THE SCIENTIFIC METHOD AND SCIENTIFIC MEASUREMENT
A Unit of Study

Cat. No. 2032

BLACKLINE MASTERS

Included in this package are 11 Blackline Masters. Specific instructions for their use are given in the Teacher's Guide under Suggested Instructional Procedures for each lesson.

Lesson 1: THE SCIENTIFIC METHOD	**4 Blackline Masters**
Lesson 2: SCIENTIFIC MEASUREMENT	**7 Blackline Masters**

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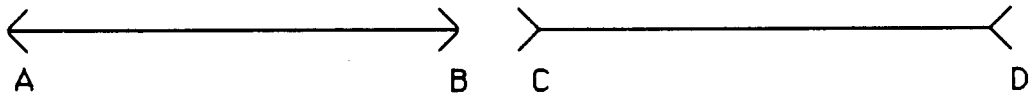
Name _____

THE SCIENTIFIC METHOD
Optical Illusions

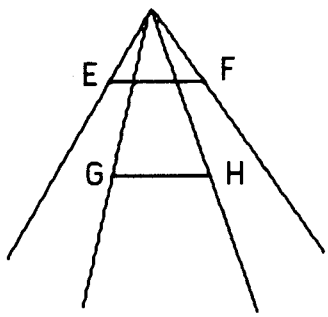
Make your guess first and then measure with a metric ruler.

1. Which line is longer AB or CD? _____

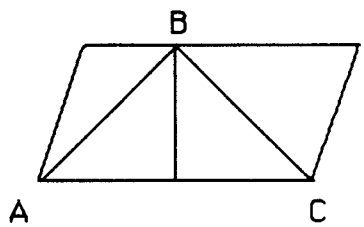


What are the actual lengths of the two lines? AB = CD =

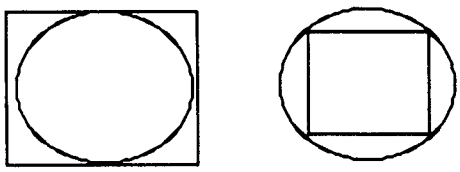
2. Which line is longer EF or GH? _____
   What are the actual measurements? EF = GH =



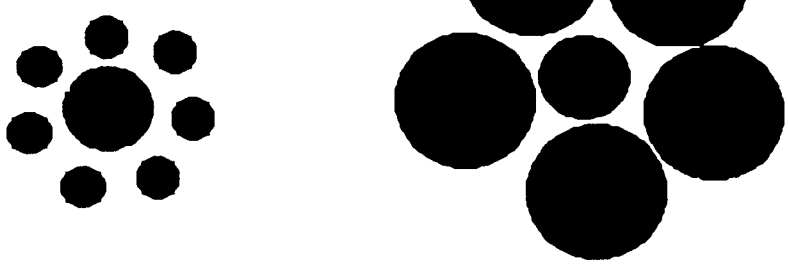
3. Which line appears longest?
   What are the lengths?
   AB =
   BC =



4. Which circle is larger?



5. Which center circle is largest?



Name _____

THE SCIENTIFIC METHOD
Experiment Write Up Form

PURPOSE OR PROBLEM:

HYPOTHESIS:

MATERIALS:

PROCEDURE:

OBSERVATIONS:

CONCLUSION:

Name _____

THE SCIENTIFIC METHOD
Ice Cube Survival Test

PURPOSE: To develop a strategy to keep an ice cube in its solid state for as long as possible.

MATERIALS: ice cube
styrofoam cup
Students may select whatever materials they would like to keep the ice cube solid. No refrigerators, cold packs, or products designed to keep things cold allowed.

PROCEDURE:

1. Everyone will be given an ice cube of the same size.
2. Students will time how long their ice cube will stay solid.

OBSERVATIONS: Check the ice cube periodically to observe and record results.

1. Starting Time:
2. Time Cube Disappeared:

Total Lasting Time For Ice Cube:

CONCLUSION: Did your strategy for keeping the ice cube in its solid state work?

Why or why not?

Name _____

THE SCIENTIFIC METHOD
Operation Egg Drop

PURPOSE: To design a container no larger than a shoebox to protect a raw egg from a fall of 50 to 60 feet onto a hard surface such as cement. Anything may be used inside the container to protect the egg. The egg may not be altered in any way. No glue or tape should touch the egg shell.

MATERIALS:
raw egg
container no larger than a shoebox (doesn't have to be a shoebox)
materials to protect the egg
masking tape to tape outside of container

PROCEDURE:
1. You will write up your egg drop containers as an experiment so remember the steps you go through when assembling your design.
2. Think about the forces that will act upon the egg and container.
3. Brainstorm some ideas for materials that may help to cushion the egg.
4 Collect the materials you wish to experiment with and build the container.
5. When the container is finished, take it to school for the official egg drop.
6. Someone will take the egg drop containers to the roof of the school where they are dropped off, one at a time.
7. When your egg drop is dropped, record observations below.

OBSERVATIONS: Record what happens to your egg drop. From how high was it dropped? How does it land? Does it bounce? What kind of sound does the container make when it hits? Are there any signs of damage to the container's outside?

CONCLUSION: Open the container carefully. Record and observe any changes inside the container.

Did your container protect the egg?

Name _____

SCIENTIFIC MEASUREMENT
The Metric System

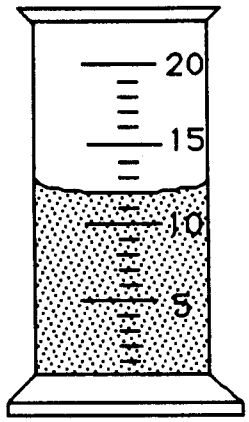
Milli	Centi	Deci	Base Unit	Deka	Hecto	Kilo
1 milli-meter equals _____m	1 _____ equals 0.01 m	1 deci-meter equals _____m	Length **Meter**	1 deka-meter equals _____m	1 _____ equals 100 m	1 _____ equals 1000 m
1 _____ equals 0.001 L	1 centi-liter equals _____ L	1 _____ equals 0.1 L	Volume **Liter**	1 _____ equals 10 L	1 hectoliter equals _____L	1 kiloliter equals _____L
1 milli-gram equals _____g	1 _____ equals 0.01g	1 decigram equals _____g	Mass **Gram**	1 _____ equals 10 g	1 hecto-gram equals _____g	1 _____ equals 1000 g

To convert from bigger to smaller units, move the decimal one place to the right for every step across the chart. To convert from smaller units, move decimal to the left one place for every step. Add zeroes as needed.

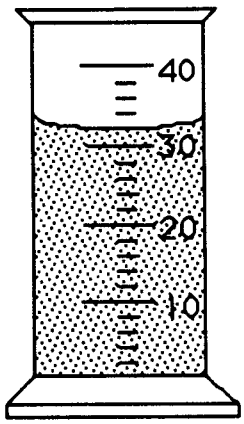
Name _____

SCIENTIFIC MEASUREMENT
Reading Graduated Cylinders and Measuring Line Segments

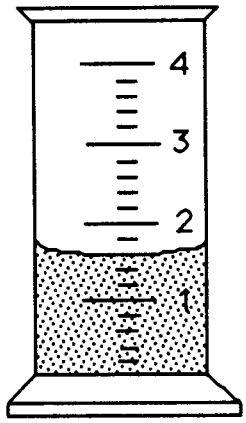
Read the meniscus line on these graduates.



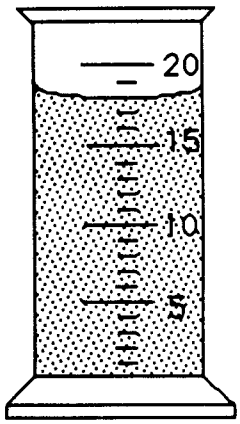
1. _____ ml



2. _____ ml

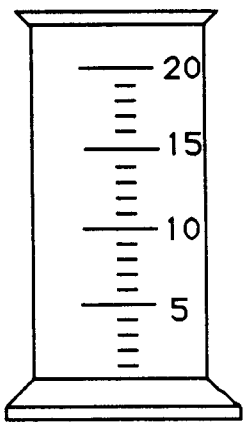


3. _____ ml

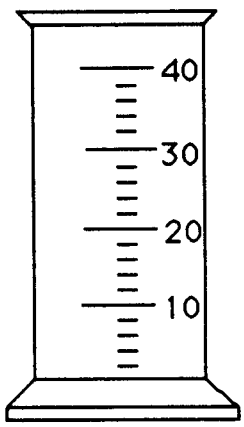


4. _____ ml

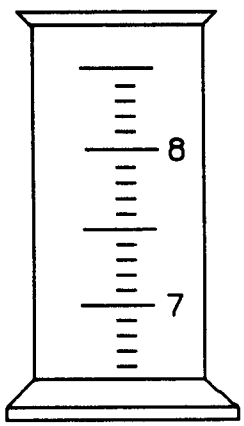
Draw a meniscus for each of the following graduates.



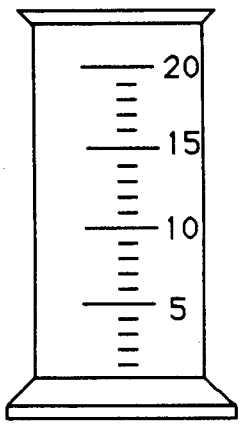
5. 14 ml



6. 22 ml



7. 7.6 ml



8. 12.5 ml

Measure the following line segments in centimeters.

9. _____

10. _____

11. _____

12. _____

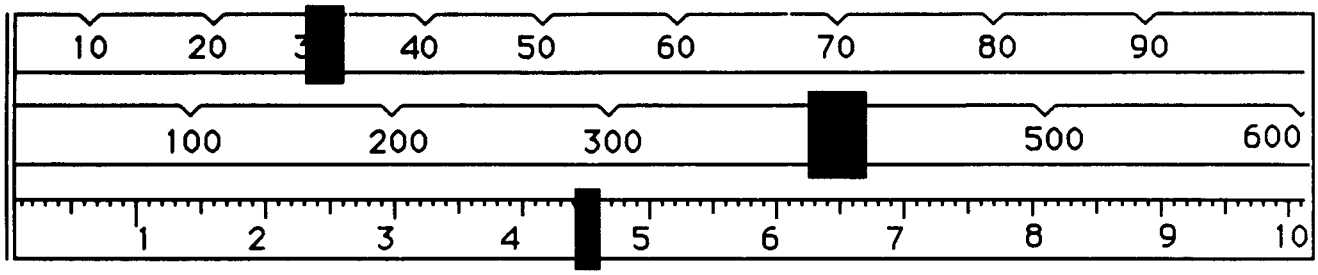
13. _____

Name _____

SCIENTIFIC MEASUREMENT
Using The Triple Beam Balance

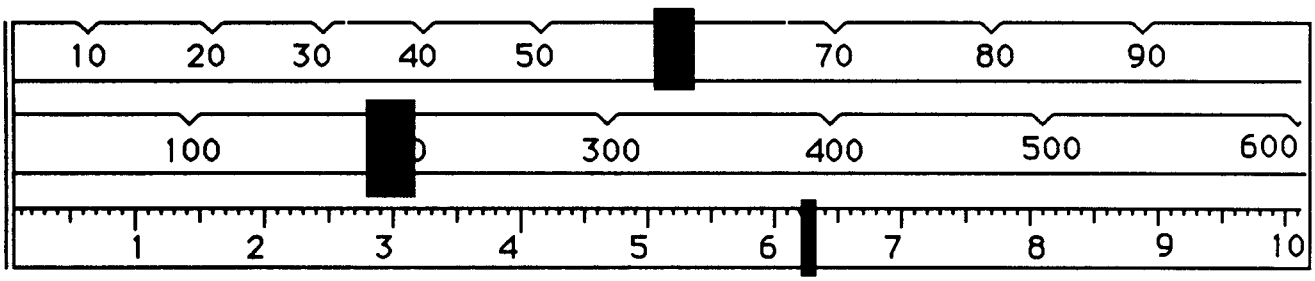
Read the triple beam balances and record the mass in grams.

1.



1. _____ grams

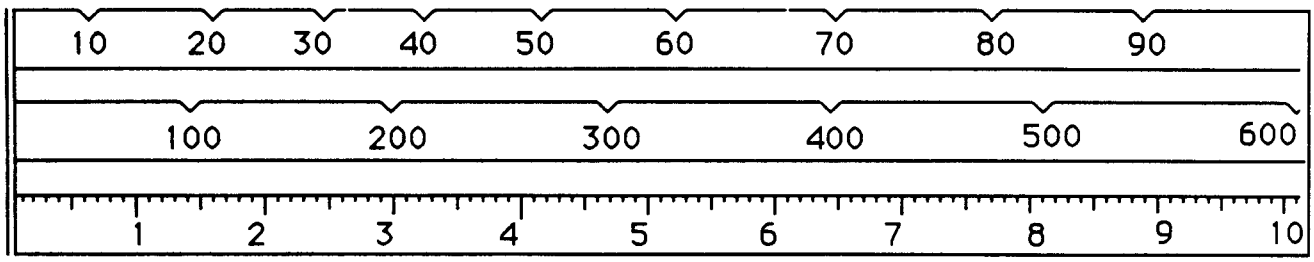
2.



2. _____ grams

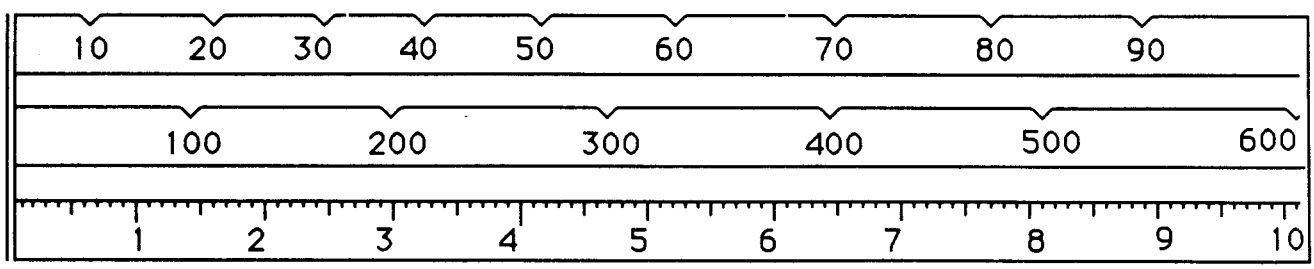
Make marks on the following triple beam balances to show the grams indicated.

3.



3. 451.7 grams

4.

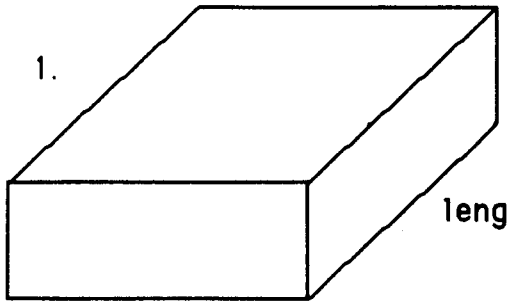


4. 589.3 grams

Name _____

SCIENTIFIC MEASUREMENT
Measuring In The Metric System

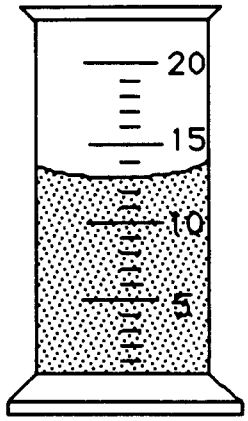
1.



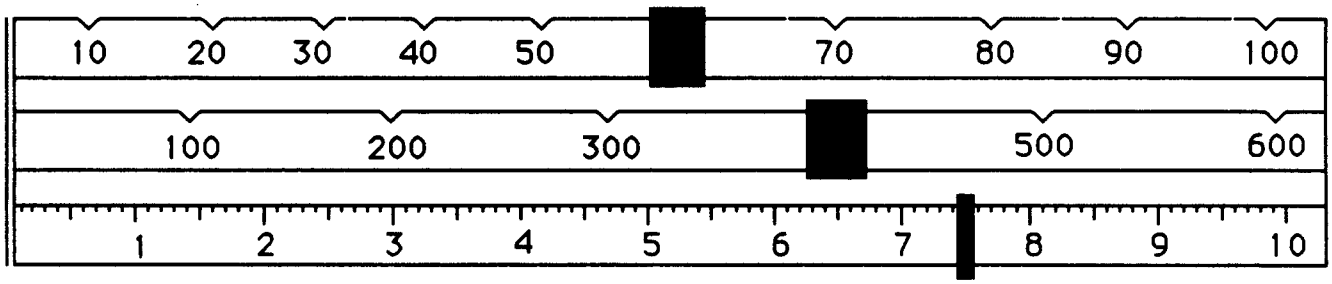
height =

length =

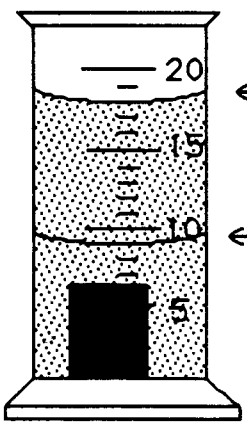
width =



2. _____ ml



3. _____ grams



← volume of water and metal

← volume of water alone

4. What is the volume of the metal?

5. Measure the lengths of these lines.

a.) _____

b.) _____

c.) _____

d.) _____

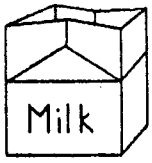
Name _____

SCIENTIFIC MEASUREMENT
Finding the Density Of Water

PURPOSE: To calculate the density of water.

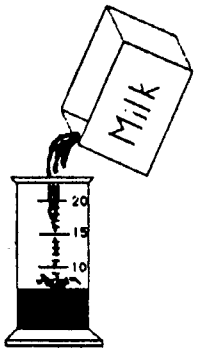
MATERIALS:
half-pint milk carton
scissors
metric ruler
graduated cylinder
water
balance

PROCEDURE:



1. You will only need the base of the milk carton. Open up the top and use the scissors to cut off the top.
2. Find the mass of the empty carton.
3. Fill the milk carton to the very top with water and then mass again.
4. Find the mass of the water alone by subtracting the mass of the empty carton from the combined mass of carton and water.
5. Pour the water from the carton into the graduated cylinder to find the volume of the water. (Remember 1 ml equals 1 cubic centimeter)
6. Verify the volume of the water by calculating the volume of the milk carton. Measure the length, width, and height and find volume with the formula: V = l x w x h.
7. To find the density of the water, divide the mass of the water by its volume. (Remember density equals mass divided by volume)

OBSERVATIONS:



Mass of carton _____ grams

Mass of carton and water _____ grams

Mass of water _____ grams

Volume of water _____ cm3

Density of water _____ g/mL

CONCLUSION: What is the density of water?
The metric system is set up so that one milliliter of water is equal to a volume of one cubic centimeter and has a mass of one gram. How is this useful?

Name _____

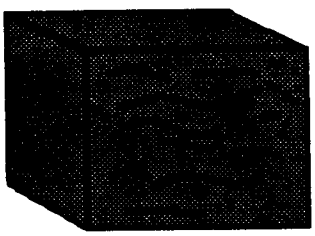
SCIENTIFIC MEASUREMENT
Finding the Density Of Wood

PURPOSE: To calculate the density of wood.

MATERIALS:
regular shaped piece of wood (about 2 inches square)
metric ruler
balance

PROCEDURE:
1. Measure the length, width, and height of the block of wood.
2. Find the volume of the wood. (V = l x w x h)
3. Find the mass of the block of wood.
4. Calculate the density of the wood. (D = M / V)

OBSERVATIONS:



Mass of wood _____ grams

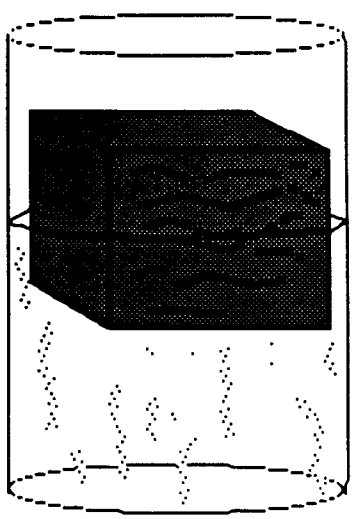
Volume of wood _____ cm3

Density of wood _____ g/mL

CONCLUSION: What is the density of water?

What is the density of wood?

How can you explain why wood floats?



Name _____

SCIENTIFIC MEASUREMENT
Finding the Density Of A Rock

PURPOSE: To calculate the density of a rock.

MATERIALS:
irregular shaped rock
graduated cylinder
balance

PROCEDURE:
1. Find the mass of the rock.
2. Put about 20 ml of water in the graduated cylinder and then drop the rock in.
3. Find the volume of the rock by water displacement. How much did the water go up after the rock was dropped in?
4. Calculate the density of the rock. (D = M / V)

OBSERVATIONS:

Mass of rock _____ grams

Volume of rock _____ cm3

Density of rock _____ g/mL

CONCLUSION: What is the density of the rock?

How does that compare to the density of water?

Why do rocks sink in water?