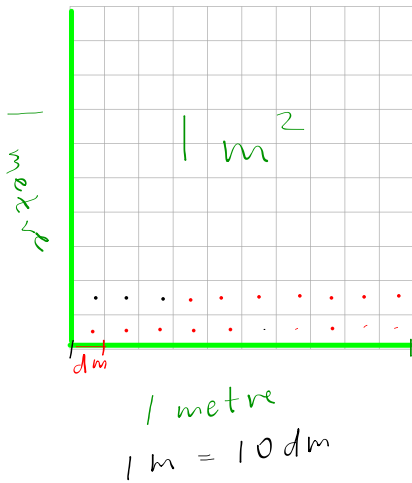
7.89×10^6 dam

7890865.446

The metric System for Area

1.3 Converting Area

Let's discover how to come up with a conversion procedure for area in the metric system:



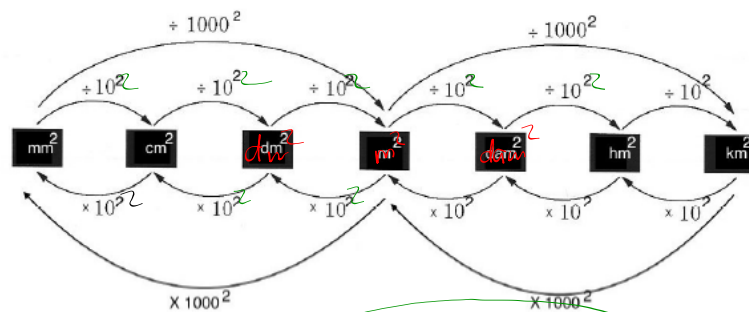
$$1 \text{ m} = 10 \text{ dm}$$

$$1 \text{ m}^2 = 100 \text{ dm}^2$$

$$1 \text{ m}^2 = 10^2 \text{ dm}^2$$

$$10^2 = 10 \times 10 = 100$$

To convert area, use the following conversion diagram:



e.x. Convert

$$50 \text{ cm}^2 = \underline{0.005} \text{ m}^2$$

$$50 \div 10^2 \div 10^2 = 0.005$$

5×10^{-3} → small #
• go to the left

e.x. $15.64 \text{ km}^2 = \underline{156400} \text{ dam}^2$

$$15.64 \times (100)^2$$

$$15.64 \times 10^2 \times 10^2$$

$$15.64 \times 100 \times 100$$

$$15.64 \times 100^2$$

$10^2 = 10 \times 10$

1.3.1 Example

Convert the following:

(a) $2 \text{ m}^2 = \underline{20\,000} \text{ cm}^2$

(b) $2.7 \text{ cm}^2 = \underline{270} \text{ mm}^2$

(c) $17 \text{ dam}^2 = \underline{0.0017} \text{ km}^2$

You do

1.3.2 Practice

Convert the following:

(a) $22 \text{ m}^2 = \underline{220\,000} \text{ cm}^2$

(b) $4.79 \text{ dm}^2 = \underline{479} \text{ cm}^2$

(c) $170 \text{ hm}^2 = \underline{1.7 \times 10^{12}} \text{ mm}^2$ *mm²*

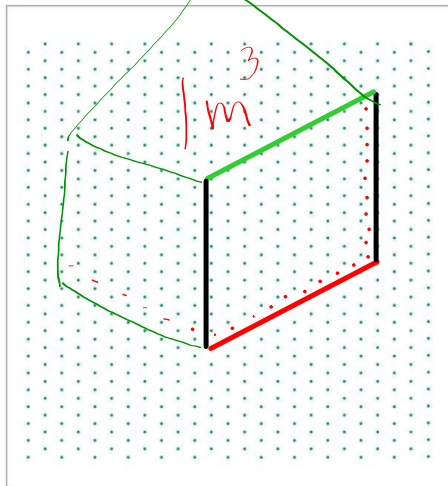
(d) $88.5 \text{ km}^2 = \underline{885\,000} \text{ dam}^2$

(e) $100 \text{ mm}^2 = \underline{0.01} \text{ dm}^2$

(f) $1.08 \text{ km}^2 = \underline{1080\,000} \text{ m}^2$

1.4 Converting Volume

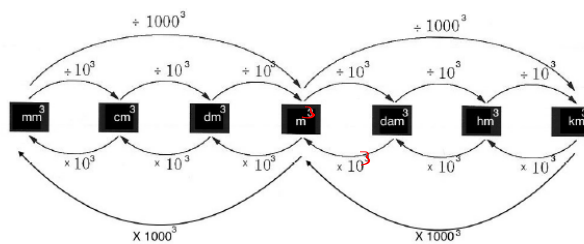
Let's discover how to come up with a conversion procedure for area in the metric system:



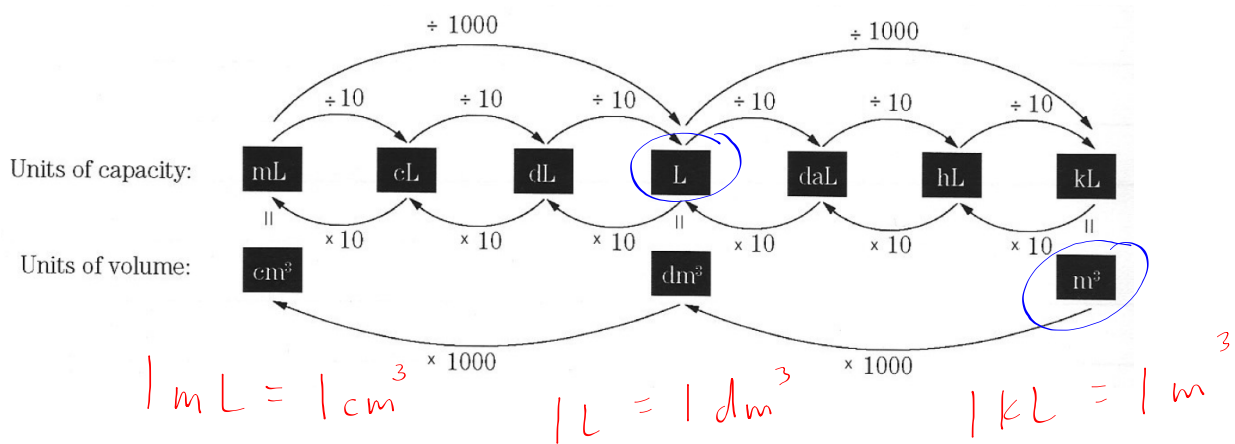
$$1 \text{ m}^3 = 1000 \text{ dm}^3$$

$$1 \text{ m}^3 = 10^3 \text{ dm}^3$$

Thus, to convert volume, we can use the following *conversion diagram*:



Conversion Diagram for Metric Volumes based on the Litre



1.5.1 Example

A container has a 27000L capacity. What is the volume of this container in m³?

$$\therefore 1 \text{ L} = 1 \text{ dm}^3$$

$$\therefore 27000 \text{ L} = 27000 \text{ dm}^3$$

$$27000 \text{ dm}^3 = \frac{27}{1000} \text{ m}^3$$

$$27000 \div 1000$$

$$\therefore 27000 \text{ L} = 27 \text{ m}^3$$

ex. Convert 62000 cm^3 to L.

$$1 \text{ cm}^3 = 1 \text{ mL}$$

$$62000 \text{ cm}^3 = 62000 \text{ mL}$$

$$62000 \text{ mL} = \underline{62} \text{ L}$$

$$62000 \frac{\circ}{8} 10 \frac{\circ}{8} 10 \frac{\circ}{8} 10$$

You do
pg 5 and
6.

Convert the following:

- (a) $2.8 \text{ dm}^3 = \underline{2800} \text{ cm}^3$
- (b) $38.9 \text{ mm}^3 = \underline{0.000000389} \text{ m}^3$
- (c) $0.89 \text{ km}^3 = \underline{890} \text{ hm}^3$
- (d) $0.0678 \text{ m}^3 = \underline{67800000} \text{ mm}^3$
- (e) $16 \text{ dm}^3 = \underline{0.00016} \text{ dam}^3$
- (f) $0.93 \text{ hm}^3 = \underline{93000000} \text{ dm}^3$

1.5.2 Example **Bonus:**

Could 950mL of juice be poured into a container measuring $7\text{cm} \times 8\text{cm} \times 10.9\text{cm}$?

$= 950 \text{ cm}^3$

$l \quad w \quad h$

$V = l \cdot w \cdot h$

$V = 610.4 \text{ cm}^3$

NO

the juice can't be poured in since $950 \text{ cm}^3 > 610.4 \text{ cm}^3$ capacity

1.5.3 Practice

Convert the following:

- (a) 25000 daL into m^3 . 250 m^3
- (b) 340 cL into cm^3 . 3400 cm^3
- (c) 58900 dL into m^3 . 5.89 m^3
- (d) 156000 cm^3 into L. 156 L
- (e) 1.89 m^3 into mL. 1890000 mL