Monday, August 19, 2019

Welcome to Investigative Science with Mr. Fireng

SKEPTIC VADER
FINDS YOUR LACK OF EMPIRICAL EVIDENCE DISTURBING
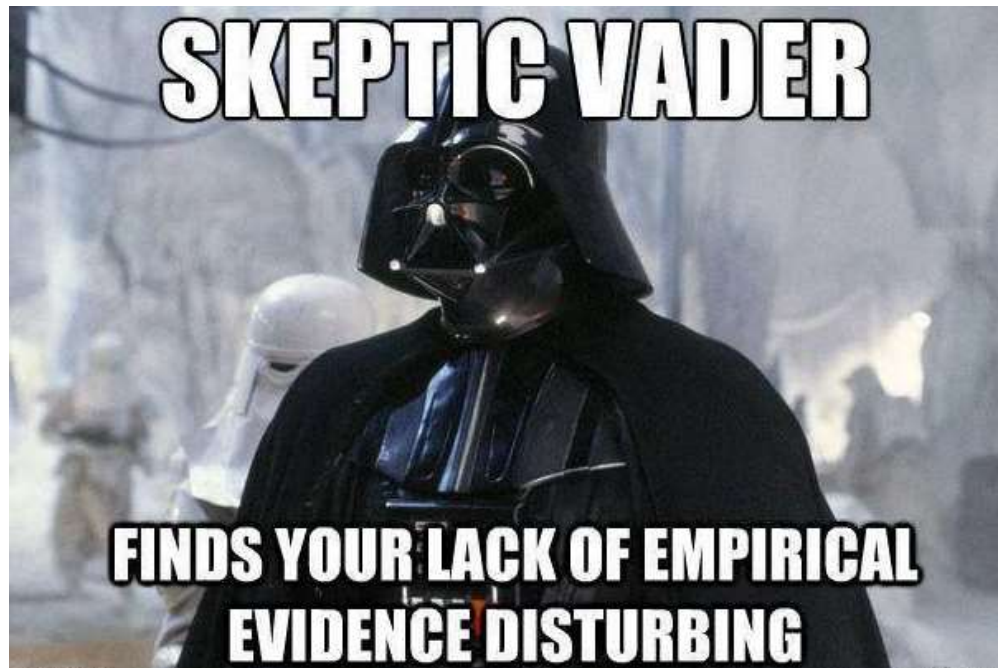
1. Get out your stampsheet
2. Get out your homework
3. Write tomorrow's homework in agenda
4. START WORKING QUIETLY

Investigative Science

Learning goal: Properly apply all steps in the scientific method when problem solving.

Learning goal: Properly apply all steps in the scientific method when problem solving.

Learning scale:

1	2	3	4
Name the steps	Name the steps and follow directions in an investigation	Can design and conduct an investigation leading to a conclusion	Design and carry out an investigation leading to a valid and rational conclusion

Student's self-evaluation: *Complete at home or at the end of class, use the 4-3-2-1 Learning scale (two to three sentences).*

4
Design, complete, valid conclusion

3
Design & complete

2
Know steps, follow directions

1
Know the steps

Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

What is the metric system?

What is length? What is the SI unit?

What is mass? What is the SI unit?

What is volume? What is the SI unit?

Pneumonic device to memorize prefixes

Metric Conversions device instructions.

1.

2.

3.

Metric System

Write all Cues!!

4
Design, complete, valid conclusion

3
Design & complete

2
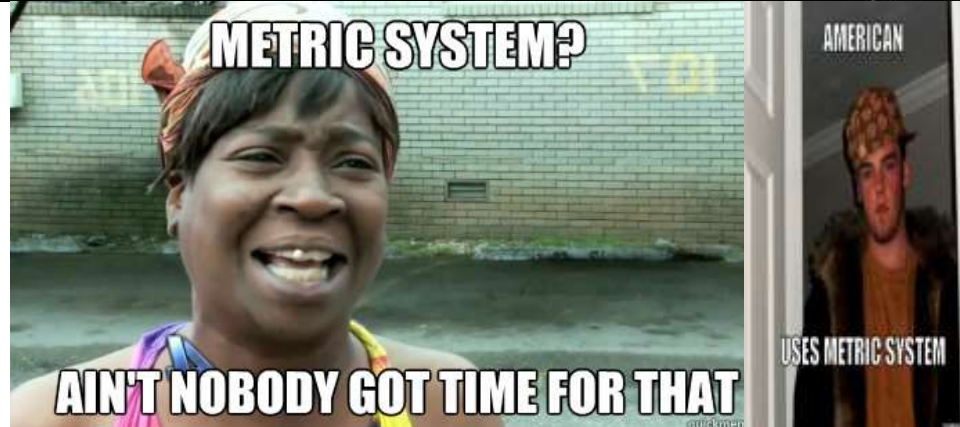Know steps, follow directions

1
Know the steps

Summary:

Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

METRIC SYSTEM?

FREEDOM AIN'T DIVISIBLE BY TEN

Good, good...

Let the Metric System flow through you.

AMERICA

METRIC SYSTEM?

AIN'T NOBODY GOT TIME FOR THAT

AMERICAN

USES METRIC SYSTEM

Y NO USE METRIC SYSTEM?!?

4 Evaluate based on A&P

3 Distinguish A&P in data

2 Importance of A&P

1 Define A&P

Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Countries That Don't Use the Metric System

- Liberia
- Myanmar (a.k.a. "the country formerly known as Burma")
- United States of America

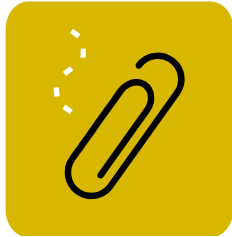| 4 Evaluate based on A&P |
| --- |
| 3 Distinguish A&P in data |
| 2 Importance of A&P |
| 1 Define A&P |

Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Mars Probe Lost Due to Simple Math Error

October 01, 1999 | ROBERT LEE HOTZ | TIMES SCIENCE WRITER

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NASA lost its $125-million Mars Climate Orbiter because spacecraft engineers failed to convert from English to metric measurements when exchanging vital data before the craft was launched, space agency officials said Thursday.

A navigation team at the Jet Propulsion Laboratory used the its calculations, while Lockheed Martin Astronautics in Denve provided crucial acceleration data in the English system of in

As a result, JPL engineers mistook acceleration readings mea a metric measure of force called newton seconds.

In a sense, the spacecraft was lost in translation.

"That is so dumb," said John Logsdon, director of George Washington University's space policy institute. "There seems to have emerged over the past couple of years a systematic problem in the space community of insufficient attention to detail."

4 Evaluate based on A&P

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The Metric System

The metric system is a measurement system based on our decimal (base 10) number system.

Uses "SI" units or "International System of Units"; The widely excepted system of measurement.

4
Evaluate based on A&P

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Importance of A&P

1
Define A&P

Investigative Science

SI Units

SI unit for length is the Meter (m)
Length is the distance between two points

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Define A&P

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SI unit for length is the Meter (m)

One **centimeter** is about the width of a **large** paper clip
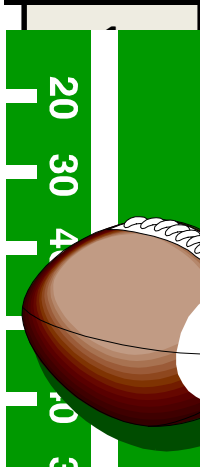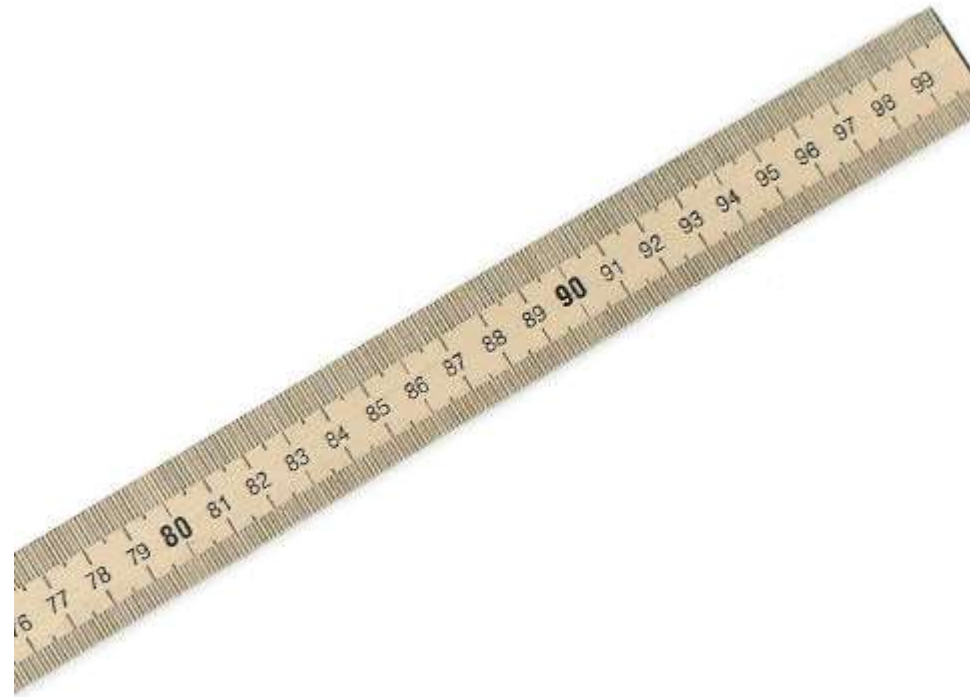
A **meter** is about the width of a doorway

One **millimeter** is about the thickness of a dime.

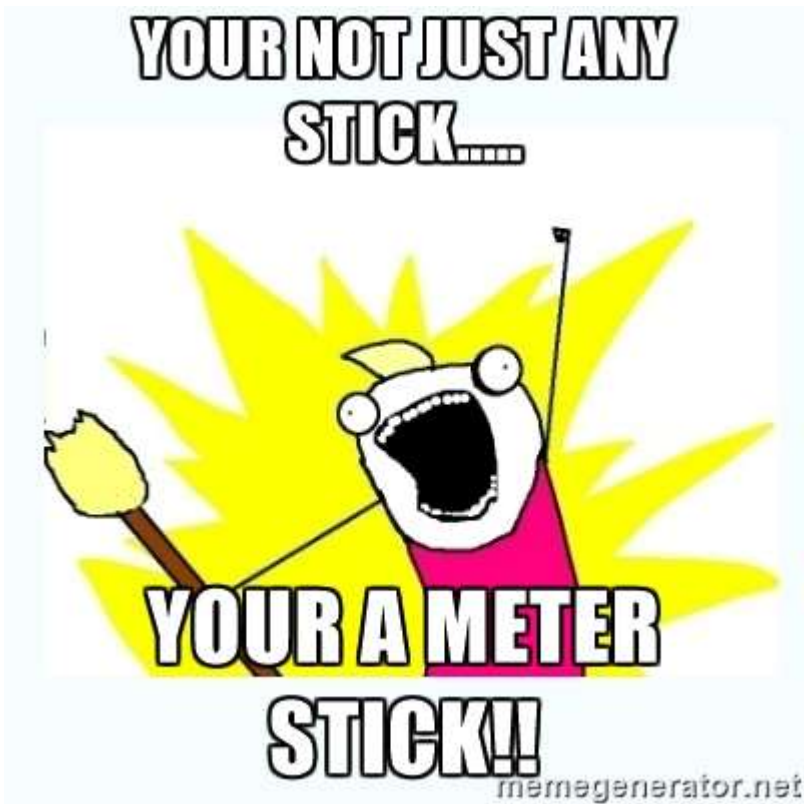A **kilometer** is about six city blocks or 10 football fields.

F O O T B

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Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Meters: Typically use a meter stick to measure

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Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

SI Units

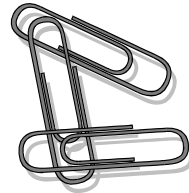SI unit for mass is the Gram (g)

Mass is how much matter is in an object

Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

SI unit for mass is the Gram (g)

1 **gram** weighs about as much as a small paper clip.

1 **kilogram** weighs about as much as 6 apples or 2 pounds.

A **milligram** weighs about as much as a grain of salt.

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Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Use a scale or a triple beam balance to measure mass:

4
Evaluate based on A&P

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Importance of A&P

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Define A&P

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Mass and Weight are not the same!!
MASS   vs.   WEIGHT

MASS	WEIGHT
Always remains constant	Depends on gravity
Does not depend on gravity	weight=mass x gravity
	weight of an object changes if the gravity changes

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Importance of A&P

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Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

SI Units

SI unit for volume is the Liter (L)

Volume is how much space a liquid takes up

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Evaluate based on A&P

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Define A&P

gative Science

ke accurate and precise measurements
icant figures when collecting and

2 Liter Soda

Liters: measure volume

1 **liter** is half a big bottle of soda

A **kiloliter** would be about 500 2-liter bottles of pop

1 **milliliter** is about the amount of one drop

4
Evaluate based on A&P

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Distinguish A&P in data

2
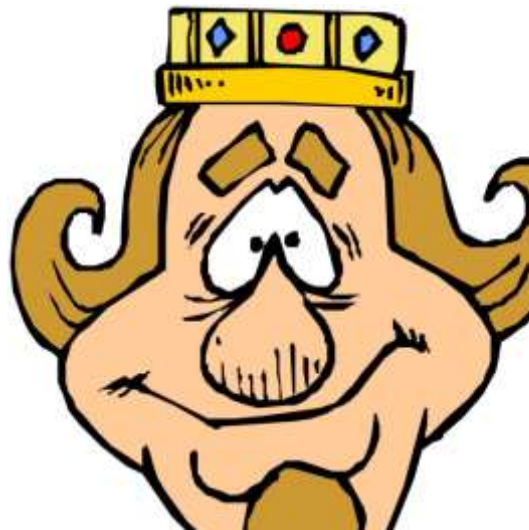Importance of A&P

1
Define A&P

Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Volume: typically use beakers or graduated cylinders

Investigative Science

Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Pneumonic device to memorize prefixes

King Henry Died Unexpectedly Drinking Chocolate Milk

SI Prefix	Meaning
kilo-	thousand (1000)
hecto-	hundred (100)
deka-	ten (10)
deci-	tenth (0.10)
centi-	hundredth (0.01)
milli-	thousandth (0.001)

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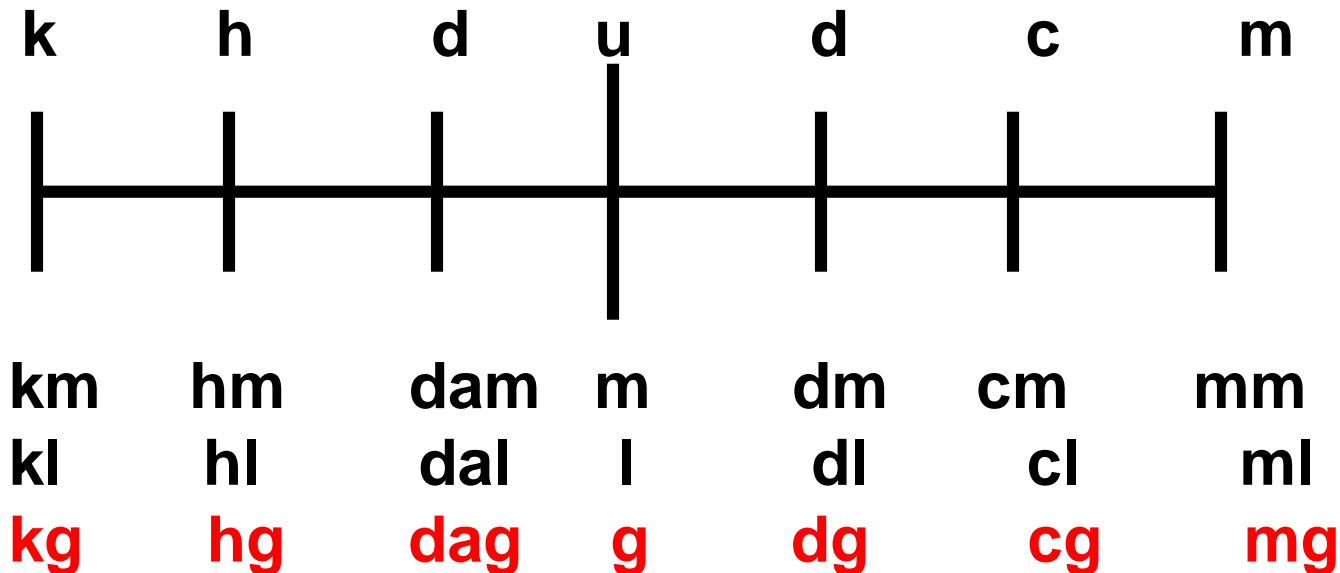Importance of A&P

1
Define A&P

Investigative Science
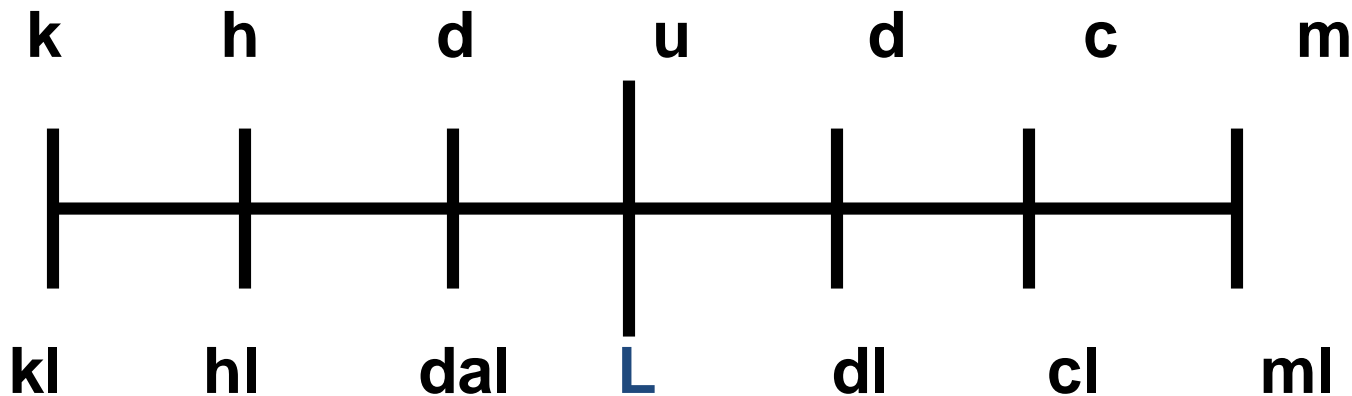
Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Do: Let's add the gram line:

k	h	d	u	d	c	m

km	hm	dam	m	dm	cm	mm
kl	hl	dal	l	dl	cl	ml
kg	hg	dag	g	dg	cg	mg

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Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Example:

7.25 L = _____ kL

1. Look at the unit of the number you are converting from. On the device put your pencil on <u>that</u> unit.

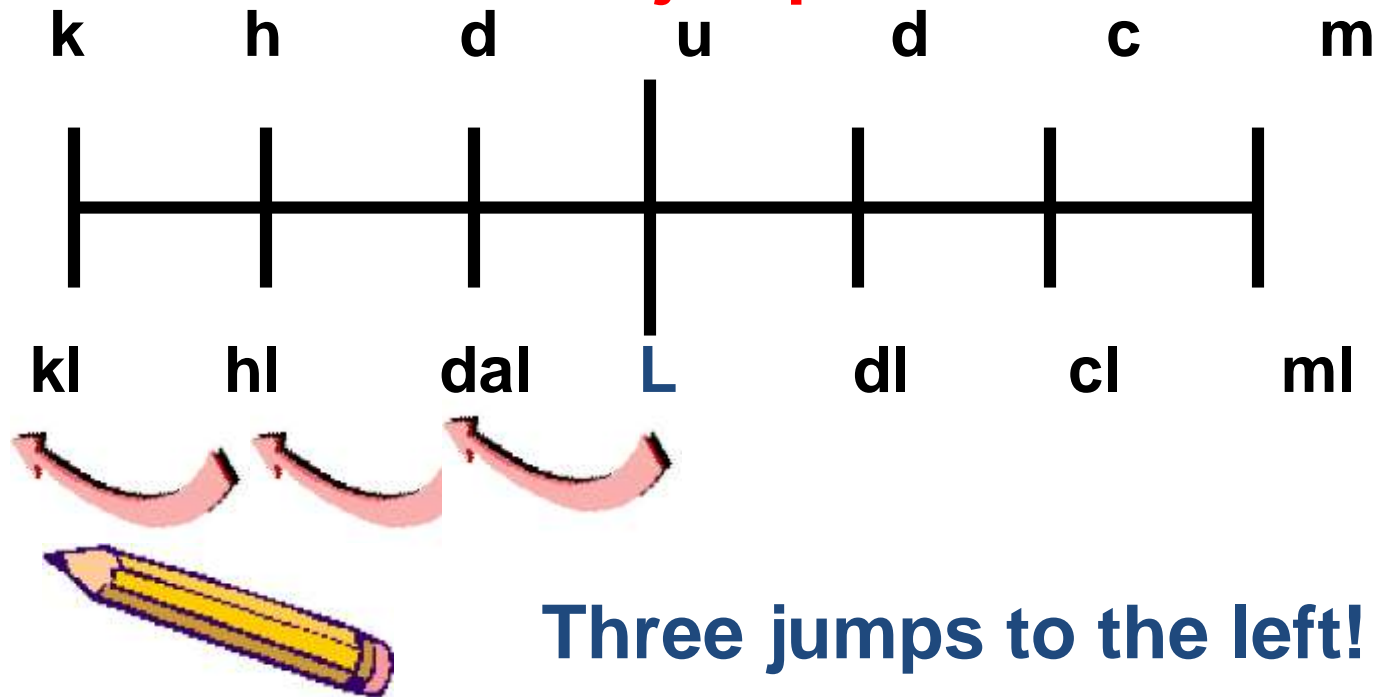| k | h | d | u | d | c | m |

kl   hl   dal   L   dl   cl   ml

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Learning goal: Make accurate and precise measurements using proper significant figures when collecting and organizing data.

Example:

2. **Move to the unit you are converting to, counting jumps and noticing the direction of the jump!**

k   h   d   u   d   c   m

kl   hl   dal   L   dl   cl   ml

Three jumps to the left!

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Example:

3. Move the decimal that many places and in that direction. Add zeros if needed.

7.25 L = _____ kL

7.25 L = .00725 kL

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