Name(s):
Core:
Date:

Why does Popcorn pop?

Directions: Please follow the Scientific Method procedures we learned to work through today's lab.

1. Question: Why does Popcorn pop?
2. Hypothesis: (I believe… because)

   Prediction:
   -How long will it take to completely pop all the kernels?

   -Whose will pop our popcorn faster Jiffy Pop or teacher's popper?

3. Procedure: We will be racing to see which gender, boys or girls, or teacher's secret method, will pop their Popcorn the fastest. Students will be placing the Jiffy Pop over a hot plate and teacher will be using a different method. How long will it take to complete this process? Use the classroom clock to time the popping.

4. Results: Please place your results in the data table below

	Students BOYS	**Student GIRLS**	**TEACHER**
Time			

5. Analysis: While we are waiting and before we eat, answer the following questions.

- How is Conduction being demonstrated through this lab?

- How is Convection being demonstrated through this lab?

- How is Radiation being demonstrated through this lab?

- What is the insulator in this lab?

- What acts as the conductor in this lab?

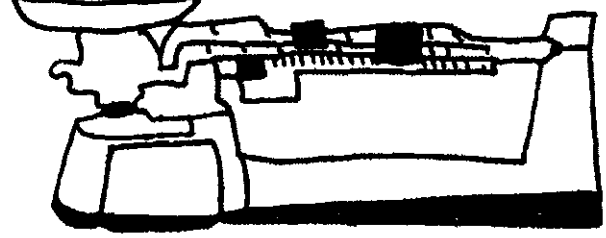
- What expands during this lab?

6. Conclusion: Summarize this lab in 3 or more sentences.

7. Further Questions: Draw and label a picture using the vocabulary words in the questions to demonstrate what is occurring in this lab.

MASS

the amount of **matter** in an object



MATTER any substance that has mass and occupies space

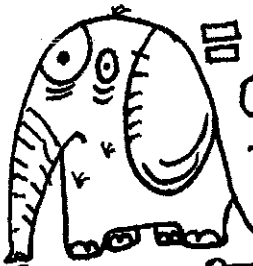
GRAMS (g) — Metric units of MEASURE

KILOGRAMS (Kg)

Hmm...

A PAPERCLIP IS ABOUT ONE GRAM

A PINEAPPLE IS ABOUT ONE KILOGRAM WOW!



The mass of one elephant is that of approximately three cars.

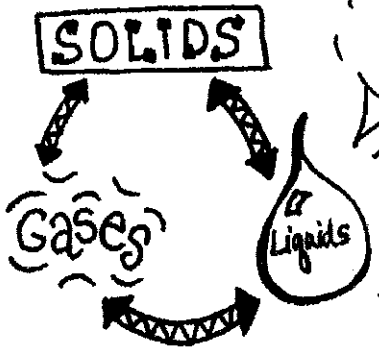
1 KG = 1,000 GRAMS

1 KG = 2.205 POUNDS

CONSERVATION OF MASS

Matter is not created or destroyed

It can only be transferred from one state to the next.



Mass vs. Weight

- matter inside
- stays the same in space

- force of gravity
- changes in space

same mass → Less gravity = Less weight

*Gravity the force of attraction BETWEEN TWO Masses

HOW DOES MASS RELATE TO FORCE AND ACCELERATION?

Practice Questions

Mass Practice

Use your MASS sketch notes to help you answer these practice questions. Write your answers to the right of each question.

1. What is the definition of mass?
2. What is the tool used to measure mass?
3. What is the metric unit of measure used for mass?
4. What is the approximate mass of a pineapple?
5. What is the approximate mass of a paperclip?
6. How many grams are in a kilogram?
7. If you traveled to the moon would your weight change? Explain.
8. What is the law of conservation of mass?

Trim between each strip.
Glue into the margin of a notebook.

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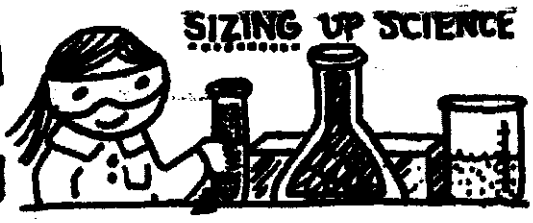
VOLUME

SIZING UP SCIENCE



the amount of space an object takes up

3D

100mL

$1cm^3$ is 1/100 the size of a HOCKEY PUCK

CUBIC

Standard metric unit of measure

1 Liter = 1000mL = $1,000cm^3$ or cc

CENTIMETER

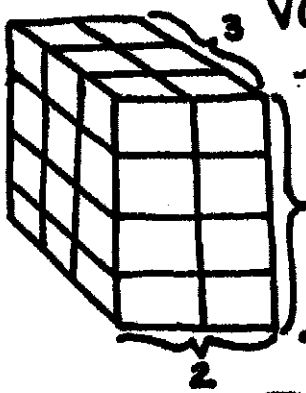
The method for finding volume depends on the SHAPE!

liters or milliliters

REGULAR SOLID

meters^3 or centimeters^3

LIQUID



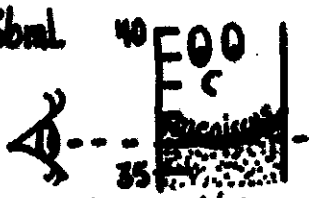
Volume = length × width × height

$V = l \times w \times h$

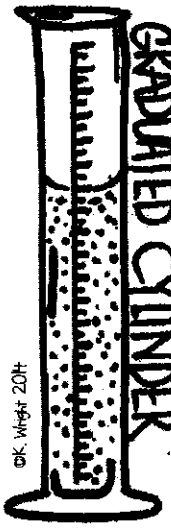
$3cm \times 2cm \times 4cm$

$V = 24cm^3$

1mL equals $1cm^3$



read from the bottom of the curve!



GRADUATED CYLINDER

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Other Formulas (plus many more)

$V = \frac{4}{3}\pi r^3$ SPHERE

$V = \pi r^2 h$ CYLINDER

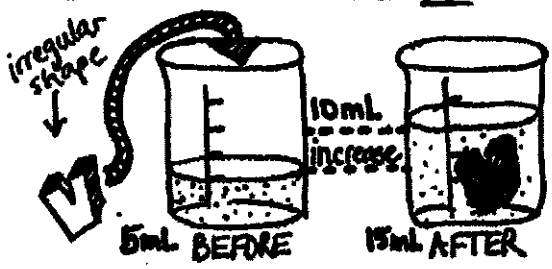
$V = \frac{1}{3}\pi r^2 h$ CONE

FIXED VOLUME?

- ☑ Solid
- ☑ Liquid
- ☐ Gas

PRESSURE AND TEMPERATURE IMPACT GAS VOLUME!!!!!

IRREGULAR SOLID

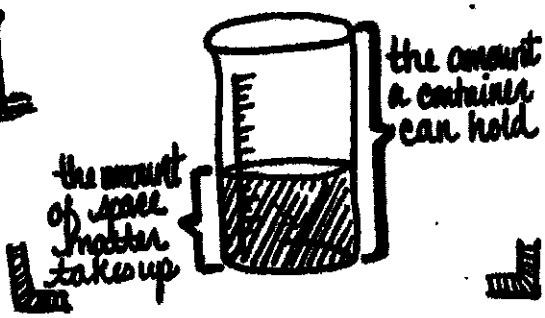


DISPLACEMENT

EUREKA!

ANCIENT GREECE

VOLUME VS. CAPACITY



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DENSITY

the amount of matter in a given space

* the ratio of mass to volume

Love is... M/V

population density

USA

Greatest # of people per square mile

How Tightly PACKED an objects ATOMS are!

Density = mass / volume

DIVIDED BY

Equals

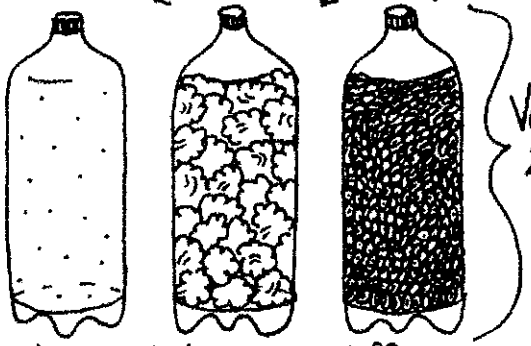
Relates to...

PING PONG D = 0.084 g/cm³

GOLF D = 1.15 g/cm³

Water 1 g/cm³

Floating or Sinking



more tightly packed

DENSITY INCREASES

LOW DENSITY

HIGH DENSITY

Same size different mass

LOW DENSITY

HIGH DENSITY

Same mass different volume

An object will float in a fluid if its average DENSITY is less than the density of the fluid!

Things that make you go hmm...

Aluminum 2.7g / 1cm³

D = m ÷ V

D = 2.7g ÷ 1cm³

D = 2.7g/cm³

Silver 10.5g / 1cm³

D = m ÷ V

D = 10.5g ÷ 1cm³

D = 10.5g/cm³

D = m/V

OR

M = D × V

OR

V = m/D

Most Dense ---- Least Dense

Oil

Water

Milk

Corn Syrup

Honey

ICE FLOATS IN WATER

0.92 g/cm³

92% under water

1 g/cm³

Water expands when frozen

Water is more dense than ICE

GOOD BAD UGLY

Bad to the BONE

Density

Earth's Density

Crust 2.2-2.9 g/cm³

Upper Mantle 3.4-4.4 g/cm³

Mantle 4.5-5.6 g/cm³

Outer Core 9.9-12.2 g/cm³

Inner Core 12.8-13.1 g/cm³

3.34 g/cm³ MOON'S DENSITY

0.69 g/cm³ SATURN'S DENSITY

Hmm... So would Saturn float in Water?

HOT AIR

COOLER AIR

WHAT

Hot air is LESS dense than cold ai

I ♥ SCIENCE

Practice Questions

Density Practice

Use your DENSITY sketch notes to help you answer these practice questions. Write your answers to the right of each question.

1. What is the definition of density?
2. What formula is used to calculate density?
3. How does density relate to floating?
4. What is the density of water compared to ice?
5. Which has a greater density Water or milk?
6. How to hot air balloons relate to density?
7. Which layer of Earth's crust has a density closest to 5 g/ cm^3?
8. What is the density of an object with a mass of 12 grams and a volume of 6 cm^3? Would this object float in water?

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THINKING ABOUT DENSITY?? AN ACTIVITY FOR FUN M. PARFITT

DENSITY is a physical property of matter, as each element and compound has a unique density associated with it. Density is defined in a qualitative manner as the measure of the relative "heaviness" of objects with a constant volume. As far back in time as can be imagined, people have used density to help them identify the "fake" from the "real". How does the density of certain materials differ and how is density measured?

DENSITY = mass/volume

1. **Find the mass of an object by using a triple beam balance or a scale.**
2. **Find the volume of the same object using a graduated cylinder and a method called displacement or by a measurement (cubic centimeters, feet, inches).**
3. **Divide**
4. **Your answer will be expressed using two units like: grams/milliliter or grams/cm^3**

WHAT DID YOU DISCOVER??? READ MORE BELOW

Densities of materials

metal	g/cm^3	lb/in^3	lb/ft^3	lb/gal
water	1.00	0.036	62	8.35
aluminum	2.70	0.098	169	22.53
zinc	7.13	0.258	445	59.50
iron	7.87	0.284	491	65.68
copper	8.96	0.324	559	74.78
silver	10.49	0.379	655	87.54
lead	11.36	0.410	709	94.80
mercury	13.55	0.490	846	113.08
gold	19.32	0.698	1206	161.23

The lb/gal column is used for comparison to a gallon of milk, which weights about 8.4 lb (it's mostly water). If that milk were changed to aluminum, it would weigh about 22.5 lb. If it were changed to gold, it would weigh about 161 lb (19 gallons of water)! Did you notice that copper is heavier than iron? A cubic foot of iron is 491 lb. A cubic foot of copper is 559 lb. Silver is even heavier than copper, at 655 lb for a cubic foot. Gold is really heavy at 1206 lb for a cubic foot. When you see a movie of thieves carrying bars of gold, you know they are faking it!