CHEMISTRY LEE	
NAME	
DateВLOCK	
UNIT OI	NE
PROBLEM SET	Score:

Do not cheat by copying the work of another person, or by allowing another person to copy your answers. Cheating results in a 0% grade for both parties involved.

Signature	Date

In the event any or all of this Problem Set is assessed for a grade, it <u>must be signed and dated</u> in order to receive a grade. The work shall be your own.

Problem Sets are generally not accepted late. Late assignments are 50% off.



Laboratory Safety Worksheet

Fill in the table below by describing how and when to use the safety equipment indicated.

Equipment	How to Use	When to use
safety goggles		
fire extinguisher		
fire blanket		
eyewash		
shower		
fume hood		
gas shut-off valve		

Fill in the table below with the safety rule for each topic and provide a rationale (reason) for the rule.

Topic	Rule or guideline	Rationale
food, drinks, & gum in lab		
long hair		
loose or bulky clothing		
horseplay or running		
hot glassware		
heating test tubes		
washing hands		
smelling chemicals		
unused chemicals		
broken glassware		

Unit___ # ___ Name: _____ Date: ____ Period: ____

Chapter 3 Matter and Change

(You need your Glencoe textbook)

1. Complete the following table for each phase with the terms yes or no

physical state	definite shape?	definite volume?	Can it be compressed?
solid			
liquid			
gas			

Look at the data in Table 1 on page 73 and answer the following questions. Note that the state column lists the substance's state at room temperature.

- 2. Which substance has the highest boiling point?
- 3. The two solid substances would appear similar in color. What method(s) would you use in an attempt to distinguish them from each other?
- 4. How many of these substances are in the liquid state at 85°C?_____
- 5. Which substance has the broadest temperature range where it remains a liquid? (This is the difference in values between the melting and boiling points)
- 6. Indicate whether the following are elements (e), compounds (c) or mixtures (m). Only one answer is possible for each.

table salt, NaCl	С	salad oil	
Iron, Fe		air	
sterling silver	m	chocolate chip cookie dough	
kool-aid		Water, H ₂ O	
vinegar		sea water	
helium		caffeine	
Nitrogen, N ₂		Fog	

Heliox, a mixture of oxygen and helium, is used by deep sea divers to replace compressed air (scuba divers do not breathe pure oxygen. They'd die!) Draw a Heliox mixture at the atomic and molecular level in the scuba tank diagram cross-section. **Include a key to identify the gases.**



Ν	ame	
	anc	

Date_____ Block_

Physical vs. Chemical Properties

A physical property can be determined without destroying chemical makeup of the object. For example, color, shape, mass, and odor are all physical properties.

A chemical property indicates how a substance reacts with something else. The original substance is fundamentally changed in observing a chemical property. For example, the ability of iron to react with oxygen to "rust" is a chemical property. The iron, Fe, now exists as iron(III)oxide, Fe₂O₃—a different substance.

Classify the following properties as either chemical or physical by putting a check in the appropriate column.

Property	Physical property?	Chemical property?
Red color		
Density		
flammability		
solubility		
reacts with acid to form a salt		
supports combustion		
bitter taste		
melts at 25°C		
reacts with water to form a gas		
hardness		
boiling point		
can be easily bent		
odor		
decomposes to hydrogen and oxygen		
reacts with metal to form hydrogen		

Chapter 2 Worksheet 2

Physical vs. Chemical Changes

In physical changes, the original substance still exists. It has only changed form. In a chemical changes, new substances are produced. Energy change always accompanies chemical changes. Energy changes may accompany a physical change (phase changes).

Classify the following as being chemical or physical changes

Property	Physical change?	Chemical change?
Hydrochloric acid reacts with potassium hydroxide to produce salt, water, and heat	<u>enange</u>	onungo.
A pellet of sodium is sliced in two		
Ice is heated and changes to water		
Potassium chlorate decomposes to potassium chloride and oxygen Iron rusts		
A sodium pellet catches fire in water and produces hydrogen gas and sodium hydroxide		
Ethanol evaporates		
Milk sours		
Sugar dissolves in water		
Wood rots		
Cookies cook in the oven		
Dry ice vaporizes to a gas		
Grass grows on the lawn		
Food is digested in the stomach		
grapes ferment to produce wine		
Glass shatters when dropped		
A paper towel absorbs water		

Name	Date	Block

Chapter 3: Worksheet 1

1. A standard mass of 500.0 grams is massed on Balance A and Balance B. Which balance is more accurate? Which balance is more precise?

Balance A	Balance B
500.0 g	498.1 g
500.1 g	501.9 g
500.2 g	500.0 g

2. Ice water is used to calibrate a thermometers. A thermometer should read 0.00°C in ice water. Two different thermometers are used to measure the temperature of ice water. Which thermometer was most accurate? Which thermometer was most precise? Which thermometer was probably improperly calibrated?

Thermometer 1	Thermometer 2
0.0°C	1.0°C
0.4°C	0.8°C
0.2°C	1.1ºC

- 3. What is the equation to calculate percent error?
- 4. A student measures the length of a block of wood as 12.5 cm. The true length of the wood block was 13.2 cm. What was the student's percent error?
- 5. A student uses a balance to determine the mass of a copper cylinder. She records the mass as 29.0 grams. The accepted mass of the copper cylinder is 25.0 grams. What was the percent error?
- 6. Convert the following to correct scientific notation

251	0.00063
12003	230,005
0.21	0.0022
4.0	
onvert the following scientific notation values to	o standard notation:
4.3 x 10 ⁴	4.6 x 10 ⁻¹
7.28 x 10 ⁻²	8.403 x 10 ²
9.0 x 10 ³	9.84 x 10 ⁻⁴
	$251 \$

3.25 x 10¹

Unit	1	Name:

Period: ____

Part I

<u>Directions</u>: For each item below:

- a) draw a model, using a different shape or color for each different element present in the item
- b) label each shape/color in your model
- c) indicate whether the item is an element, compound or mixture
- d) <u>if the item is an element or compound</u>, indicate whether the smallest particle item is an atom or a molecule

Elements, Compounds and Mixtures

Ca	NaCl	H2O	H2
O ₂	CaBr ₂	N ₂	Li ₂ O
NH ₃	NaNO3	NaCl + H ₂ O (NaCl (aq))	Ag + Au
S ₈	Li	NH₄CI	O ₂ + CO ₂

Part II

Directions:

There are 6 pictures below.

- a) Label each picture as one of the following (some might be used more than once): <u>pure element, pure</u> <u>compound, mixture of two elements, mixture of a compound and element, or a mixture of two</u> <u>compounds</u>
- b) Next, label each picture with one of these formulas below (each formula is only used once): KCl N₂ Fe Al +Cu CO + Au CO_2 + CO



Name	Date	Block

Chapter 3: Worksheet 2 NO CALCULATOR

 $(Y \times 10^{a})(X \times 10^{b}) = XY \times 10^{a+b}$ and $(Y \times 10^{a}) = Y/X \times 10^{a-b}$ $(X \times 10^{b})$

Solve these problems without a calculator. Express in correct scientific notation

- 1) $(6 \times 10^3)(8 \times 10^{10}) = 48 \times 10^3 \times 10^{10} = 48 \times 10^{3+10} = 48 \times 10^{13}$
- 2) (4.0 x 10^{-11}) (5.0 x 10^{9})

3)
$$(3.0 \times 10^{-4}) (2.0 \times 10^{2}) (8.0 \times 10^{-6})$$

- 4) $\frac{(8 \times 10^{32})}{(4 \times 10^{10})}$
- 5) $\frac{(3 \times 10^3)}{(9 \times 10^{10})}$
- 6) $\frac{(5.0 \times 10^{-4})}{(2.5 \times 10^{-6})}$

Express the following values in correct scientific notation.

- 7) $312 \times 10^{-3} = (3.12 \times 10^2) \times 10^{-3} = 3.12 \times 10^{2+(-3)} = 3.12 \times 10^{-1}$
- 8) 57.1 x 10²
- 9) 0.0064 x 10⁻⁸
- 10)0.045 x 10⁵
- 11)0.0008 x 10⁷
- 12)7800.4 x 10⁻²
- 13)0.12 x 10⁻²³

Significant Figure Powerpoint Problems

- 1. Leading zeros are never significant
- 2. Trailing zeros are significant if there's a decimal point
- 3. Exact counts and conversion factors have an infinite number of significant digits:

Significant Figure practice

- 1. 40,200 has _____ sig figs
- 2. 0.0402 has _____ sig figs
- 3. 8,000 has _____ sig figs
- 4. 3.0×10^2 has _____ sig figs
- 5. 0.7090 has _____ sig figs
- 6. 0.005 has _____ sig figs
- 7. 50. has _____ sig figs

In multiplication and division, the final answer must match the least number of sig figs in the problem.

- 1. (2.00 cm)(0.50 cm) =
- 2. (2.0) cm)(0.5 cm) =
- 3. (3 m)(1.5 m) =
- 4. 10. mm/2.50 mm =
- 5. 10 mm/4.05 mm =

In addition and subtraction, the final answer should be rounded to the least number of decimal places.

1.2	9.6	32
+0.45	+9	- 0.9

Final Practice

- 1) (0.20 cm)(5.76 cm) = _____
- 2) (35.01 cm)(0.2 cm) = _____
- 3) (0.0071 cm)(95,000 cm) = _____
- 4) (7.0 cm)(4286 cm) = _____
- 5) 15 mm ÷ 3.00 mm = _____
- 6) 8.2 m + 6 m = _____

Part A – Indicate the number of significant digits each number has. 1) 0.0453 8) 0.0700 15) 34,000. 2) 2.300 _____ 9) 7070 16) 0.0006 _____ 3) 1020 _____ 10) 7.070 17) 0.04400 4) 450.0 _____ 11) 70700 18) 0.0000510 19) 32.00 x 10^{33} 5) 32 ____ 12) 0.500 13) 3.42×10^4 20) 2020 6) 0.0020 14) 1.0 x 10^{-2} 7) 1,000 _____ 21) 0.900 _____ Part B – Round the following numbers using: 3 sigfigs 1 sigfig 2 sigfigs 1) 1070 2) 350 3) 4.0×10^2 4) 6851.23 5) 98 6) 500 7) 0.002567 8) 0.12 9) 13 10) 4.056 x 10⁻⁵ Part C When multiplying or dividing, I round my answer to the____ 7) 3.14 x 14 = ____ ≈ ____ 1) 2.3 ÷ 1.31 = ____ ≈ ____ 2) 6.65 x 1.2 = _____ ≈ _____ 8) 230 ÷ 0.0004 = ____≈ ____ 9) 230. ÷ 0.0004 = ____ ≈ ____ 3) 2400 ÷ 12.3 = ____ ≈ ____ 10) 2 x 250. x 34.5 = $aggarage \approx 2.5$ x 10³ = aggarage = 2.5 x 10³ = aggarage = 2.5 x 10³ 4) 2.780 x 131 = ____ \approx _____ 5) $1000 \ge 456.23 = \approx$ 12) 45.55 x 220 = \approx 6) 1000. x 456.23 = \approx Part D When adding or subtracting, I round my answer to the____ 6) $100 \text{ mL} - 17.5 \text{ mL} = __ \approx __$ 1) 3.4 - 1.23 = ____ ≈ ____ 2) 3.4 + 4 = _____≈ ____ 7) 19.056 + 1.4567 = ____ ≈ ____ 8) 25.0 − 21.0 = ____ ≈ ____ 3) 5.00 - 2.300 = ____ ≈ ____ 4) 77.5 - 0.0032 - 0.0098 = ____ ≈ ____

Ch 3 WS 3 Significant Figures Worksheet

5) 900 cm + 12.5 cm + 50.5 cm = $\simeq 10 2000 - 0.09999 = \simeq \approx$

9) 54.22 + 2.980 + 10 = ____ ≈ ____

Name	Date	Block

Chapter 3: Worksheet 3a Significant Figure Practice

- 1. All leading zeros are insignificant
- 2. Trailing zeros are significant IF there's a decimal point
- 3. Exact counts and conversion factors are treated as having an unlimited number of significant digits.

How many significant figures does each of the following numbers have?



Write the answer for each problem rounding to the correct number of significant figures. Use correct scientific notation and units when appropriate. Hint—when all else fails use scientific notation.

M u 1.	5 cm x 5 cm =	8. $(4.8 \times 10^2 \text{ m})(2.301 \times 10^3 \text{ m}) =$
2.	5.0 cm x 5 cm =	9. $(9.13 \times 10^{-4} \text{ cm})(1.2 \times 10^{-3} \text{ cm}) =$
3.	5.0 cm x 5.0 cm =	10. 42 cm x 119 =
4.	2.89 cm x 4.01 cm =	11. 150.0 m x 4.00 m =
5.	17.3 cm x 6.2 cm =	12. 282.2 km x 3.0 km =
6.	3.08 m x 1.2 =	13. 100 mm x 1.2 mm =
7.	5.00 mm x 7.3216 mm =	14. 0.400 cm x 42 cm =
Div	vide	
1.	$109.37 \text{ cm}^2 \div 5.81 \text{ cm}=$	5. 93,602 ÷ 31 =
2.	$100,000 \text{ cm}^3 \div 3.1 \text{ cm} =$	6. 231 m ÷ 0.03 =
3.	0.40 m ² ÷ 241 m =	7. 200. $\text{km}^2 \div 5.5 \text{ km} =$
4.	$(6.8 \times 10^{-3}) \div (2 \times 10^{-5}) =$	8. $(4.1 \times 10^3) \div (6.00 \times 10^{-1}) =$

Name	Date	Block

Chapter 3: Worksheet 4 (Scientific Notation and Significant Figure Review)

Convert each of these to scientific notation.



Solve these problems. Express your answer in scientific notation with the correct number of significant figures.

17) (8.07 x 10^{-16}) (4.5 x 10^{10}) = _	Calculator answer	rounds to _	sig fig answer
18) $\frac{(7.0 \times 10^{32})}{(9.06 \times 10^{10})} = \frac{1}{\text{calculator answ}}$	ver	rounds to sig fig	answer
19) $\frac{(5.006 \times 10^8) (4.53 \times 10^{-6})}{(2.900 \times 10^{-19})} = $	calculator answer	rounds to	sig fig answer

Ch 4 WS 1: Basic Unit Cancelation Method

Directions:

Use the <u>method</u> taught in class. The relationships below can be made into conversion factors. You must show your work including units. When you're done, correct for significant figures and box the final answer. The answers in parentheses are NOT corrected for sig figs.

Relation	onships:			
	1 dozen bagels = 12 bagels 1 kilometer = 1000 meters	1 liter = 1000 mL 1 centimeter = 10 milli	1 meter = 100 centimeters imeters	
examp	le: How many bagels are in 0.75 dozen?	Given: 0.75 dozen bag	gels Find: # bag	gels
	$0.75 \text{ dozen } x \frac{12 \text{ bagels}}{1 \text{ dozen}} = 9 \text{ bagels}$	≈ 9.0 bagels with sig	fig	
1)	How many bagels are there in 12 do	zen bagels?(Ans = 144 t	oagel) ≈	w/ sig fig
2)	How many bagels are there in 7.25 c	lozen bagels? (Ans=87	7 dozen bagel) ≈	w/ sig fig
3)	How many meters are in 62 centime	ters, cm?(Ans=0.62 m	ı) ≈	w/ sig fig
4)	How many centimeters are in 1.5 me	eters?(Ans= 150 cm) ≈	<u>.</u>	w/ sig fig
5)	How many kilometers are in 750 me	eters?(Ans = 0.75 km)	≈	w/ sig fig
6)	How many meters are in 2.30 kilome	eters?(Ans = 2300 m)	≈	w/ sig fig
7)	How many liters are in 5270. mL?(A	Ans = 5.27 L) ≈		_w/ sig fig
8)	How many mL are in 0.070 liters?(A	Ans = 70 mL) ≈		_ w/ sig fig

Ch 4 WS 1b: Unit Canceling Word Problems

Use the following conversion factors to solve the following unit cancelation problems. Remember units and significant figures!

Length conversions: 1 inch = 2.54 cm and 1 mile = 5280 feet, 1 kilometer = 0.62 mile, 1 yard = 3 feet, 12 in=1 ft. Volume conversions: 1 quart = 0.9463L, 1 quart = 4 cups, 4 quarts = 1 gallon, 1 cup = 16 Tablespoons, 1 Tablespoon = 3 teaspoons Mass conversions: 1 lb = 453.6 g, 1 carat = 0.20 grams, 1 lb = 16 ounces

- 1. You are scaling up your grandmother's recipe for cookies. How many quarts of vinegar are in 240 tablespoons of vinegar?(*Ans* 3.8 quarts)
- 2. You completed a 5.0 kilometer run. How many feet did you run?(Ans = 16,000 ft)
- 3. How many grams are in an 8.0 ounce steak?(Ans = 230 g)
- 4. Europeans buy gasoline in liters. How many liters of gas would fit in a 15 gallon tank?(Ans = 57 L)
- 5. How many centimeters are in 0.52 miles?(Ans=84,000 cm)
- 6. The **Cullinan diamond** was the largest gem-quality diamond ever found, at 3100 carat on 26 January 1905 in South Africa. What was the mass in pounds of the diamond?(Ans = 1.4 lb)
- 7. A European cookbook calls for using 750 mL of flour to make a cake. How many cups of flour should you use?(Ans = 3.2 cups)

Ch 4 WS 2: Metric system Unit Canceling Word Problems

Convert the following. You are not required to use the unit cancelation method 34 cm = _____ meters 78 m = _____ km 12 dm = _____ mm 1200 mL = _____ Liters 0.542 kg = _____ grams 320 mg = _____ kg 32 cm = _____ mm 2.3 liters = _____ mL 4.5×10^{-5} kg = _____ grams 5.0 mg = _____ grams

7800 g = _____ kg

Chapter 4 WS 2b Unit Cancelation Method

Use the following conversion factors, and your knowledge of the English system and Metric system to solve the factor label problems. Remember units and significant figures!

	1 inch = 2.54 cm and 1 mile = 5280 feet and 1 yard = 3 feet
	1 meter = cm 1 kilometer = meters
1.	68 inches = ? cm (Ans = 172.72 cm) w/ sig fig \approx
2.	0.45 m = ? in(Ans = 17.716 in) w/ sig fig \approx
3.	520 inches = ? mm (Ans = 13208 mm) w/ sig fig \approx
4.	1.00 meter = ?in (ans = 39.37008 in) w/ sig fig \approx
5.	3.2 ft = ?mm(Ans = 975.36 mm) w/ sig fig \approx
6.	9.18 km = ? yd(Ans = 10039.3 yd) w/ sig fig \approx
7.	If you run a 5 kilometer race, you've run miles(Ans =3.1068 miles) w/ sig fig \approx

Ch 4 WS 3: Unit Canceling Word Problems (2 sides)

Use the following conversion factors, and your knowledge of the English system and Metric system to solve the factor label problems. Remember units and significant figures!

Length conversions: 1 inch = 2.54 cm and 1 mile = 5280 feet, 1 kilometer = 0.62 mile Volume conversions: 1 quart = 0.9463L, 1 quart = 4 cups, 4 quarts = 1 gallon, 1 cup = 16 Tablespoons Mass conversions: 1 lb = 453.6 g, 1 carat = 0.20 grams, 1 lb = 16 ounces

- 1. An average woman is 64 inches tall. How tall is this in meters? (Ans = 1.6 m)
- 2. The average man is 1.78 meters tall. How tall is this in inches? (Ans = 70.1 in)
- 3. A pudding recipe calls for 3.5 cups of milk, but all you have are metric measuring cups. How many milliliters of milk do you need?(Ans = 830 mL)
- 4. A blacksmith has to put new shoes on 25 horses. Each shoe requires 3 nails. How many nails does the blacksmith need?(Ans = 300. Shoes) Note all the counts are exact.
- 5. A dressmaker needs 5.25 yards of French silk ribbon. The European boutique only sells by the meter. How much ribbon should the dressmaker buy?(Ans = 4.80 m)

Your European sports car has a 61 liter gas tank. How many gallons of gas will the car's tank hold?(Ans = 16 gal)

Length conversions: 1 inch = 2.54 cm and 1 mile = 5280 feet, 1 kilometer = 0.62 mile Volume conversions: 1 quart = 0.9463L, 1 quart = 4 cups, 4 quarts = 1 gallon, 1 cup = 16 Tablespoons Mass conversions: 1 lb = 453.6 g, 1 carat = 0.20 grams, 1 lb = 16 ounces

- 7. You have a bad cough and need to take 2 tablespoons of cough medicine. You only have a graduated cylinder marked off in milliliters. How many mLs of cough medicine do you need?(Ans = 30 mL)
- 8. You order a McDonald's quarter pounder hamburger. How many kilograms of beef will you be eating assuming the hamburger patty weighs 0.25 lb.(Ans = 0.11 kg)
- 9. The Hope diamond weighs 45.52 carats. How many ounces is this?(Ans = 0.3211 oz)

10. Harry Potter won 1000. galleons for winning the tri-wizard tournament. How much money did he win in U.S. dollars? (100 knuts = \$ 0.98, 29 knuts = 1 sickle, 17 sickles = 1 galleon)(Ans = 4,831 dollars)

11. Lethal dose (LD50) is the amount of an ingested substance that kills 50 percent of a test sample. The LD50 for caffeine is 140 mg/1 Kg for dogs. How many grams of caffeine would have a 50/50 chance of killing a 50. lb dog?(Ans = 3.2 grams) Hint: use 140 mg caffeine = 1 Kg dog.

Chapter 7 WS 1: Unit Cancellation and the Mole

Use Significant Figures.

You must use the Unit Canceling Method and show your work. Answers must include units.

- 1. How many moles are in 6.3 x 10¹³ atoms of silver, Ag?
- 2. How many atoms are in 4.8×10^{-6} moles of copper, Cu?
- 3. How many moles are in 1 x 10^{27} molecules of oxygen, O₂?
- 4. How many moles are in 300,000 molecules of fluorine, F₂?
- 5. How many atoms are in 92.3 moles of tin, Sn?
- 6. How many molecules are 0.012 moles of carbon dioxide, CO₂?
- 7. Challenger: How many atoms are in 12 moles of ammonia, NH₃?(Hint: each ammonia molecule contains 4 atoms). Add a final step to the unit cancellation.

Answers 1)1.0x10⁻¹⁰ mol Ag, 2)2.9x10¹⁸ atom Cu, 3)2000 or 2x10³ mol O₂, 4)5x10⁻¹⁹ mol F₂, 5)5.56x10²⁵ atom Sn, 6)7.2 x10²¹ molec CO₂, 7)2.9x10²⁵ atoms

Ch 4 WS 4 More Unit Cancelation Word Problems

Use the following conversion factors, and your knowledge of the English system and Metric system to solve the factor label problems. Remember units and significant figures!

1 mole = 6.02 x 10²³ things Length conversions: 1 inch = 2.54 cm and 1 mile = 5280 feet, 1 kilometer = 0.62 mile, 3 feet = 1 yard Volume conversions: 1 quart = 0.9463L, 1 quart = 4 cups, 4 quarts = 1 gallon, 1 cup = 16 Tablespoons Mass conversions: 1 lb = 453.6 g, 1 lb = 16 ounces

- 1. A gold coin contains 8.1 x 10^{-2} moles of gold. How many atoms of gold are in the coin?(Ans = 4.9×10^{-2} atom Au)
- 2. A big balloon contains 2.2 x 10²⁶ atoms of argon. How many moles of argon are in the balloon?(ans=3.7x10² mol Ar)
- 3. A basket ball player is 2.1 meters tall. How tall is this in inches? (Ans = 83 in)
- 4. You buy 12 ounce package of jelly beans. How many grams of jelly beans did you buy? (Ans = 340 g)
- 5. How many milliliters are in 3.00 gallons of milk? (Ans = 11,400 mL)
- 6. Given the following equivalents, convert 3.0 Icks to Eeks.(Ans = 0.39 Eeks)
 2 Icks = 3 Aughs, 5 Aughs = 4 Oops, 7 Oop = 1 Ugh, 4 Ughs = 3 Eeks.

 A 8.0 ounce glass of water contains 13 moles of water. How many molecules of water are in an 8.0 ounce glass of water?(Ans = 7.8 x 10 24 molec. H₂O)

Ch 3 WS 6 Density Calculations

Density is an intrinsic physical property of a substance. For example, a sample of gold will always have a density of 19.3 g/cm³ regardless of how massive the sample of gold.

D = mass/volume

- 1. What is the density of polystyrene plastic if 100. cm^3 of it has a mass of 101 grams? (Ans = 1.01 g)
- Iron, _____, has a density of 7.87 g/cm³. How many grams of iron are in an iron sample that is 392 cm³?(Ans = 3090 g)
- 3. Bromine, Br₂, is a liquid with a density of 3.12 g/mL. How many milliliters of bromine are in a 100. gram sample?(Ans = 32.1 mL)
- 4. A graduated cylinder is filled to 8.0 mL with water. A stone is dropped in that weighs 10. grams. The new volume reading is 10.5 mL. What is the density of the stone? (Ans = 4.0 g/mL)
- 5. A graduated cylinder contains 22 mL of mercury, _____, How many grams of mercury does the cylinder contain if mercury has a density of 13.55 g/cm³?(Ans = 3.0 x 10² g)
- 6. What will be the volume of a balloon containing 0.60 grams of Helium, which has a density of 1.9×10^{-4} g/cm³? (Ans = 3.2×10^{3} cm³)
- Challenger: A pine board that is 120 cm x 2.0 cm x 10. cm has a mass of 2.1 lbs. If one pound equals 454 grams, what is the density of the pine in g/cm³? (Ans = 0.40 g/cm³)

Chapter 3 WS 5: Metric System Prefixes and Conversion

Kilometer	Hectometer	Dekameter	Meter	Decimeter	Centimeter	Millimeter
km	hm	dam	m	dm	cm	mm
1000	100	10	1	0.1	0.01	0.001

This list shows the units of length in the SI system. They range from the smallest to the largest (from right to left). The whole system is based on powers of 10.

Example: Millimeter and centimeter are next to each other. Since mm is to the right of cm, it is the smaller unit. It takes 10 mm to equal 1 cm.

Since cm is to the left of mm, cm is the larger unit. It takes 0.1 cm = 1 mm.

Conversions using decimal point jump method

- 1. Identify the starting and ending unit.
- 2. Begin at the starting unit and count "jumps" to the ending unit. Note your direction/
- 3. Move the decimal that number of spaces and in the SAME direction as you moved on the chart.

Examples:

256 mm =	dm	0.023 kg =	mg
		0	U

- 1. Start at mm and count jumps to dm
- 2. I moved 2 spaces to the left
- 3. I move the decimal in 256 two places to the left
- 4. The answer is 256 mm = 2.56 dm

Practice

34 cm =	_ dm	1.34 cm =	mm
78 m =	_ km	6.98 m =	_ cm
901 mm =	_m	0.876 km =	m
768 km =	_ m	999 m =	mm
761 cm =	m	0.000 002 km =	mm
134 hm =	_dkm	1.456 km =	hm
445 cm =	dm	0.714 dm =	km
809 mm =	dm	0.442 km =	m