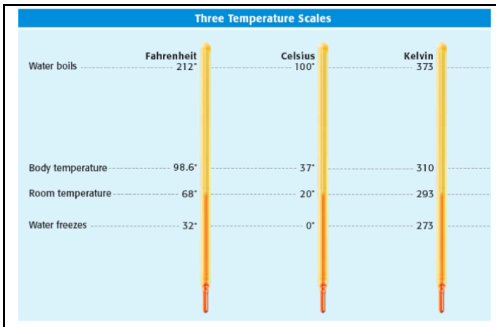
ABC's of Science Lecture Day 2: Temperature, Volume, Mass 2 pts ec printing



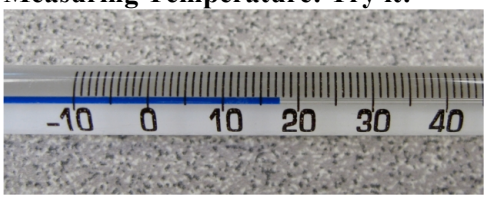
Measuring Temperature

In science, temperature is measured using the _____ temperature scale. The temperature scale is based on the freezing and boiling points of water. The freezing point of water is given the value of _____. The boiling point of water is labeled at _____. Human body temp is about 37° C.

Measuring Temperature! Try it!

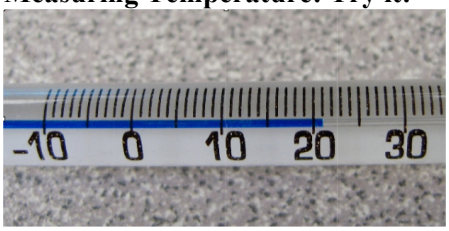
Answer: _____

Measuring Temperature! Try it!



Answer: _____

Measuring Temperature! Try it!



Answer: _____

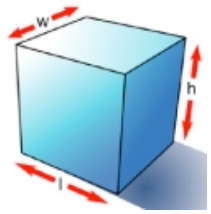
In the International System (SI), temperature is measured in _____ The kelvin scale is based on absolute zero, the coldest possible temperature. This temp. corresponds to -273° C

0°C =_____

100°C = _____

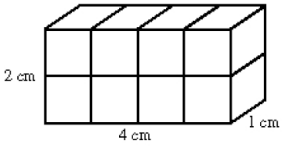
Volume

Have you ever heard someone say "this shampoo gives my hair a lot of volume!!!" What does that mean? Volume means to _____. Or, volume is the amount of space occupied by an object. So if someone's hair has a lot of volume that means it is full. It takes up a lot of space. **Volume of Solid Rectangular Objects:** For solid rectangular objects, the volume is the length x width x height. _____. A cubic meter (m^3) is a unit of volume. A cubic meter is a very large unit - it contains 1,000,000 cubic centimeters.



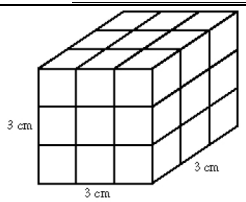
You try it! 4. What is the volume of this solid?

V= L x W x H



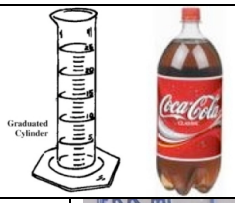
You try it! 5. What is the volume of this solid?

V= L x W x H



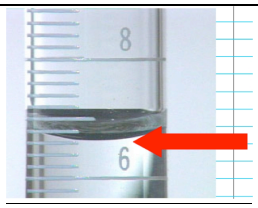
Measuring Volume of Liquid Objects

For liquid objects, we use _____ to measure the volume. In cooking, we may also use measuring cups, teaspoons or tablespoons. The level of a liquid in a graduated cylinder shows the volume of the liquid. A _____ (L) is a unit that is usually used to express volume. A soft drink bottle is a 2-liter bottle. For smaller volume measurements, we also use: milliliter (ml), cubic centimeter (cm^3). 1 liter contains 1000 milliliters or 1000 cubic centimeters.



Accuracy is Everything

To read the volume of the liquid, note the level at the _____ of the curve. We call this the _____.



You try it!

What is the volume in ml?

You try it!

What is the volume in ml?

Volume of Liquids

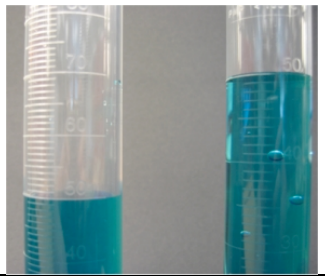
Do these graduated cylinder have the same volume of liquid in them? YES! How can that be??? One is a 100-mL cylinder & the other is a 50-mL cylinder.

Which one is better to use to measure this liquid?

The smaller one!!! Why? Better Accuracy! The smaller the cylinder, the smaller the increments on the cylinder, which means a more accurate result.

Volume of Liquids- But look at this!

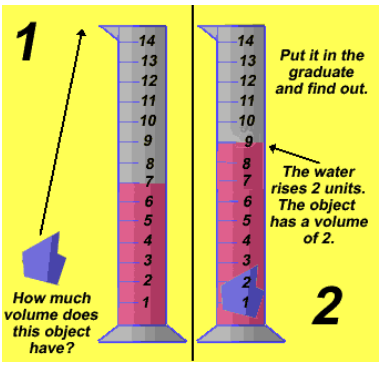
Both of these cylinders have exactly 50 ml of water



Measuring Volume of Solid Irregular Objects

So, how would I measure the volume of an irregular object such as a piece of clay? I can't measure the sides and I can't use a measuring cup. But I CAN still use a graduated cylinder. Simply submerge the object in the graduated cylinder and record the difference in water level. We call this measuring volume by _____
You will practice it during our lab this week.

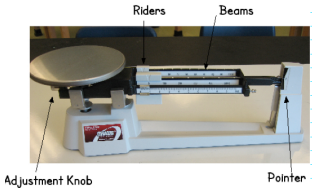
Volume		**cubic meter (m^3)** cubic centimeter (cm^3) liter (L) milliliter (mL)	1 cm^3 = 0.000001 m^3 1 L = 1 dm^3 = 0.001 m^3 1 mL = 0.001 L = 1 cm^3



Mass Review:

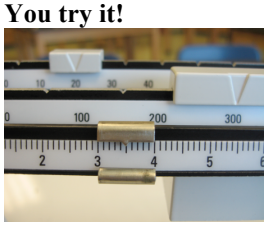
Mass is the amount of _____ in an object.
It's measured on a _____ (also called a triple beam balance).
Mass is measured in grams or kilograms.
A science book is about 1.3 kilograms.

Balance Parts to Know: Be careful!!



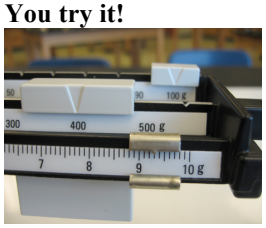
A large paperclip is about 1 gram.

Reading the balance- You try it!



Reading the balance- You try it!

Reading the balance- You try it!



MEASURING MATTER

BrainPOP

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 weight?
A 10 centimeters
B 10 kilograms
C 10 newtons
D 10 grams per cubic cm

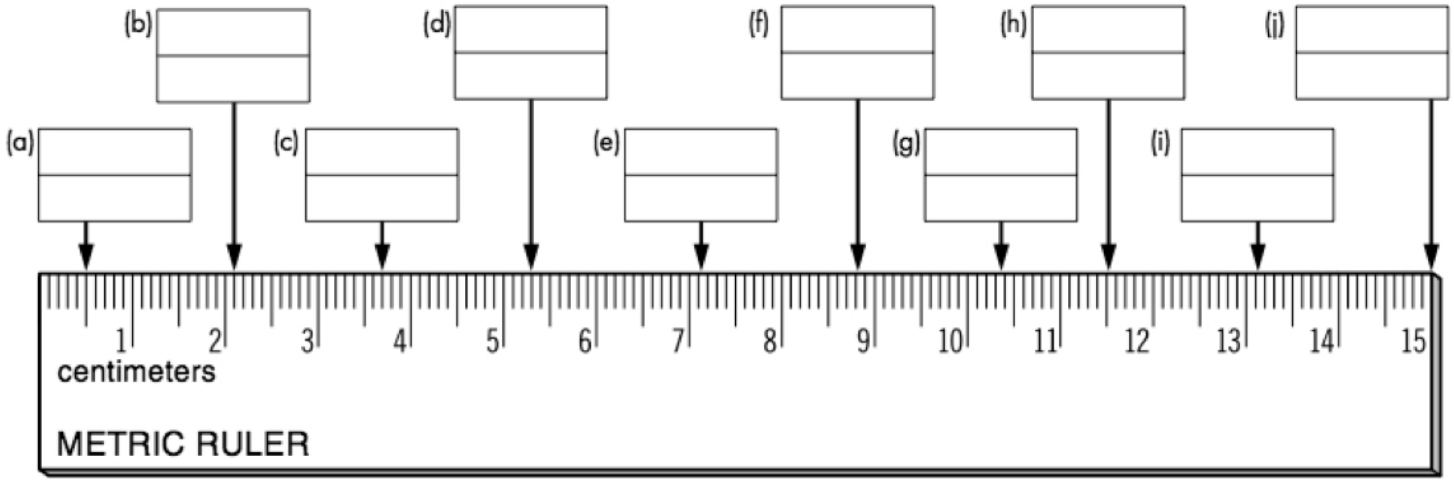
9 What is the relationship between cubic centimeters and milliliters?
A They are equivalent
B Cubic centimeters measure length; milliliters measure volume
C They are both dependent on an object's mass
D They are both unrelated to an object's density

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

Now it's YOUR TURN!! Metric Measurement

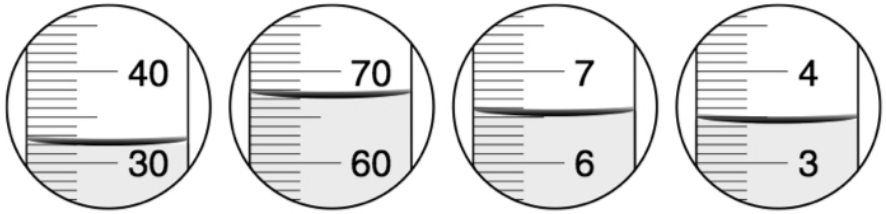
Ruler:

Now it's your turn to practice measuring with a metric ruler. In each box below, write the length from the zero edge to each arrow in both centimeters and millimeters. Check your answers below.



You Try It!

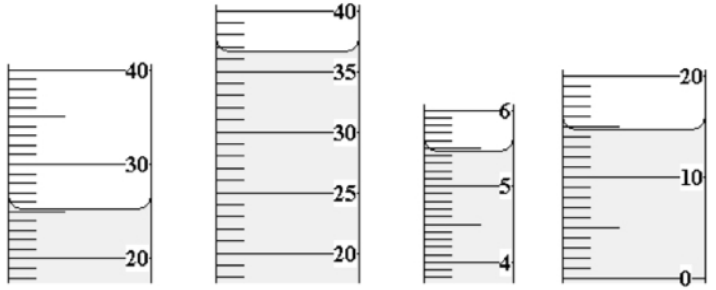
1. The following pictures show water in different graduated cylinders. What would be the correct measurement (in milliliters) for each picture? Record your answer in the space provided below each picture. Check your answers below after writing the four measurements.



(a) Volume =_____mL **(b)** Volume =_____mL **(c)** Volume =_____mL **(d)** Volume =_____mL

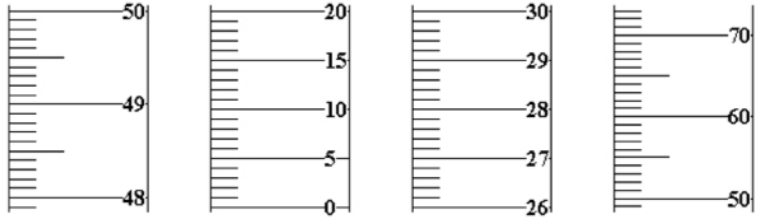
Note: If additional precision is desired, you can estimate an additional digit between the marks. For example, the bottom of the meniscus of cylinder (d) is a little less than halfway between 3.4 and 3.5. So, the next digit could be estimated and added to the reading, about 3.43 mL.

2) Determine the volume of the liquids in the following cylinders:



a) _____ b) _____ c) _____ d) _____

3) Draw in the meniscus for the following readings:



a) 49.21 mL b) 18.2 mL c) 27.65 mL d) 63.8 mL

Think Celsius

Draw lines to join the temperatures on the right side of the thermometer (in degrees Celsius) to the correct descriptions on the left. To help you, the temperatures in degrees Fahrenheit are shown on the left side of the thermometer.

a) "It's hotter than a firecracker outside today."

b) "This room feels comfortable – not too hot and not too cold."

c) Isopropyl (rubbing) alcohol boils at this temperature.

d) "This is sweater weather!"

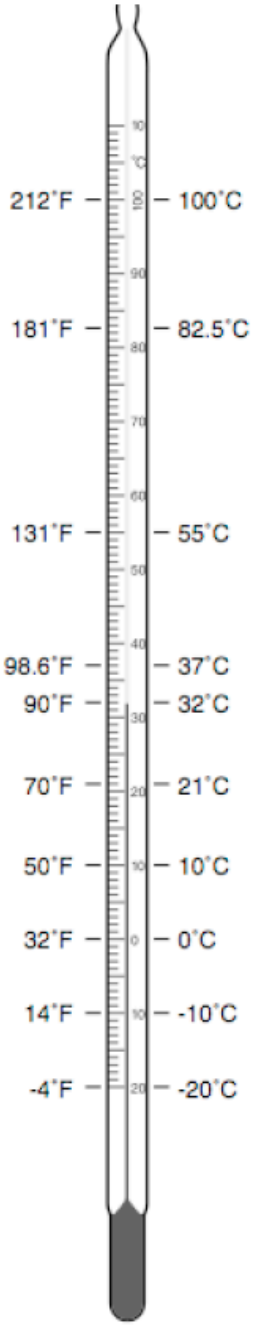
e) "Hey, the water on the stove is boiling."

f) Ice cream stays hard at this temperature.

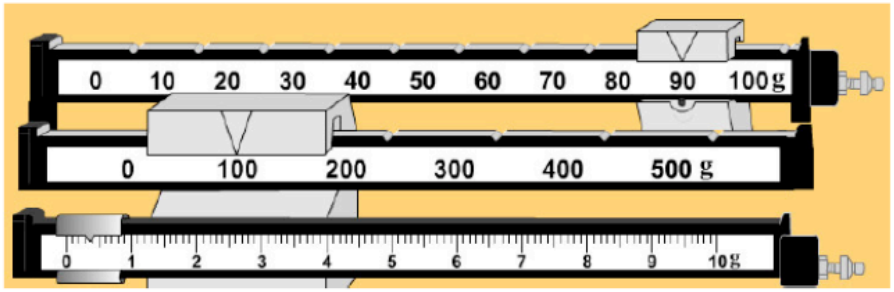
g) "There are icicles on my nose!"

h) "Ouch – that water's hot!"

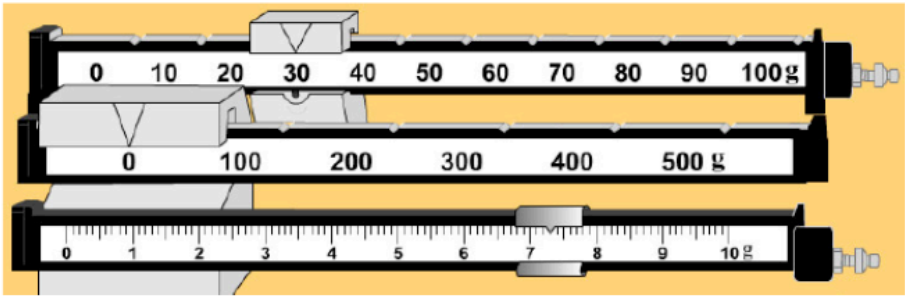
i) This is normal body temperature.



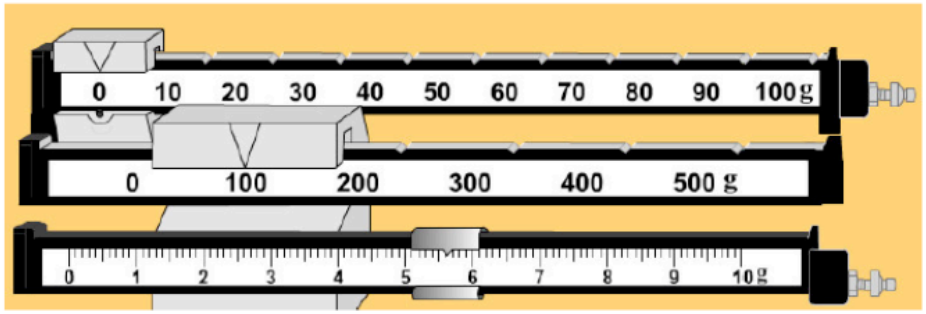
Reading a Triple beam Balance



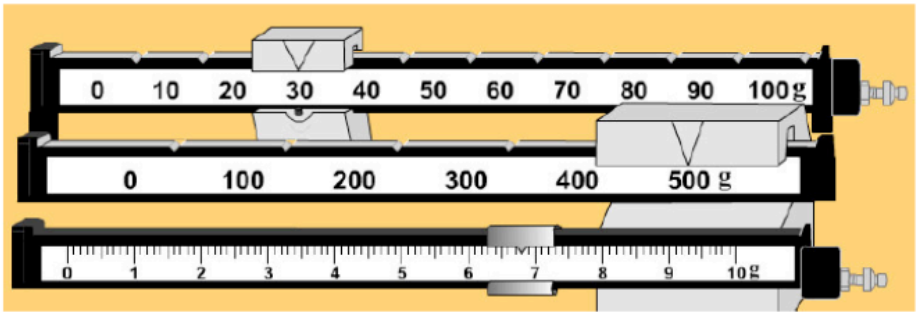
mass 1: _____



mass 2: _____



mass 3: _____



mass 4: _____

Finding Temperature

Converting from Fahrenheit to Celsius

Name:

Convert the temperatures from Fahrenheit to Celsius.

Ex) 77 °F = 25° C

1) Subtract 32 from the temperature. 77° - 32 = 45°

2) Multiply the temperature by 5. 45° X 5 = 225°

3) Divide the temperature by 9. 225° ÷ 9 = 25°

1) 212 °F = _____ C

2) 176 °F = _____ C

3) 149 °F = _____ C

4) 104 °F = _____ C

5) 194 °F = _____ C

6) 77 °F = _____ C

7) 86 °F = _____ C

8) 95 °F = _____ C

9) 140 °F = _____ C

10) 59 °F = _____ C

Converting from Celsius to Fahrenheit

Name:

Convert the temperatures from Celsius to Fahrenheit.

Ex) 25 °C = 77° F

1) Multiply the temperature times 9. 25° X 9 = 225°

2) Divide the temperature by 5. 225° ÷ 5 = 45°

3) Add 32. 45° + 32 = 77°

1) 90 °C = _____ F

2) 60 °C = _____ F

3) 25 °C = _____ F

4) 75 °C = _____ F

5) 100 °C = _____ F

6) 30 °C = _____ F

7) 10 °C = _____ F

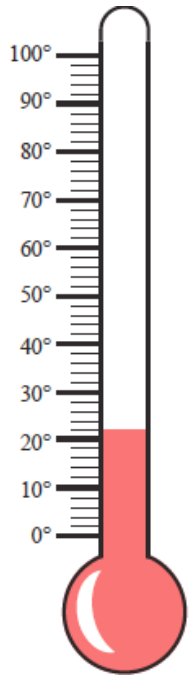
8) 35 °C = _____ F

9) 80 °C = _____ F

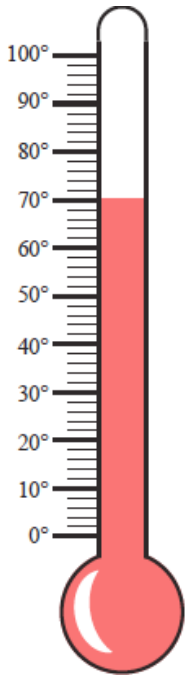
10) 40 °C = F

Find the temperature!

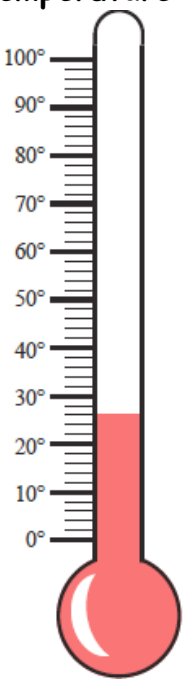
Determine the Fahrenheit temperature



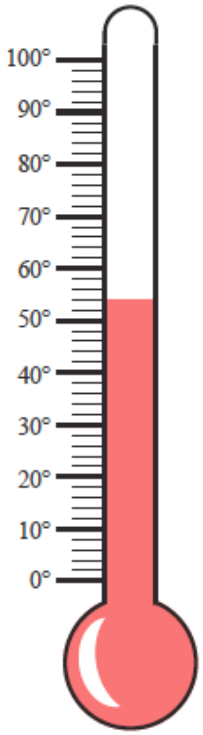
1. _____



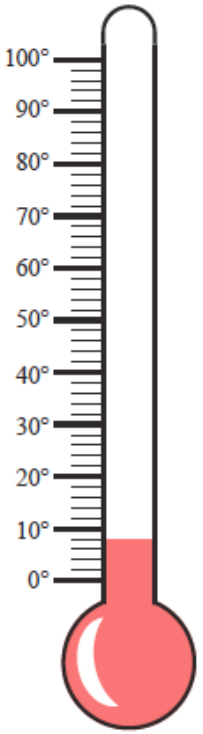
2. _____



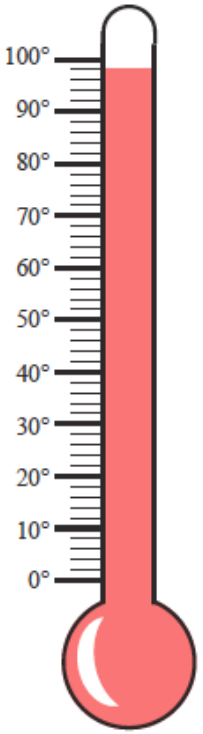
3. _____



4. _____



5. _____



6. _____

Now you try it!

Around the room you will find multiple stations. In table groups, go to the stations and determine the mass, volume and temperatures. Write down your answers here:

Station 1: Mass Determine the mass of the objects on the balances Ball: _____ paper clip: _____ Eraser: _____ large washer: _____ Small washer: _____ marble: _____	**Station 2: Graduated Cylinders** Determine the volume of the 5 different liquids in graduated cylinders Cylinder 1: _____ Cylinder 2: _____ Cylinder 3: _____ Cylinder 4: _____ Cylinder 5: _____ Cylinder 6: _____
Station 3: Displacement Method Determine the volume of the object by using the displacement method rock: _____ paper clip: _____ Small washer: _____ marble: _____	**Station 4: Measuring for Volume** Determine the volume of the objects using your rulers Box 1: _____ Box 2: _____ Box 3: _____ Box 4: _____

Video Notes lecture 2:

Video 3: _____

_____

_____

Video 4: _____

_____

_____

Video 5: _____

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_____

Video 6: _____

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Video 7: _____

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Video 8: _____

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