

# Metric System Basics: Le système internationale (SI)



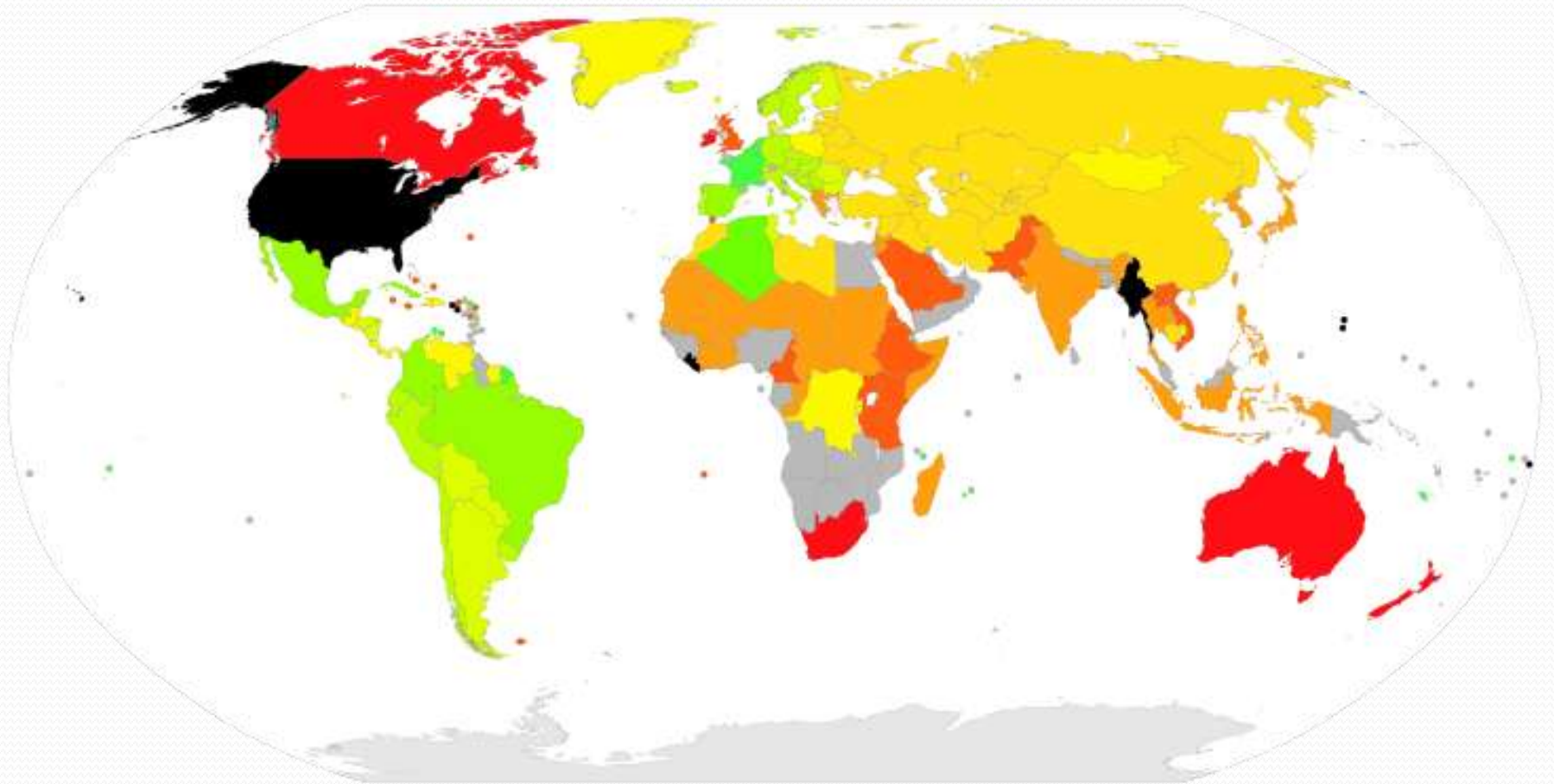
Look out for the special *check mark* to know which notes to write!

- On a checked slide, write all notes, unless ...
- On a checked slide with lots of notes, **just write the underlined text!**

# Where is it important?



# Used by MOST of the WORLD





# Metric System

- The metric system is based on a base unit that corresponds to a certain kind of measurement
  - Length = meter
  - Volume = liter
  - Weight (Mass) = gram
- Prefixes plus base units make up the metric system
  - Example:
    - Centi + meter = Centimeter
    - Kilo + liter = Kiloliter



# Mnemonic Device

<b>K</b>	<b>H</b>	<b>D</b>	<u><b>unit</b></u>	<b>D</b>	<b>C</b>	<b>M</b>
i	e	r	o	e	h	i
n	n	a	n	l	o	l
g	r	n	e	i	c	k
	y	k		c	o	
				i	l	
				o	a	
				u	t	
				s	e	

# Metric System

- So if you needed to measure length you would choose **meter** as your base unit
  - Length of a tree branch
    - 1.5 meters
  - Length of a room
    - 5 meters
  - Length of a ball of twine stretched out
    - 25 meters

# Metric System

- But what if you need to measure a longer distance, like from your house to school?
  - Let's say you live approximately 10 miles from school
    - 10 miles = 16093 meters
  - 16093 is a big number, but what if you could add a **prefix** onto the base unit to make it easier to manage:
    - 16093 meters = 16.093 kilometers (or 16.1 if rounded to 1 decimal place)





# Metric System

- These prefixes are based on powers of 10. What does this mean?
  - From each prefix every “step” is either:
    - 10 times larger
    - or
    - 10 times smaller
  - For example
    - Centimeters are 10 times larger than millimeters
    - 1 centimeter = 10 millimeters

kilo	hecto	deca	<u>Base Units</u> meter gram liter	deci	centi	milli
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# Metric System

- For each “step” to right, you are multiplying by 10
- For example, let’s go from a base unit to centi

1 liter = 10 deciliters = 100 centiliters

$$(1 \times 10 = 10) = (10 \times 10 = 100)$$

2 grams = 20 decigrams = 200 centigrams

$$(2 \times 10 = 20) = (20 \times 10 = 200)$$

kilo	hecto	deca	meter liter gram	deci	centi	milli
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# Metric System

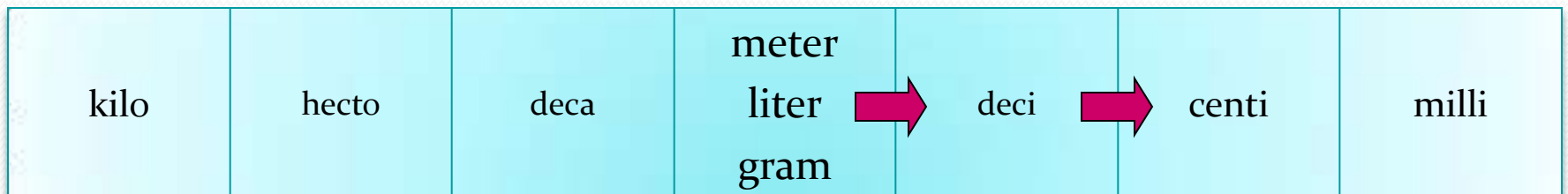
- An easy way to move within the metric system is by moving the decimal point one place for each “step” desired

Example: change meters to centimeters

1 meter = 10 decimeters = 100 centimeters

or

1.00 meter = 10.0 decimeters = 100. centimeters

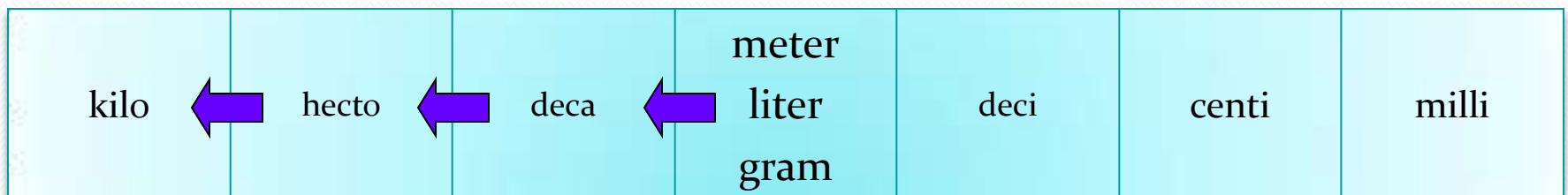


# Metric System

- Now let's try our previous example from meters to kilometers:

16093 meters = 1609.3 decameters = 160.93 hectometers = 16.093 kilometers

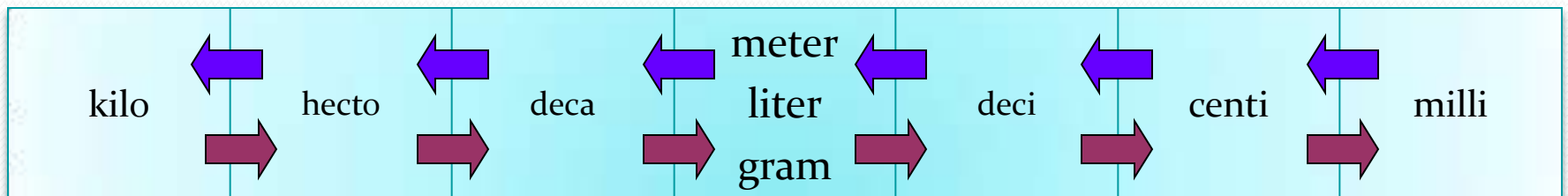
- So for every “step” from the base unit to kilo, we moved the decimal 1 place to the left  
(the same direction as in the diagram below)





# Metric System

- If you move to the **left** in the diagram, move the decimal to the **left**
- If you move to the **right** in the diagram, move the decimal to the **right**

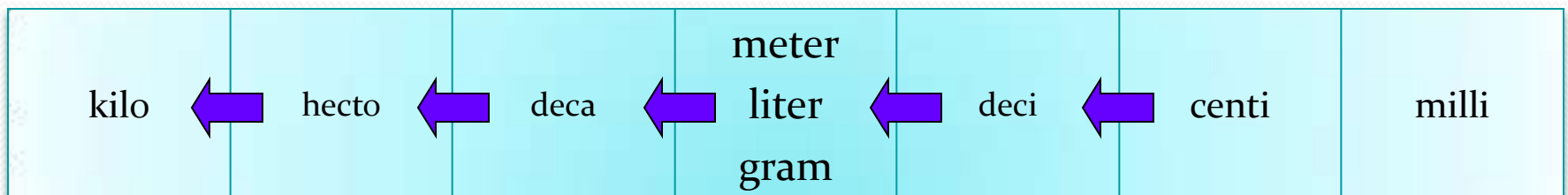


# Metric System

- Now let's start from centimeters and convert to kilometers

400000 centimeters = 4 kilometers

400000 centimeters = 4.00000 kilometers



# Think/Pair/Share

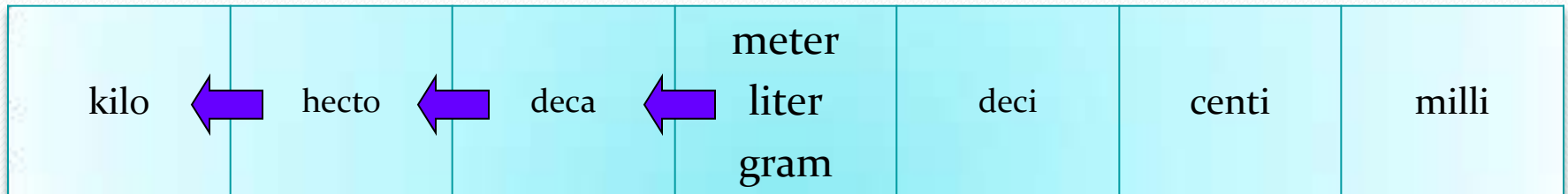
- Can you think of two reasons why scientists use the metric (SI) system instead of the English system of measurement?



# Metric System

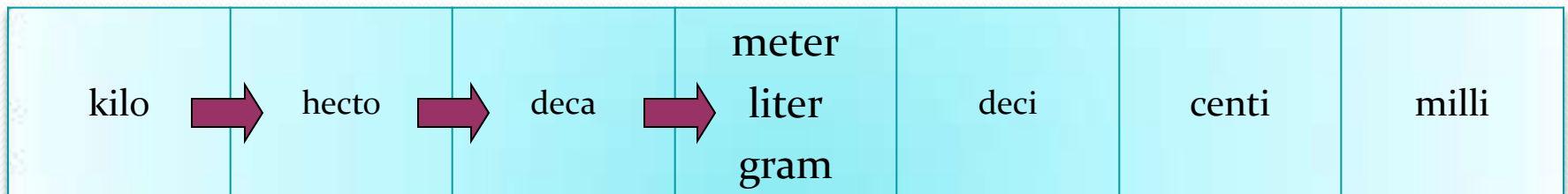
- Now let's start from meters and convert to kilometers

4000 meters = 4 kilometers



- Now let's start from kilometers and convert to meters

.3 kilometers = 300 meters



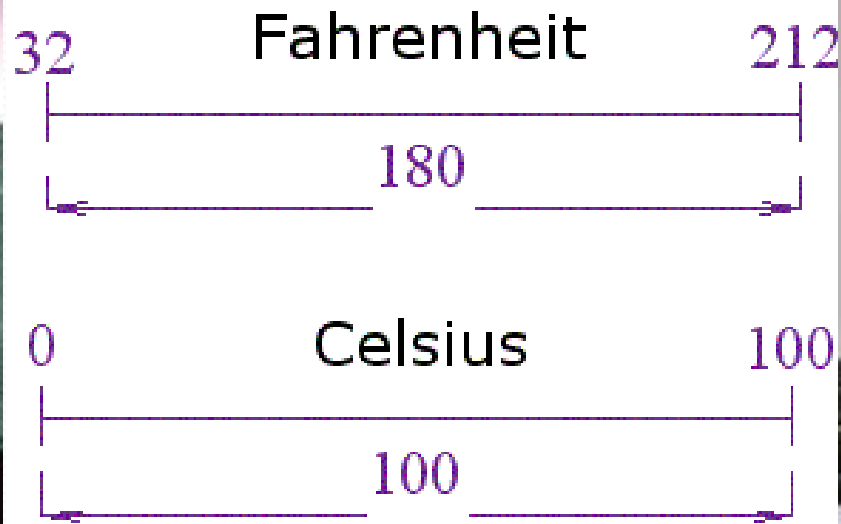




# Temperature

Freezing

Boiling





# Converting Temperatures

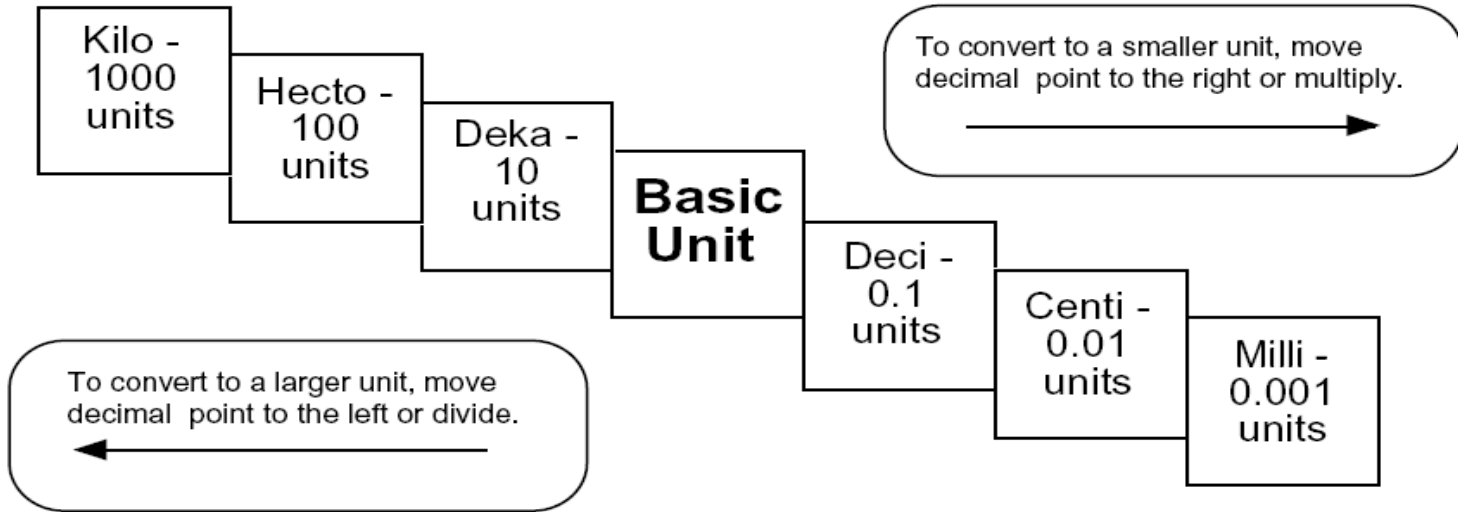
- C is Celsius
- F is Farenheit

- $C = 5/9 (F - 32)$

- $F = C * 9/5 + 32$



# Conversion Practice



**Try these conversions using the ladder method.**

$1000 \text{ mg} = \underline{\hspace{2cm}} \text{ g}$

$1 \text{ L} = \underline{\hspace{2cm}} \text{ mL}$

$160 \text{ cm} = \underline{\hspace{2cm}} \text{ mm}$

$14 \text{ km} = \underline{\hspace{2cm}} \text{ m}$

$109 \text{ g} = \underline{\hspace{2cm}} \text{ kg}$

$250 \text{ m} = \underline{\hspace{2cm}} \text{ km}$

**Compare using <, >, or =.**

$56 \text{ cm} \bigcirc 6 \text{ m}$

$7 \text{ g} \bigcirc 698 \text{ mg}$