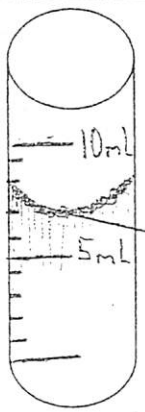
Scientific Inquiry Study Guide

1. Read over Lab Safety Rules In your ISN
2. Complete the Chart:

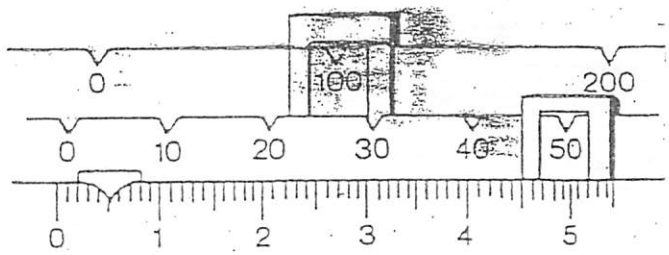
	Base Unit	Tool
Liquid	Liter (L)	graduated cylinder
Mass	gram (g)	Triple-beam balance
Length	meter (m)	meter stick
Temperature	celsius (°C)	thermometer
Time	seconds (s)	stopwatch

3.



What is the volume? 7 mL

What is this "area" called? Meniscus



The mass above = 150.5g

SCENARIO #1 - Maggie's Plant Experiment

In this exercise you will read the following scenario and identify the parts of the scientific method in it.

Maggie read that some plants grow better if the soil is acidic. She can't believe that a plant can grow when exposed to acid. Maggie decides to test if the plants she has will grow better when acid is added to the soil. She puts potting soil in two planting containers and transplants two of her geraniums that seem about the same size into the pots. She puts the pots in the same location so that they both get the same sunlight each day, are at the same temperature and she makes sure they get the same amount of water. However, Maggie puts a tablespoon of vinegar in the water she gives to one of the plants. She measures the growth of the plants every week for five weeks and records the results in a data table below:

Week	Height of Plants in Container with Vinegar (cm)	Height of Plants in Container without Vinegar (cm)
1	10.0	10.0
2	12.4	11.5
3	14.8	13.0
4	18.0	15.7
5	21.4	17.8

1. Hypothesis: If the soil is acidic, then the plants will not grow.
2. Dependent Variable: plant growth (height)
3. Independent Variable: acid / no acid (vinegar)
4. Constants: same plants, amount of water, soil, sunlight, location
5. Control Group: plants without vinegar
6. Experimental Group: plants with vinegar

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9. Identify the best Unit of length for each of the following:

Goldfish cm Football Field m Ant mm Shoe Size cm

Train m Distance to California Km Height of a Basketball Goal m

10. Identify the best unit of Mass for each of the following:

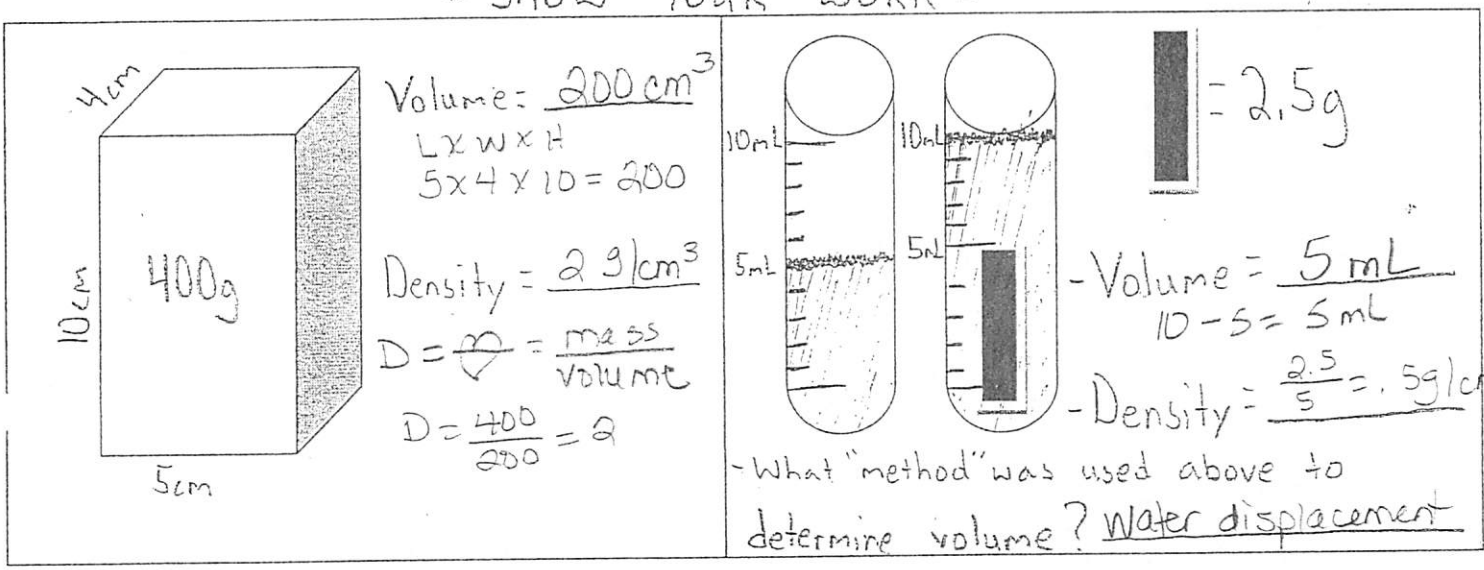
Stapler g Grain of Sand mg A Truck Kg Muffin g

Bag of Apples Kg My Weight Kg Tube of Toothpaste g

11. Complete the Chart:

	Explanation	Base Unit	Tool(s)
Mass	the amount of matter in an object	g	Triple-beam balance
Liquid Volume	the amount of space an object occupies	L / cm^3	graduated / metric ruler
Density	the amount of matter COMPACTED in an object	g/cm^3	graduated cylinder and triple beam balance

12. Answer Each of the Following: * SHOW YOUR WORK *



Volume: 200 cm^3

L x W x H

5 x 4 x 10 = 200

Density = 2 g/cm^3

D = $\frac{m}{v}$ = $\frac{\text{mass}}{\text{volume}}$

D = $\frac{400}{200}$ = 2

- Volume = 5 mL

10 − 5 = 5 mL

- Density = $\frac{2.5}{5}$ = .5 g/cm^3

- What "method" was used above to determine volume? Water displacement

13. Does the brand of tires on a car affect its top speed?
    a. Independent: Brand of tire
    b. Dependent: Speed
    c. Controls: car, track, driver, environment

14. If the NBA used a 12 ft. goal, would it affect the average score of a game?
    a. Independent: 12 ft goal
    b. Dependent: average score
    c. Controls: players, shot selection, basketball, # of shots

15. Does the mass of a football affect the distance it can be kicked?
    a. Independent: mass of football
    b. Dependent: distance it is kicked
    c. Controls: ball, kicker, environment, wind speed / direction

16. Within a classroom setting, subjects were asked to listen to a guest instructor. All subjects were given a description of the instructor. Some subjects read a description containing the phrase "People who know him consider him to be a rather cold person...", while other people read a description where the word "warm" was substituted for the word cold (otherwise, the descriptions were identical). After the lecture, subjects were asked to rate the instructor. Subjects who were told the instructor was warm gave him more favorable ratings compared to subjects who were told that the instructor was cold.
    a. Independent: description of instructor
    b. Dependent: instructor rating
    c. Controls: instructor, speech, rating scale, location