Name _____

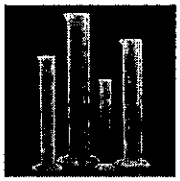
Unit 2-1

The Metric Ruler & Mass!

Mr. Coffey

Tools of Measurement

(The things we use to make observations in a science class.)



Measurement

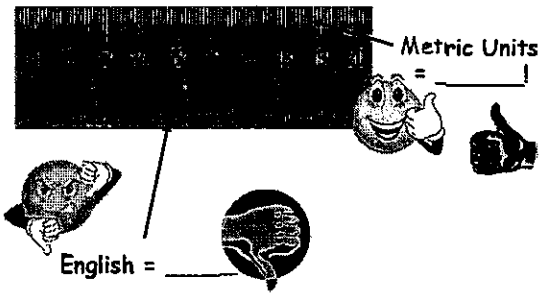
- A _____ is an observation that we make using a tool (meter stick, graduated cylinder, triple beam balance, etc.).
- When we calculate something like volume, we first take measurements then *manipulate* the numbers using a formula.
- We can _____ the volume of a liquid but we _____ the volume of a box!

Measurement

****Always remember – if you are going to do a calculation using your measurements, you must always use the _____ for each measurement – you cannot multiply cm and mm – you must first convert one to the other! ****

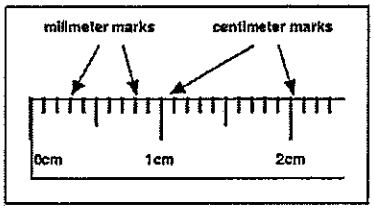
Measurement: Metric Ruler

- Used to measure length (meters)



How do you measure with a metric ruler?

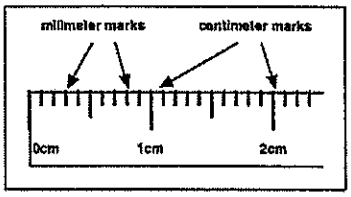
- Always _____ with the _____, not the edge of the ruler.
- Use the side of the ruler with ***cm*** or ***mm***.



Name _____

Using a Ruler

- Count the whole numbers and then the remaining black lines.
- Each individual black line represents ***1 mm.*** There are 10 black lines between each cm.

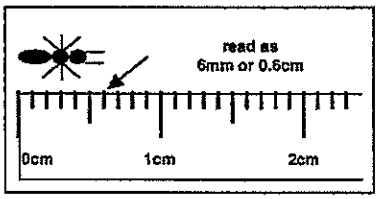


LOOK!
10mm = 1cm

Using a Ruler

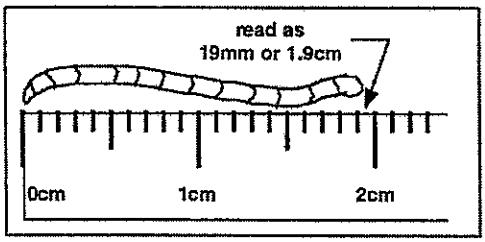
- _____ - all answers must have a value in the tenth decimal point position (4.0 mm, 25.1 cm).
- _____ to record answers.

EXAMPLE 1—an ant

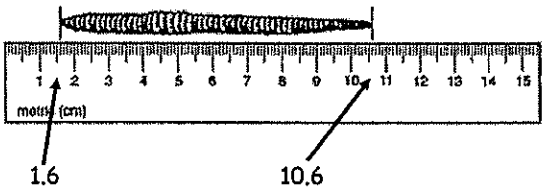


Another example...

EXAMPLE 2—a worm



How about this?



1.6 10.6

End - start = actual length

10.6 - 1.6 = 9.0 cm

Mass

Mass versus Weight

- Mass and weight are _____ the same thing.
- Mass - the _____ in an object

The mass of an object will NEVER change unless YOU DO something to change it!

Name _____

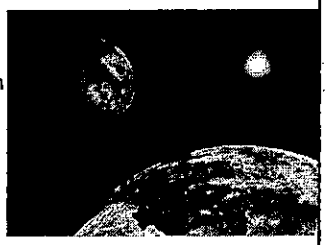
What is weight?

- Weight – is the measure of the _____ of _____ on an object.

The weight of an object WILL change as gravity does!

Example:

- The moon is 1/6 of the Earth's gravity.
- Weight will be 1/6 of what it is here on Earth (divide by 6).
- *However*, their size will not change!
- A person will not physically shrink to 1/6 their size if they go to the moon!



Measuring Mass: Triple Beam Balance

Measures mass in grams!

How do we use it…..?

Let's See!

Name:_____ Date
Period Science

Measuring with a Metric Ruler

Measure the following lines in Centimeters and Millimeters.

A) cm_____ mm_____

B) cm_____ mm _____

C) cm _____ mm_____

D) cm_____ mm_____

E) cm_____ mm_____

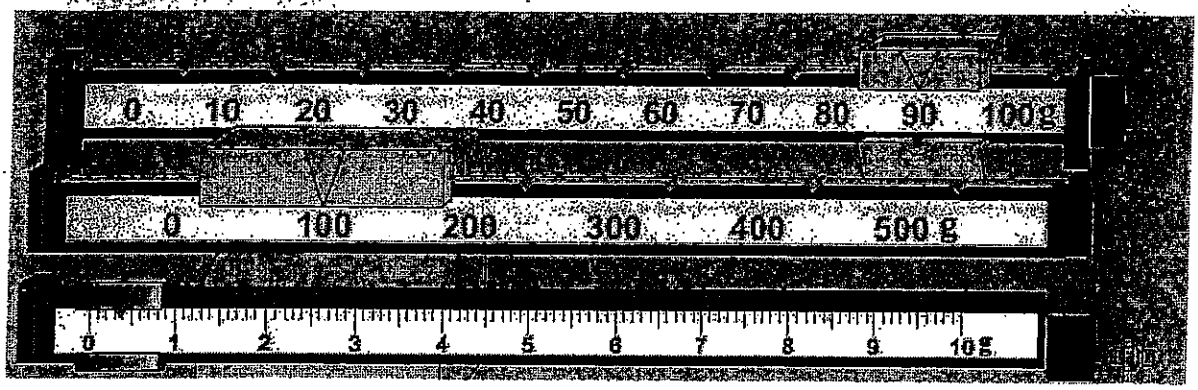
F) cm_____ mm_____

G) cm_____ mm_____

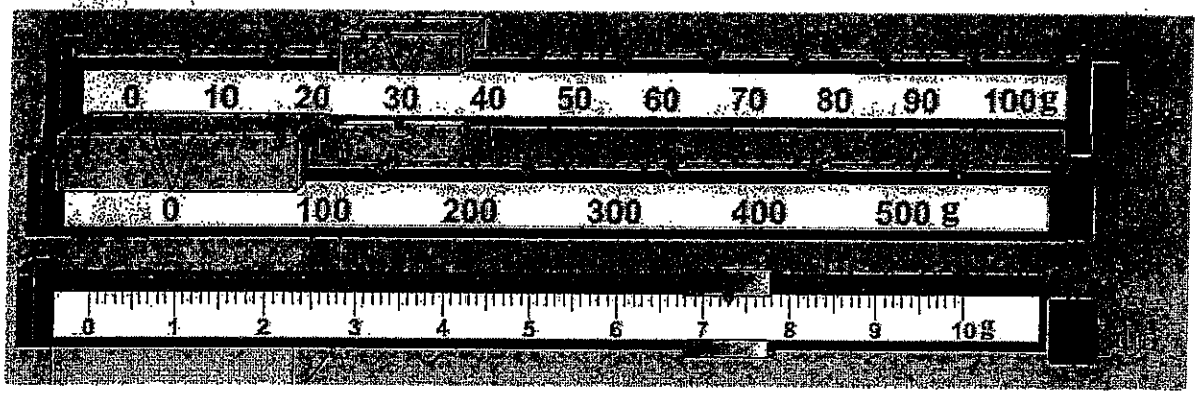
Name: _____ Period: _____

Triple Beam Balance Practice

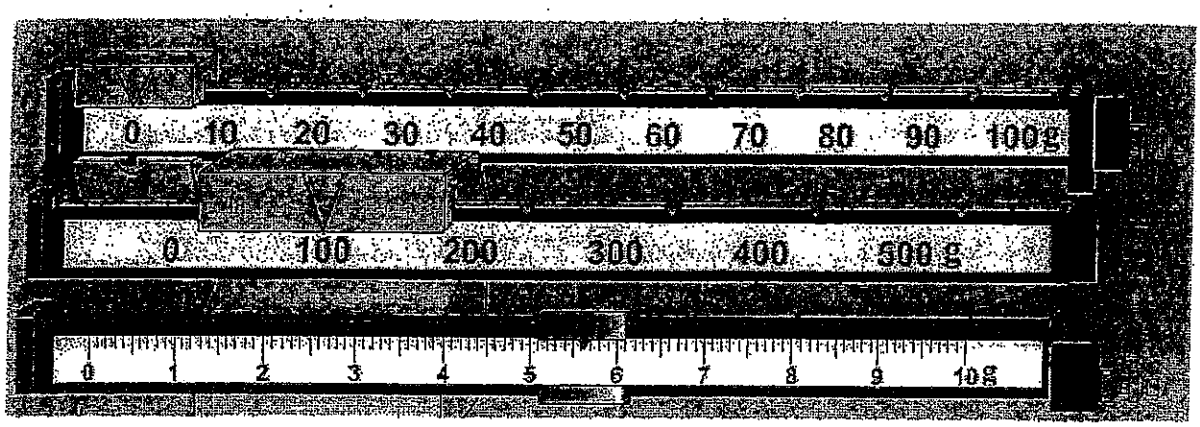
Record the mass show on each balance. Remember to include both the value on the beams and the unit of measurement.



1. _____

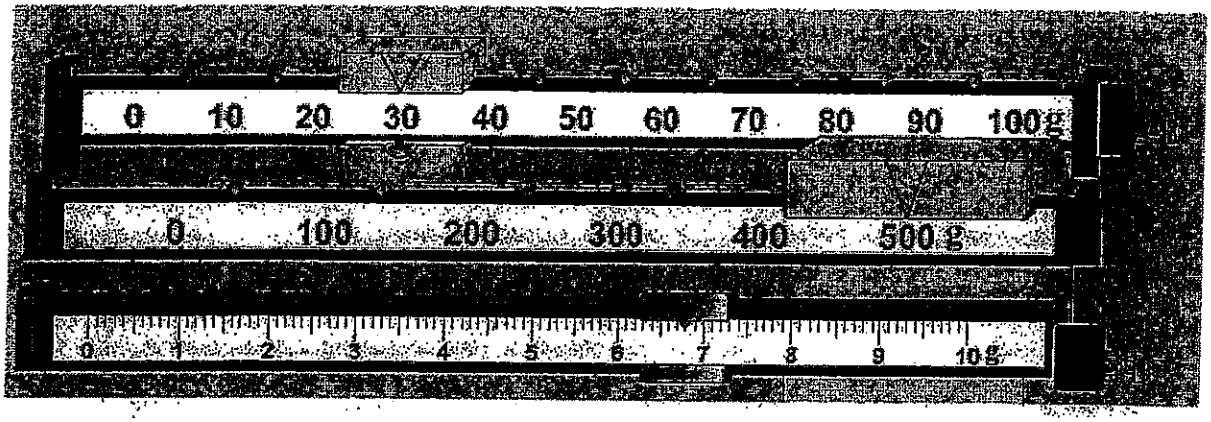


2. _____

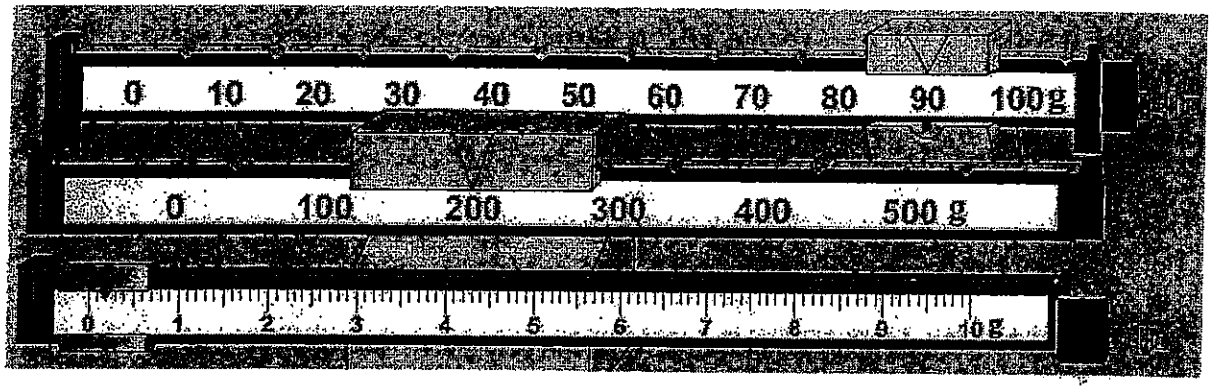


3. _____

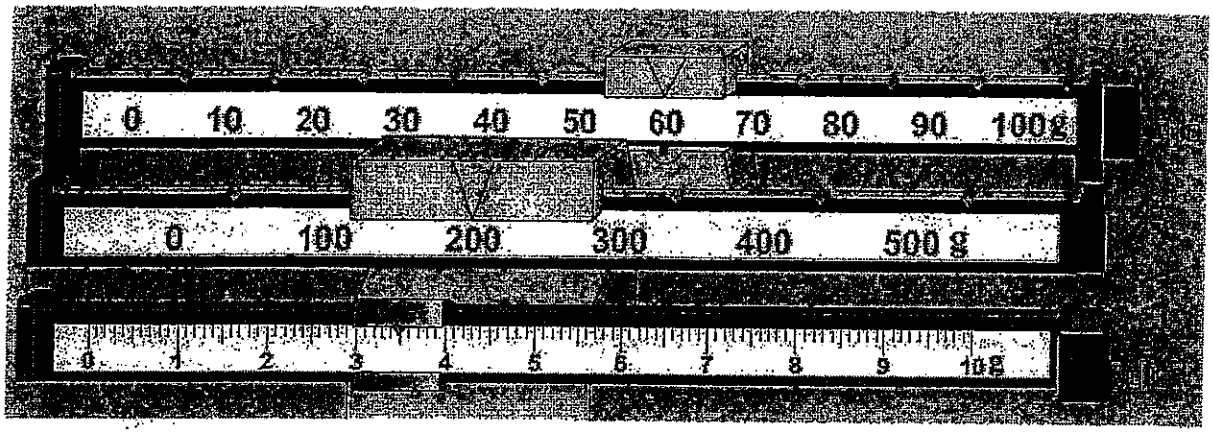
Name: _____ Period: _____



4. _____

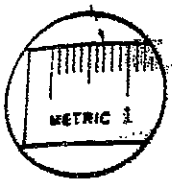


5. _____

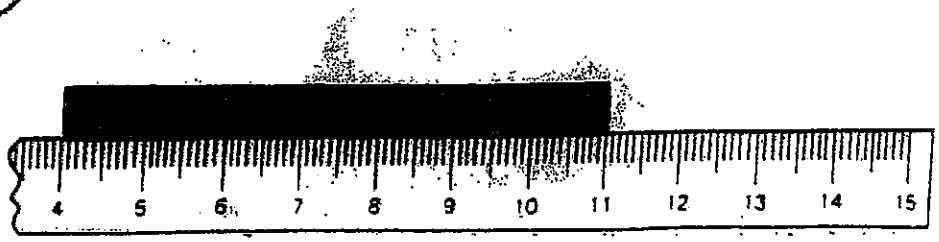


6. _____

Name:_____ Date:_____ Period:____



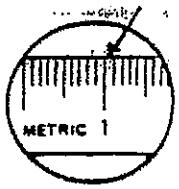
When the length of an object is less than 1.0 cm, the measurement must still be written with two numbers, such as 0.7 cm, not 7 cm.



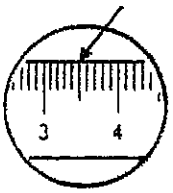
1. The ruler above is broken, but the part of the scale that remains can still be used to measure the length of an object. The piece of tape in the figure stretches from the 4.0 cm mark to the 11.0 cm mark. By subtracting the two numbers, you know the length of the object is _____cm.

TEST YOUR UNDERSTANDING

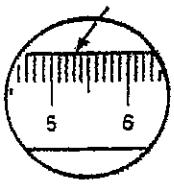
What length is indicated by the arrow in each of the following figures?



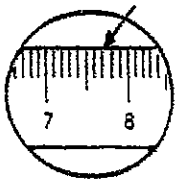
1. _____ cm



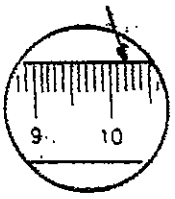
2. _____ cm



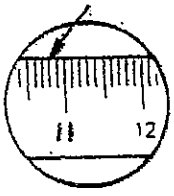
3. _____ cm



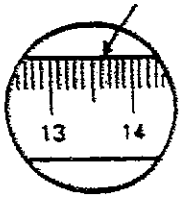
4. _____ cm



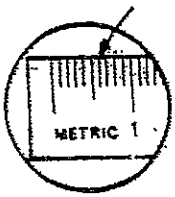
5. _____ cm



6. _____ cm



7. _____ cm

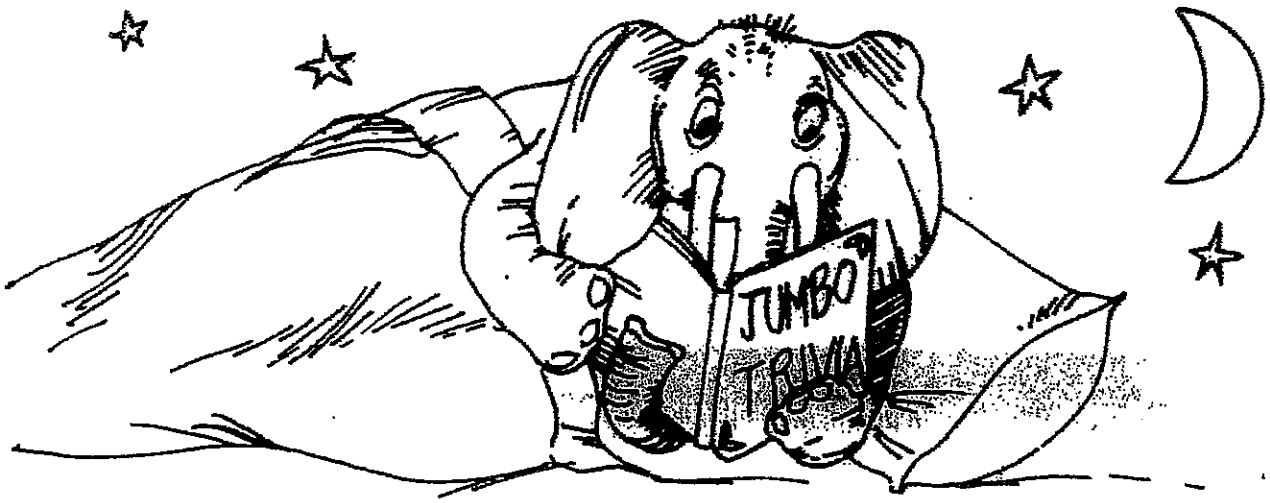


8. _____ cm

NAME

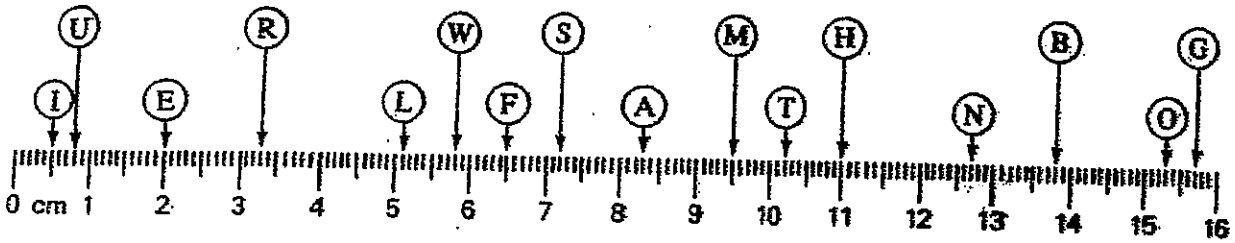
Practice Worksheet

FACTS FROM OUR SELECTION OF JUMBO TRIVIA!



To complete the fact card:

- Identify the length indicated by each arrow.
- Then write each length over its matching number of millimeters or centimeters in the Decoder.



DECODER

!! It's A Fact !!

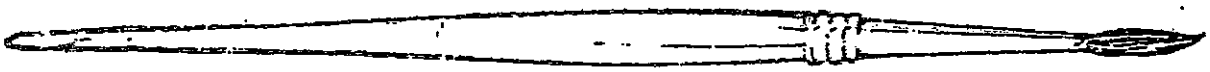
10.2 cm 110 mm 2 cm 10.2 cm 153 mm 12.7 cm 15.7 cm 8 mm 2 cm 153 mm 6.5 cm

10.2 cm 110 mm 2 cm 138 mm 5.1 cm 8 mm 2 cm 58 mm 110 mm 8.3 cm 5.1 cm 2 cm

58 mm 2 cm 0.5 cm 15.7 cm 110 mm 72 mm 95 mm 153 mm 33 mm 2 cm

10.2 cm 110 mm 8.3 cm 12.7 cm AN AVERAGE-SIZED ELEPHANT!

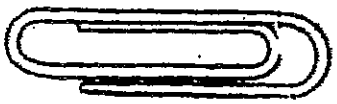
Use your metric ruler to measure the length of each object. Give each answer to the nearest tenth of a centimeter. Your error of measurement should not be more than 1 centimeter.



_____ cm

_____ cm

_____ cm

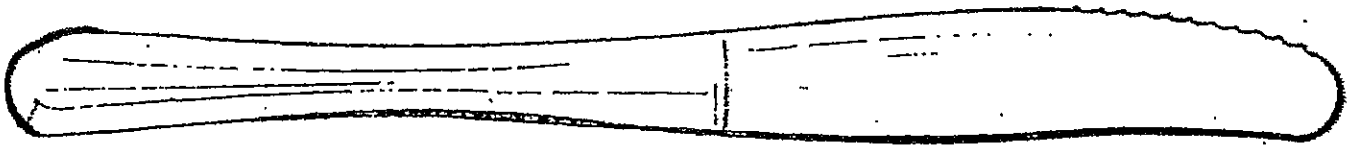


_____ cm

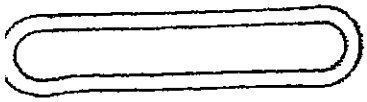
_____ cm

_____ cm

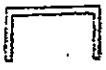
_____ cm



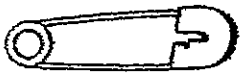
_____ cm



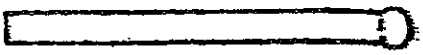
_____ cm



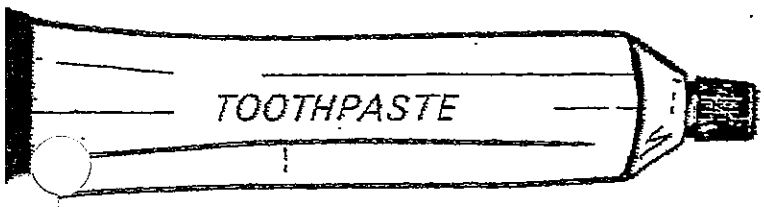
_____ cm



_____ cm



_____ cm



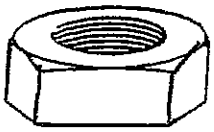
_____ cm

_____ cm

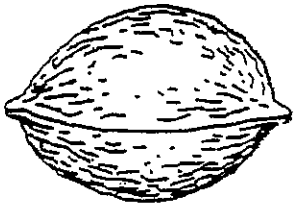
_____ cm

PRACTICE 2 MILLIMETERS

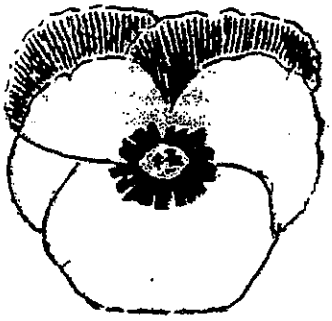
I. Look at each picture. Imagine how the object looks in real life. Circle the approximate length for each object. Do not use your millimeter ruler.



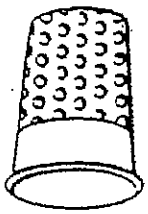
1. 10 mm 25 mm 80 mm



2. 4 mm 14 mm 40 mm



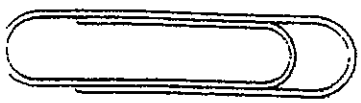
3. 2 mm 40 mm 8 mm



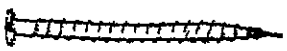
4. 20 mm 60 mm 90 mm

II. Use your millimeter ruler Measure each object from left to right.

1. _____

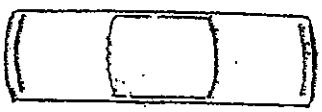


2. _____

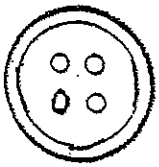


3. _____

4. _____



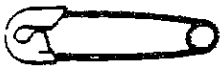
5. _____



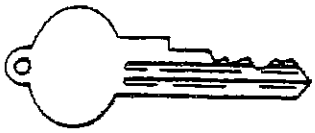
6. _____

PRACTICE 2 CENTIMETERS

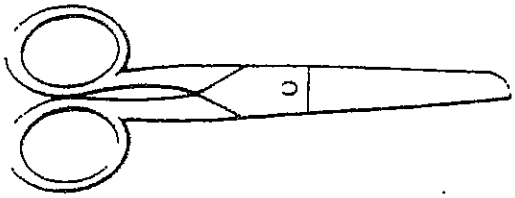
I. Look at each picture. Imagine how the object looks in real life. Circle the approximate length of each object.



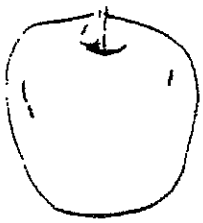
1. 9 cm 14 cm 2 cm



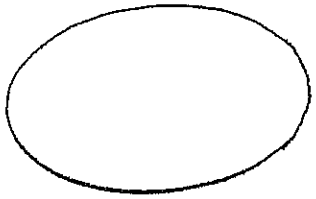
2. 5 cm 1 cm 10 cm



3. 3 cm 19 cm 4 cm



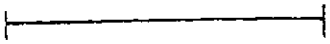
4. 7 cm 2 cm 13 cm



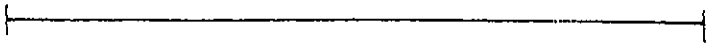
5. 3 cm 10 cm 5 cm

6. 1 cm 3 cm 6 cm

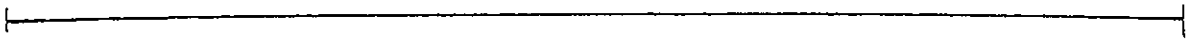
II. Without using your ruler, circle the approximate length of each line.



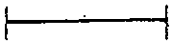
1. 4 cm 1 cm 7 cm



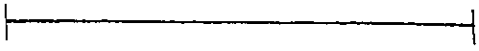
2. 3 cm 6 cm 9 cm



3. 5 cm 15 cm 25 cm

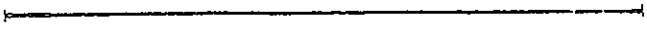


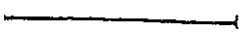
4. 1 cm 2 cm 4 cm

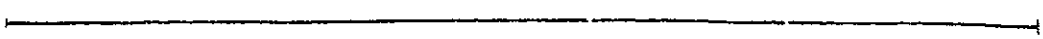


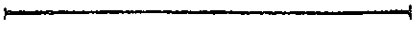
5. 6 cm 3 cm 1 cm

III. Use your centimeter ruler to measure each line. Write the measurement on each line.

1. 

2. 

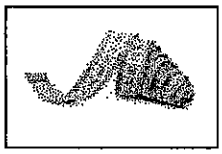
3. 

4. 

5.

Unit 2-2

Metric Conversions!



Mr. Coffey

Systems of Measurement

- The _____ is used in the United States.
- The units used are gallons, pounds, and feet.
- There are no standards in nature for these units.
- The rest of the world uses another measurement system: the _____ _____.

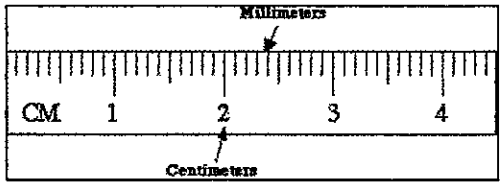
The Metric System

- The _____ is based on multiples of 10 (such as 100 and 1,000).
- Scientists all over the world use metric units.
- This allows them to share scientific knowledge even when they speak different languages.
- There is an ***International System of Units*** called the ***SI Units:***

_____, _____ ***and*** _____.

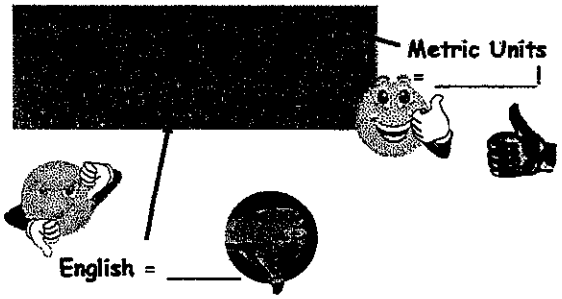
SI Units: Length

- The basic unit of length in science is called the _____ (m). *A **metric ruler** is a ruler that scientists use to measure* _____.



Metric Ruler

- Used to measure _____ (meters)

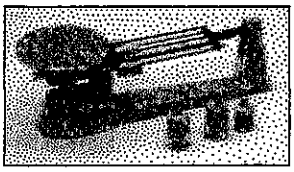


SI Units: Volume

- The basic unit of volume to measure gasses and liquids is called the _____ (l). *A **graduated cylinder** is a tool scientists use to measure liquid* _____.

SI Units: Mass

- The basic unit of mass in science is called the _____ (g). ***A triple beam balance*** is a tool scientists use to measure _____.




SI Units

Standard International Units (SI) are units that are used for consistency all around the world.

Measurement	Unit	Symbol
Length	Meter	_____
Mass	Gram	_____
Volume	Liter	_____
Time	Second	_____
Temperature	Celsius	_____

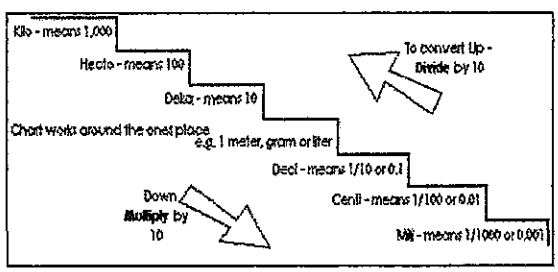
Prefixes help to make measurement of lengths, volumes, and mass more accurate by making the root measurements (m, l, g) bigger or smaller.

Prefix	Symbol	Equivalent	
Kilo	K	1,000	
Hecto	H	100	
Deka	Da	10	
Deci	d	.1 ←	.1 = 1/10
Centi	c	.01 ←	.01 = 1/100
Milli	m	.001 ←	.001 = 1/1000

Let's do an example!

Prefix	Symbol	Comparison
Kilometer	km	1.6 km = 1 mile
Hectometer	hm	1 hm is the length of 2.5 planes
Dekameter	dam	1 dam is the size of a schoolbus
Decimeter	dm	1 dm is the size of a scotch tape dispenser
Centimeter	cm	2.5 cm is the diameter of a quarter
Millimeter	mm	1 mm is the thickness of a dime

Using Steps



Understanding Unit Conversions

King Henry Doesn't (usually) Drink Chocolate Milk

K	H	D	unit	d	c	m
Kilo	Hecto	Deka	grams (g) liters (l) meters (m)	deci	centi	milli
1000	100	10		0.1	0.01	0.001

- The difference between each unit is one decimal place, or 10.
- As you go from larger units to smaller units, move the decimal place to the *right*.
- As you go from smaller units to larger units, move the decimal place to the *left*.

Using a CHART:

Used to measure bigger things!!

Used to measure smaller things!!

Kilo	Hecto	Deka	m/l/g	deci	centi	milli

- Moving to the left is like dividing.
- Your number will get SMALLER (become a decimal)

- Moving to the right is like multiplying.
- Your number will get BIGGER!

You will move your decimal point in the same direction that you moved on the chart!

How we do it.....

Convert: 23.45 mm to _____ cm

Kilo	Hecto	Deka	m/l/g	deci	centi	milli

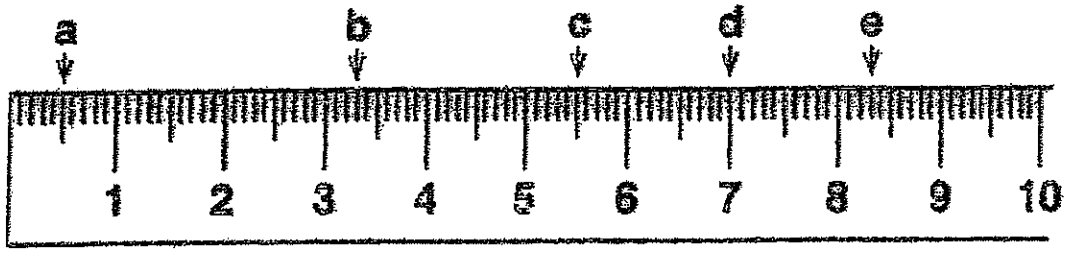
Now Try These....

1) 1000 mg = _____ g
2) 1 L = _____ mL
3) 160 cm = _____ mm
4) 14 km = _____ m
5) 109 g = _____ hg
6) 250 m = _____ km
7) 6 L = _____ mL

Name:_____ Date:_____ Period:____

Metric System Quiz!

Directions: Letters "a-e" represent positions on a marked ruler below. Write the marked length *in the proper units* on the lines provided.



1.) Letter "a" is _____ cm.

2.) This equals_____ Hm.

3.) Letter "b" is_____ cm.

4.) This equals _____ m.

5.) Letter "c" is_____ mm.

6.) This equals_____ Km.

7.) Letter "d" is _____ mm.

8.) This equals_____ Dam.

9.) Letter "e" is_____cm.

10.) This equals_____dm.

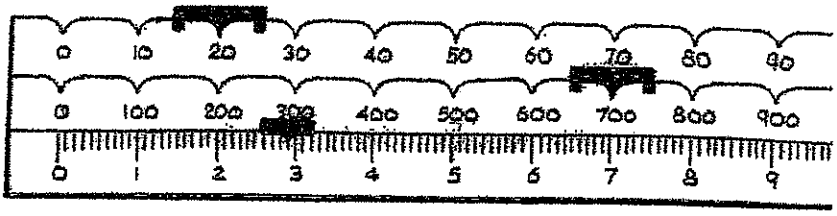
Directions: Measure the following lines. Give your answer in centimeters.

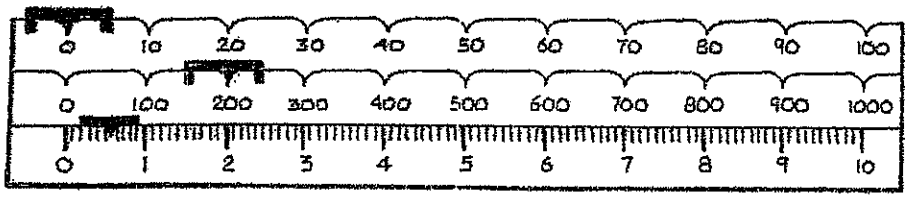
12.) _____

13.) _____

Directions: The following balances measure mass in grams. What masses are shown on each of the following balances?

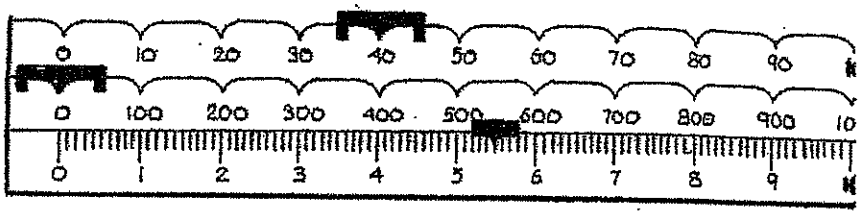
14.)_____

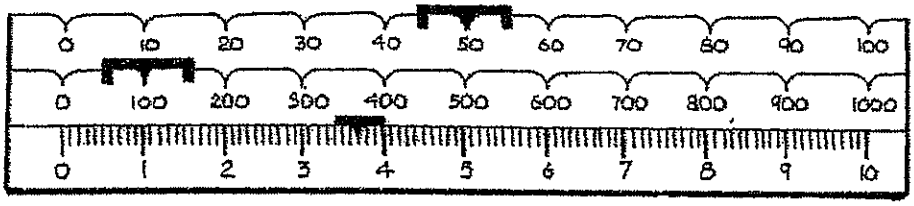




15.)_____

16.)_____





17.)_____

18.) How would you measure the volume of a liquid?_____

19.) How would you measure the volume of a regular shaped object (like a box)?

_____

20.) What is the difference between mass and weight?_____

_____

_____

METRIC UNITS

Date:_____

Name:_____

Class:_____

1 Which statement best describes the significance of the number 10 in the metric system?

A There are 10 base units

B There are 10 metric prefixes

C The system is based on multiples of 10

D The system is used by 10 countries

2 Which mathematical operation is most closely associated with the function of a metric prefix?

A Addition

B Multiplication

C Subtraction

D Exponentiation

3 Which unit is best suited for measuring the volume of a test tube?

A Milliliter

B Liter

C Dekaliter

D Kiloliter

4 A dekameter is best suited for measuring which distance?

A The earth to the sun

B A cross-country drive

C The circumference of the earth

D The length of a city block

5  **Which two units are best suited for measuring the dimensions of this object?**

A Centimeter and liter

B Centimeter and gram

C Millimeter and milliliter

D Millimeter and decigram

6 What is the most logical explanation for why "kilo" is a more important prefix to remember than "tera" (the metric prefix for 1 trillion)?

A Units with fewer 0's are easier to convert

B Quantities of thousands are more common than quantities of trillions

C "Kilo" can be added to more base units than "tera"

D The term "kilo" was invented earlier than the term "tera"

7 Why does "Ketchup helps dinosaurs devour chunky meals" not work as a memory aid for the six common metric prefixes?

A It's too long

B It doesn't mention the metric system

C It's too difficult to remember

D It doesn't have a placeholder for the base unit

8 What is the relationship between a decigram and a dekagram?

A A dekagram is 10 times as large as a decigram

B A dekagram is one-tenth as large as a decigram

C A dekagram is 100 times as large as a decigram

D A decigram is 100 times as large as a dekagram

9 How many places would the decimal move in a conversion from kilograms to milligrams?

A 1,000

B 10

C Six

D Five

10 Which conversion is most similar to the conversion from hectometers to meters?

A Hectometers to kilometers

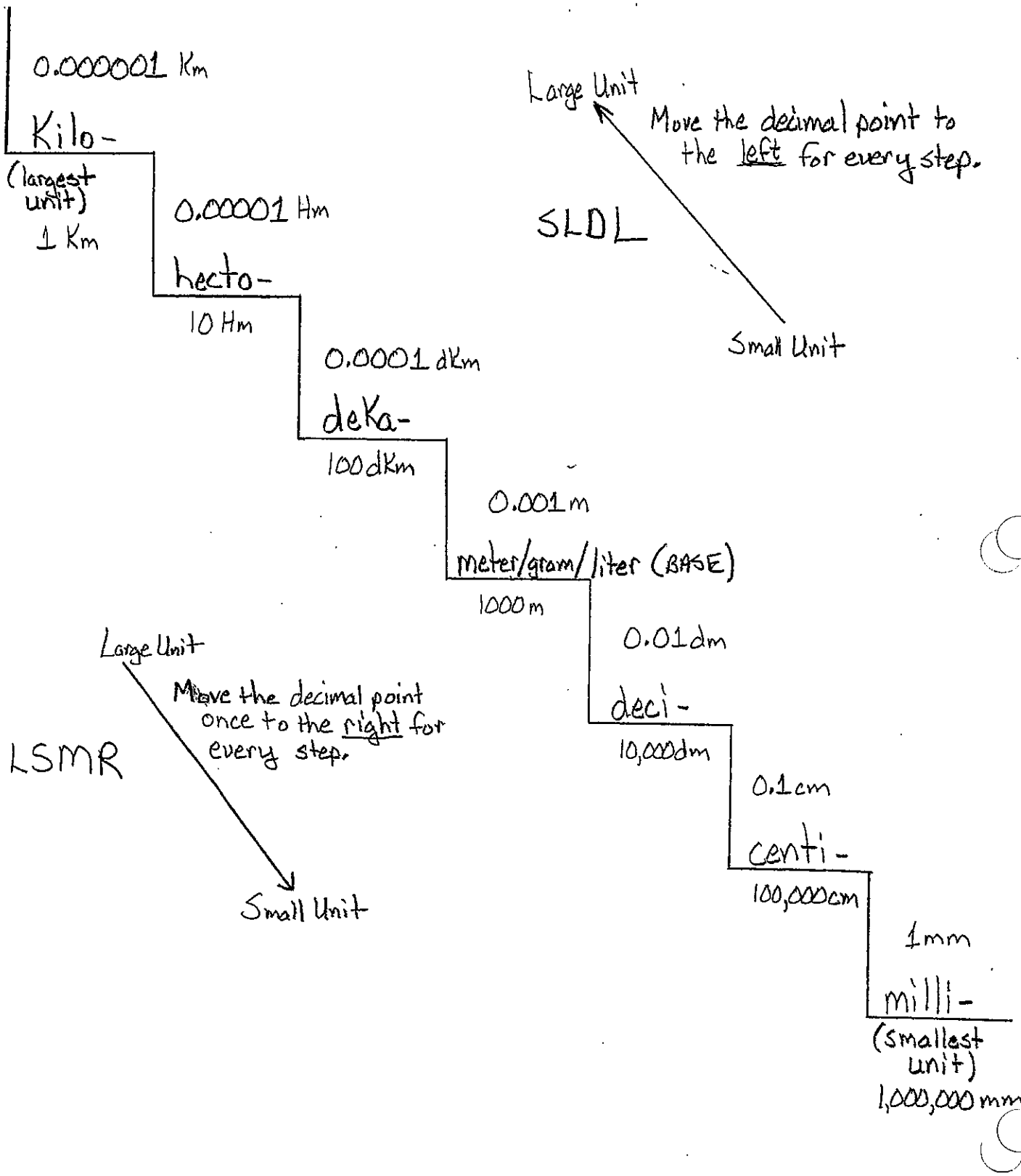
B Kilograms to dekagrams

C Millimeters to centimeters

D Deciliters to liters

Kids Hate Dividing Base

Dads Can Multiply



Name _____

Reteaching
16-2

Converting Metric Measures

Changing from one metric unit to another:

To change from a larger unit to a smaller unit, multiply by a power of ten.

3.8 L = _____ mL

A liter is a larger unit than a milliliter. To change from liters to milliliters, multiply.

1 L = 1,000 mL

3.8 × 1,000 = 3,800

3.8 L = 3,800 mL

To change from a smaller unit to a larger unit, divide by a power of ten.

100 m = _____ km

The meter is a smaller unit than the kilometer. To change from meters to kilometers, divide.

1,000 m = 1 km

100 ÷ 1000 = 0.1

100 m = 0.1 km

Name the most appropriate metric unit for each measurement.

1. mass of a cow _____

2. length of a carrot _____

3. capacity of a thimble _____

Complete.

4. 45 g = _____ mg

5. 3450 mL = _____ L

6. 4.5 m = _____ mm

7. 1.68 L = _____ mL

8. 28 cm = _____ mm

9. 7,658 g = _____ kg

10. 600 cm = _____ m

11. 5,000 mg = _____ g

12. 5.1 km = _____ m

13. 1.780 L = _____ mL

14. 0.780 L = _____ mL

15. 4,300 m = _____ km

16. 9,000 cm = _____ m

17. 8,000 mg = _____ g

18. Reasoning It is recommended that people have 1 g of calcium each day. How many milligrams of calcium is that?

_____

Name _____

Practice
16-2

Converting Metric Measures

Name the most appropriate metric unit for each measurement.

1. mass of a paperclip _____
2. capacity of a water cooler _____
3. width of a sheet of paper _____

Complete.

4. 2.7 m = _____ cm
5. 1.6 kg = _____ g
6. 9 L = _____ mL
7. 14 m = _____ mm
8. 1.6 cm = _____ mm
9. 5,400 g = _____ kg
10. 1,840 mL = _____ L
11. 32 km = _____ m

12. **Number Sense** The chemist needs 2,220 mL of potassium chloride to complete an experiment. He has 2 L. Does he have enough to complete the experiment? Explain.

_____

13. A computer floppy disk has a mass of 20 g. How many would you need to have a total mass of 1 kg?

_____

14. A battery is 5 cm long. How many batteries would you need to line up to get 3 m?

_____

15. Which would you do to convert 25 cm to millimeters?

A Divide by 10
B Divide by 100
C Multiply by 10
D Multiply by 100

16. **Writing to Explain** A banana has a mass of 122 g. Explain how to find the mass of the banana in milligrams.

_____

_____

_____

Measuring Length Practice

You will need a **metric ruler** to accurately complete these practice tasks.

Name_____

Measure the length of each line to the nearest 0.1 cm. Write your answer on the line with a label!

1.  _____

2.  _____

3.  _____

4.  _____

5.  _____

Use your notes and metric ruler to answer the following questions:

6. How many millimeters are in one centimeter? _____

7. 12 centimeters = _____millimeters

8. 37 centimeters = _____millimeters

9. 29.6 centimeters = _____millimeters

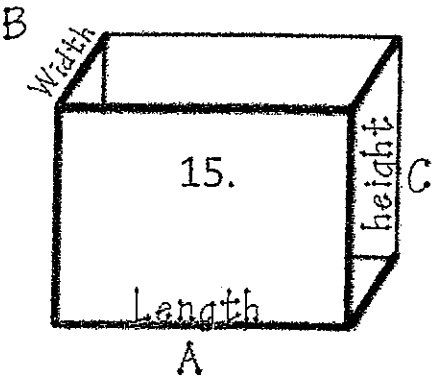
10. 18.7 centimeters = _____millimeters

11. 22 millimeters = _____centimeters

12. 45 millimeters = _____centimeters

13. 100 millimeters = _____centimeters

14. 1 meter = _____centimeters



15. Measure the length (A), width (B) and height (C) of the rectangular prism to the nearest 0.1 cm. A_____ B_____ C_____

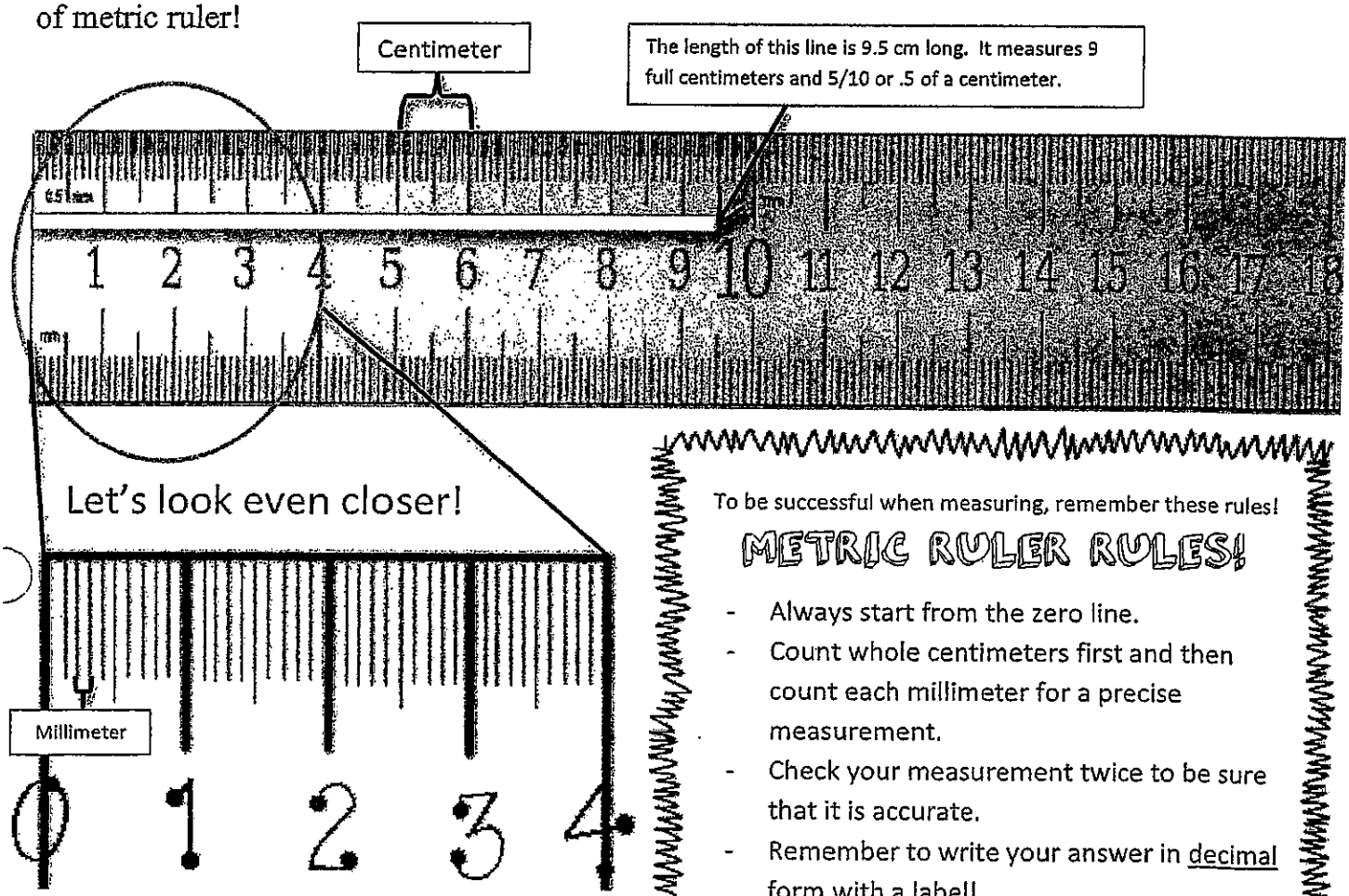
Measuring Length

Physical Properties Practice

Name:_____

Scientists measure length using the metric system. This means that they use units such as **millimeters, centimeters, meters and kilometers** instead of feet, inches and miles. For measuring length during a science experiment we will use millimeters, centimeters and meters.

Let's start by taking a look at part of metric ruler!



The numbers represent each whole **centimeter.** The small lines in between each centimeter are **millimeters.**

1. **How many millimeters make up one centimeter?**

_____**mm = 1 cm**

To be successful when measuring, remember these rules!

METRIC RULER RULES!

- Always start from the zero line.
- Count whole centimeters first and then count each millimeter for a precise measurement.
- Check your measurement twice to be sure that it is accurate.
- Remember to write your answer in decimal form with a label!

Example= 9.5 cm

"9 centimeters and 5 millimeters"

Or "9 point 5 centimeters"

Think about it...

2. A standard-size metric ruler has 30 centimeters on it. How many millimeters does it have? _____

3. One hundred centimeters is equal to one meter. How many millimeters equal one meter? _____

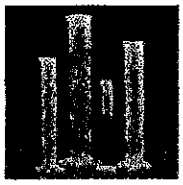
Unit 2-3

Reading the Graduated Cylinder

And all about the Meniscus!

Graduated Cylinder

Measures volume in _____ (or milliliters)



- Come in different sizes for different measurements.
- Small ones measure small volumes, big ones measure big volumes!

How do we use it…..?

Let's See!

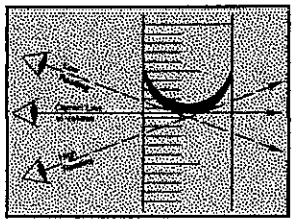
Reading the Graduated Cylinder

- Liquids in glass and some plastic containers _____ at the edges
- Changing the diameter of the cylinder will change the shape of the curve
- This curve is called the _____.

Reading the Graduated Cylinder

- Your eye should be _____ with the top of the liquid

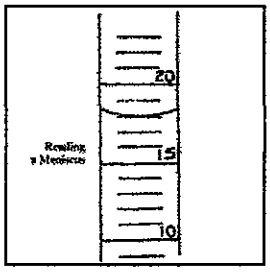
You should read to the _____ of the MENISCUS



Reading the Graduated Cylinder

- What is this reading?

18.0 ml



Reading the Graduated Cylinder

- What is this reading?

36.5 ml

Reading the Graduated Cylinder

- What is this reading?

42.9 ml

Reading the Graduated Cylinder

- What is this reading?

47.0 ml

Reading the Graduated Cylinder

- What is this reading?

61.2 ml

Water Displacement

- Used to find the _____ of an irregularly shaped object.

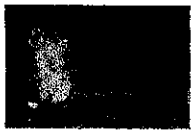
The general idea:

- When an object is placed in water it will "_____" water out of the way.
- The amount of _____ is equal to the amount of _____ _____.

So.....

- We can use this to find out the _____ of things that have _____ _____ that we cannot measure.

Like:

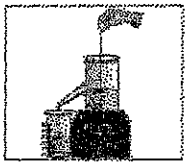


The Steps:

- 1. Record the level of water in the graduated cylinder
  - Remember there needs to be enough to cover whatever object you are measuring!
- 2. Place the object in the cylinder and record the new volume

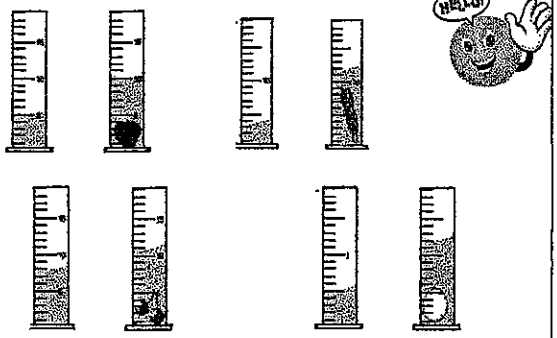
•3. Subtract the old volume from the new volume to find the volume of your object.

Can use an overflow container



- These work the same as before.
  - Now we just record how much water is actually pushed out of the container!

Let' s try one.... Or a few



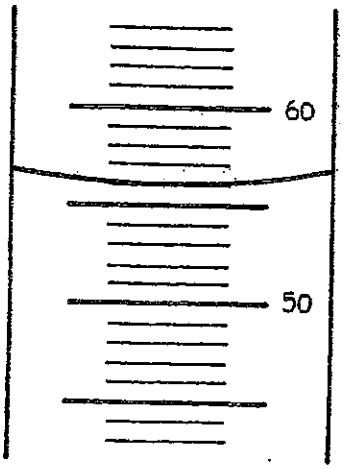
A note about volume

- If you want to know the volume of a **REGULAR** shaped object, use _____
- If you want to know the volume of an **IRREGULAR** shaped object, use _____

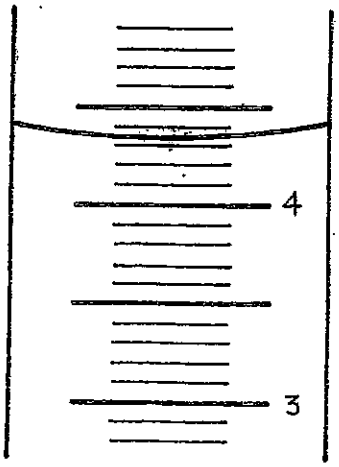
MEASURING LIQUIDS

Name _____

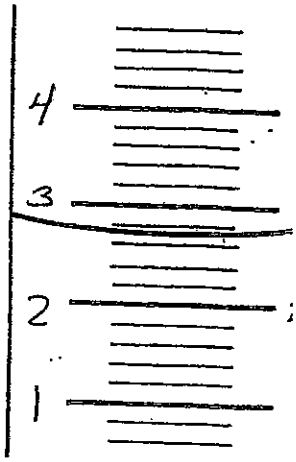
What volume is indicated on each of these graduated cylinders? The unit of volum is mL.



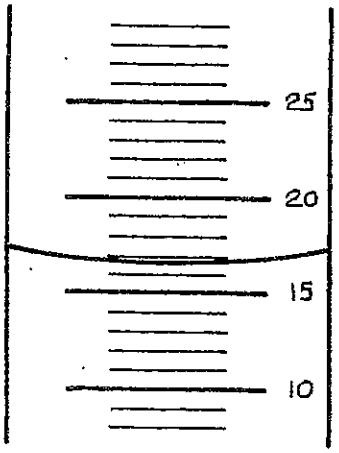
a) _____



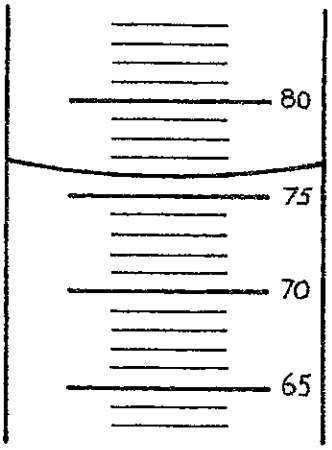
b) _____



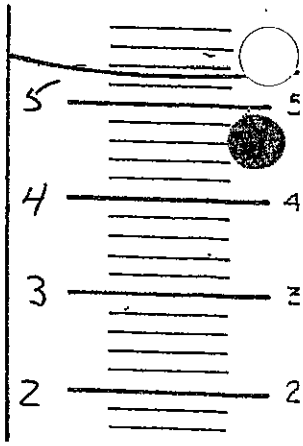
c) _____



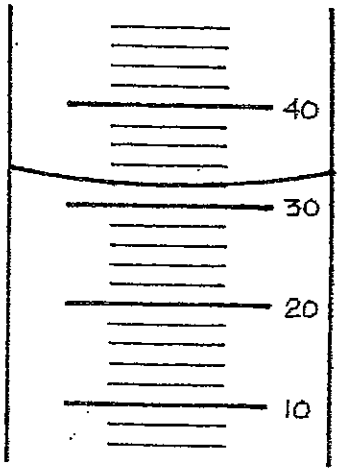
d) _____



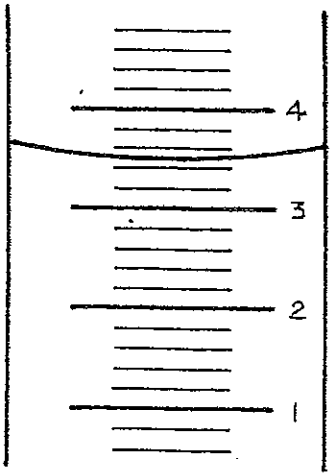
e) _____



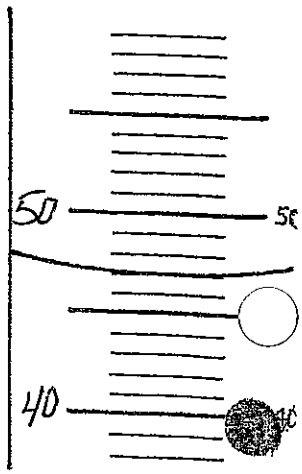
f) _____



g) _____



h) _____



i) _____

Name: _____

Graduated Cylinders

Read each graduated cylinder and write the amount. Be sure to include **mL** in your answer.

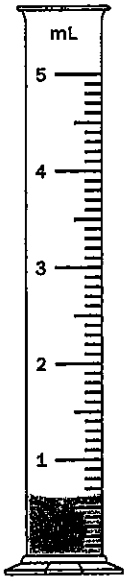
a.

2.8 mL

b.

_____

c.



_____

d.

_____

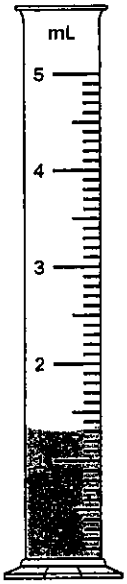
e.

_____

f.

_____

g.



_____

h.

_____

Name: _____

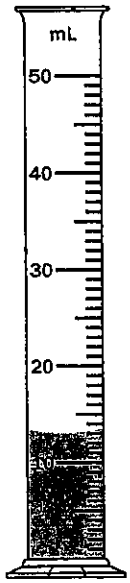
Graduated Cylinders

Read each graduated cylinder and write the amount. Be sure to include **mL** in your answer.

a.

2.3 mL

b.



_____

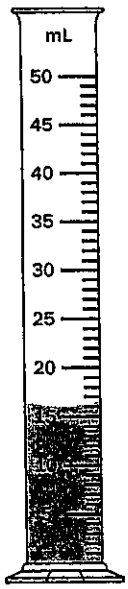
c.

_____

d.

_____

e.

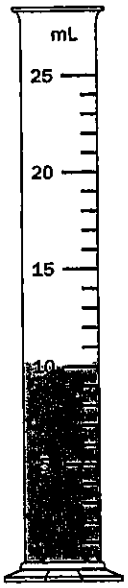


_____

f.

_____

g.



_____

h.

_____

Name:_____ Date:_____ Period:_____

Volume Pop Quiz!

Write your answers on the lines to the right.

1. Write the formula for density. _____
2. What tool do we use to measure the volume of a regular shaped object? _____
3. What formula do we use to calculate the volume of a regular shaped object? _____
4. What unit do we use for the volume of a regular shaped object? _____
5. What tool do we use to measure the volume of an irregularly shaped object? _____
6. What technique do we use to calculate the volume of an irregularly shaped object?
   _____
7. What unit do we use for the volume of an irregular shaped object? _____

Score:_____

Unit 2-4

DENSITY!

What is DENSITY?

Defined:

_____ per unit of _____

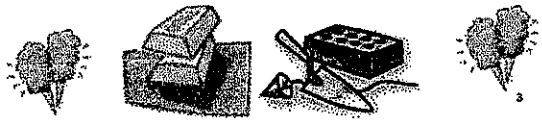
or

The amount of _____ in a given _____

2

What does that mean?

- How _____ something is _____ to its _____.
- Is it big and heavy, small and light, etc....



3

Which is heavier.....

100 pounds of feathers

or

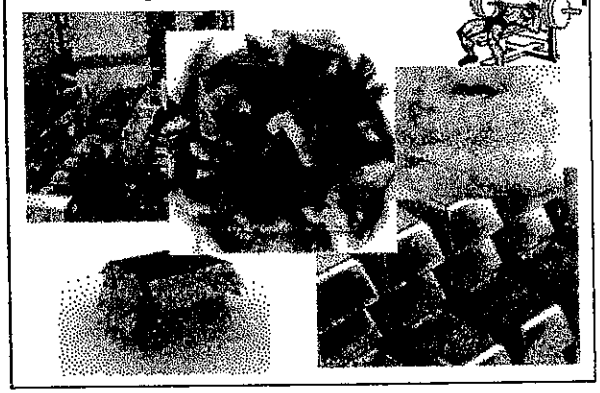
100 pounds of lead?

They're the same

But which would take up more room????

4

Consider these.....



Some Facts:

- Density is a _____
- That means it can be _____
- -Remember: it is *specific* to individual substances!
  - Ex: the density of gold is always 19.3 g/cc
- -You can tell what an _____ substance is by finding its _____.

5

The FORMULA:

- "_____ equals _____"
  divided by _____

$$d = \frac{m}{v}$$

7

Something IMPORTANT

- Density will _____ remain the same.
- If you cut an object, the _____ is still the same.

WHY?

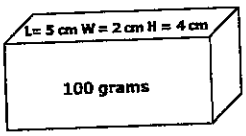
- Because if you cut an object in <u>half</u>, the _____ is _____ and so is the _____.

$$d = \frac{m}{v}$$

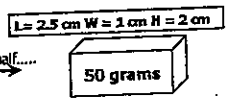
WHY? →

- Because density will always reduce to the same answer

Consider This.....



Cut in half.....



9

Very Important!

DENSITY **NEVER** CHANGES!!!

So.....

$$d = \frac{m}{v}$$

← Density never changes. Since this is a fraction, when we change the top we change the bottom as well.

10

EXAMPLE:

- 100 mL of water has a mass of 100 g.
- The density of water is 1 g/ml.
- Now <u>dump out one half</u> ($\frac{1}{2}$) of the water.....

Can you do that and still have water have a density of 1g/ml?

The math:

$\frac{100\text{ g}}{100\text{ ml}}$ = 1 g/ml ≠ $\frac{200\text{ g}}{200\text{ ml}}$ = 1 g/ml ≠ $\frac{50\text{ g}}{50\text{ ml}}$

11

Where do the UNITS of density come from?

- The units of _____ come from the calculations that you make.

•Remember that you _____ _____density, you can only _____ it using the formula.

12

Here's how it works:

$$d = \frac{m}{V}$$ measured in → g; measured in → cm^3

$$d = \frac{g}{cm^3}$$

13

The other units of density:

$$\frac{g}{cm^3} \text{ or } \frac{g}{mL} \text{ or } \frac{g}{cc}$$

Remember: cc = mL = cm^3

But your units should reflect whatever units were given in the problem.

14

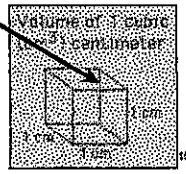
mL = cc = cm^3

The volume of this cube is 1 cm^3

If we fill this cube with water it would hold 1mL

Therefore

1 mL = 1 cc = 1cm^3



15

Show your work.....

- 1st make a list of what you're given
- 2nd write your formula
- 3rd fill in your formula
  - remember to include the UNITS!
- 4th plug your numbers into the calculator
- 5th Record your answer, again remember to include the units!

ROUND TO THE NEAREST TENTH (.1)

16

Here's how it should look:

What is the density of carbon dioxide gas if 0.250 grams occupies a volume of 25 mL?

The List

D =

M = 0.250 g

V = 25 mL

The Formula

$$d = \frac{m}{V} = \frac{0.250\ g}{25\ mL} = 0.01\ \frac{g}{mL}$$

17

Sink or Float????

Because the density of liquid water is always 1 g/cc we can predict if objects will sink or float depending upon their density.....

Density of .8 g/cc

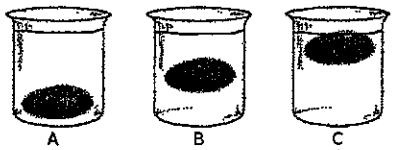
Density of .5 g/cc

Density of 1 g/cc

Density of 1.9 g/cc

18

Remember the Magic Potato?



0.1% salt. Density is close to 1 g/ml.

50% salt. Density is about 1.1 g/ml.

100% salt. Density is close to 1.2 g/ml.

Density Columns

20

Name_____ Date_____
Period _____ Number _____

Unit 2-4- Density Practice

Directions: Solve the following problems using the density formula. Be sure to show all of your work!

$$d = \frac{m}{v}$$ Density Formula

1. Volume = 5 cm^3 Mass = 25 g

2. Volume = 4 cm^3 Mass = 208 g

3. Volume = 5 cm^3 Mass = 60 g

4. A lump of gold has a volume of 10 cm^3 and a mass of 193 g. Another lump of gold has the same volume and a mass of 960 g. What is the density of the second lump?

5. A carpenter saws a wooden beam into two pieces. One piece has a mass of 600 g and a volume of 100 cm^3. What is the density of the wooden piece?

6. A 20 mL bottle is filled with oil. The oil has a mass of 180 g. What is the density of the oil?

Name_____

Calculating Density

DIRECTIONS: Using the formula, D=m/v, calculate the following problems. ***Remember to plug and chug*** (plug in the values that are given and chug, or calculate for the values you are solving for)! ☺

Always write the formula when solving a density problem.

1. The mass of an object is 64g, the volume is $8.2cm^3$, find the density.

2. The volume of an object is 870cc and the mass of the object is 450g.What is the denisty of the object?

3. The volume of an object is $100cm^3$. The mass is 4g. Find the density of the object.

4. The mass of a rock is 12g and the volume is 20cc. Find the density of the rock.

5. The volume of a marble is 13cc and the mass is 56g. What is the density of the marble?

6. The mass of a milk container is 105g. The volume is 25 cc. What is the density of the milk container?

MEASURING MATTER

Date:_____

Name:_____

Class:_____

1 If a substance has a large mass and a small volume, what can you conclude about it?

A It's very dense

B It will float on water

C It is made out of rock or metal

D It has a low density

2 What is the difference between weight and mass?

A Weight depends on density and mass depends on gravity

B Weight depends on gravity and mass depends on volume

C Mass depends on gravity and weight is constant

D Weight depends on gravity and mass is constant

3 Which of the following units is rarely, if ever, used in science labs?

A Centimeter

B Gram

C Quart

D Milliliter

4 If you wanted to measure an irregular object's volume, which of the following devices could you use?

A 

B 

C 

D 

5 One side of a cube is 5 cm long. What is the cube's volume?

A 5 cubic cm

B 15 cubic cm

C 25 cubic cm

D 125 cubic cm

6 In the context of the movie, what is the best synonym for "property?"

A Possession

B Attribute

C Virtue

D Quantity

7 What is always true of an object with a lot of mass?

A It contains a lot of matter

B It has a large volume

C It has a high density

D It cannot be accurately measured

8 Which of the following is a measurement of an object's mass?

A 10 centimeters

B 10 kilograms

C 10 newtons

D 10 grams per cubic cm

9 What is the relationship between cubic centimeters and milliliters?

A They are equivalent

B Cubic centimeters measure length; milliliters measure volume

C They are both dependent on an object's mass

D They are both unrelated to an object's density

10 If an object's mass is 50 g, and its volume is 10 cubic cm, what is its density?

A 500 g/cubic cm

B 5 g/cubic cm

C 60 g/cubic cm

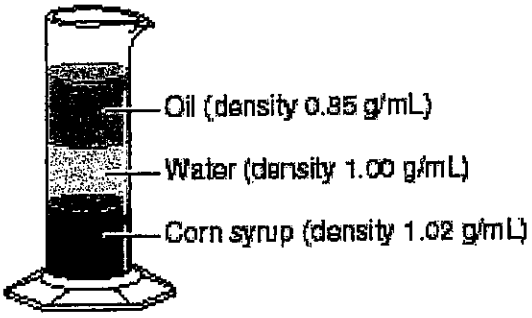
D 40 g/cubic cm

Name:_____ Date:_____ Period:____

Density Columns

1. Students measured and recorded the density of 4 samples. Use the density column and data table below to answer the following questions:

Densities of Some Unknowns	
Liquids	Density (g/mL)
Sample A	1.02
Sample B	0.96
Sample C	1.15
Sample D	0.82



Density Column

a. Which of the samples will probably float on top of the oil?_____

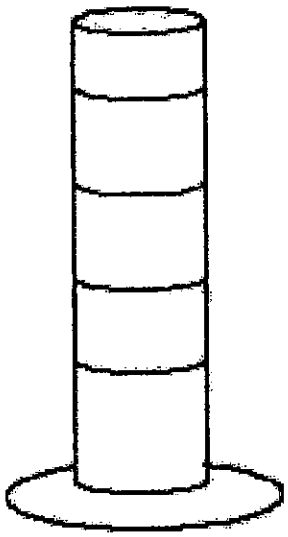
b. If sample *A* is dropped into the graduated cylinder, where would it end up and why?_____

_____

c. Which sample is most dense?_____

d. Which sample is least dense?_____

e. If all four samples were added to the graduated cylinder shown below, draw how they would look after they were allowed to settle:



Name: _____ #_____

Bill Nye Measurement Video Questions
(don't need to answer in complete sentences!)

1. What unit is used to measure the size of an atom? _____

2. What activities can we measure in the human body?_____

3. What are some things that need to be measured during an airplane flight? _____

4. How was the length of a meter determined? _____

5. The _____ is how much room something takes up.

6. One-tenth of a meter cubed is a volume called a _____.

7. One liter of water has a mass of exactly _____.

8. One thousand liters of water is called a _____.

9. What is a hodometer used for? _____

10. Why is mercury used inside a thermometer to measure temp?
_____

11. What temp does water freeze at? _____

12. What temp does water boil at? _____

13. The things we measure most are _____,_____,
_____, and _____.

Name_____ Date_____

Period ____ Number___

Unit 2-Measurement & Density

Review Sheet

Directions: Write out all of the answers in complete sentences that restate the question on a separate piece of paper.

****REMEMBER TO ALSO STUDY ALL VOCAB WORDS****

Section 1 Notes

1. An observation that we make using a tool (meter stick, graduated cylinder, triple beam balance, etc.) is called _____.
2. How do you measure with a metric ruler? Explain.
3. How many places behind the decimal is the tenths place?
4. Explain why mass and weight are NOT the same thing.
5. What does weight measure?
6. What do we measure with a triple beam balance?

Section 2 Notes

7. What system of measurement does the world use except us? Explain why?
8. Explain what tool is used in the metric system to measure length? And what is the metric unit length?
9. Explain what tool is used in the metric system to measure volume? And what is the metric unit volume?
10. Explain what tool is used in the metric system to measure mass? And what is the metric unit mass?
11. List the 6 metric prefixes, including the unit from the largest unit to the smallest unit.

    _____, _____, _____, _____, _____, _____, _____

12. Which way does the decimal move when converting from a **large** unit to a **smaller** unit?
13. Which way does the decimal move when converting from a **small** unit to a **larger** unit?

Section 3 Notes

14. Describe what the meniscus is when measuring with a graduated cylinder?
15. What term is used when finding the volume of an irregular shaped object?
16. Describe the process of finding the volume of an irregular shaped object.
17. What formula is used to find the volume of a regular shaped object?

Section 4 Notes

18. What is the definition of density and what is the formula? Label all 3 variables.
19. Does the density of an object change if you cut it into pieces? Explain why or why not.
20. Remember that you cannot _____ density, you can only _____ it using the formula.