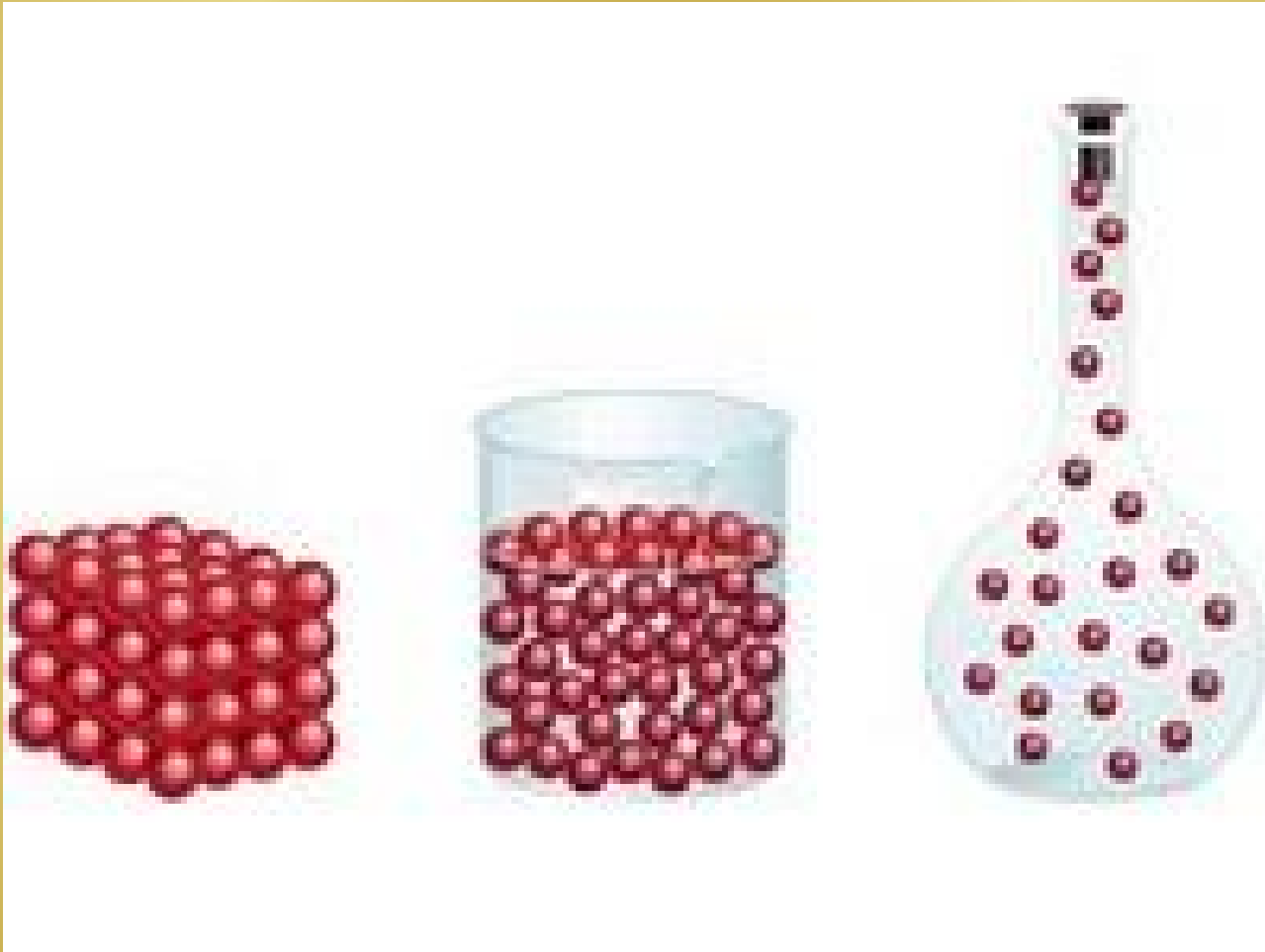


Mass, Volume, & Density



Mass

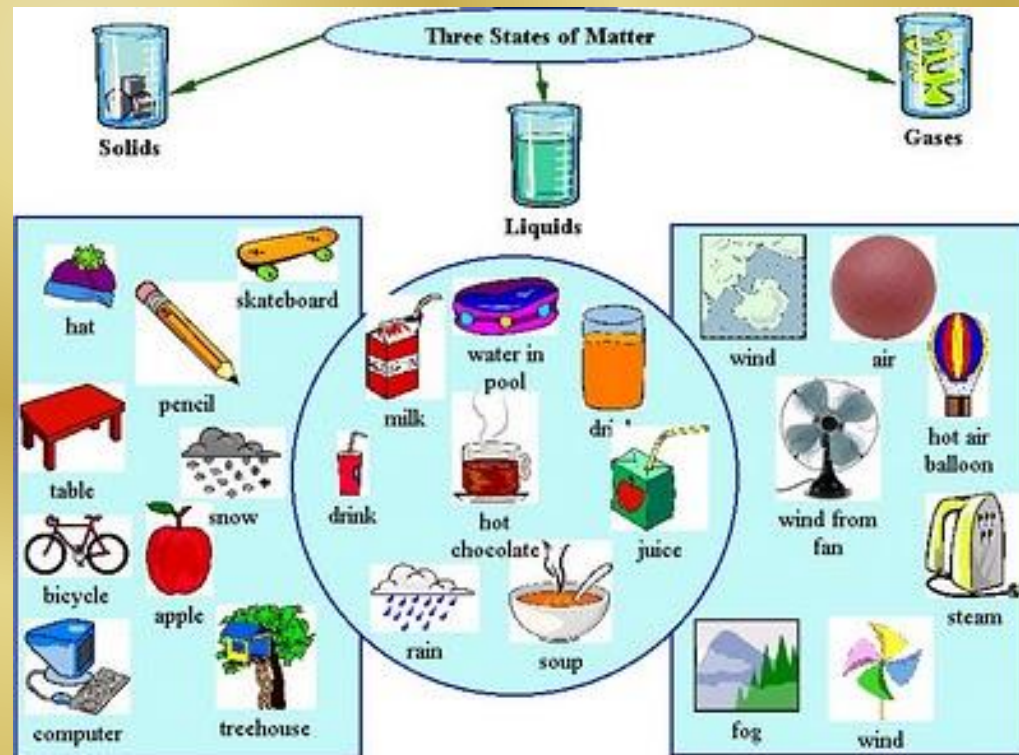
Measurement of the amount of matter
(or stuff) in an object
– Measured in grams (g)

There are 3 states
of matter:

Solid

Liquid

Gas



Volume

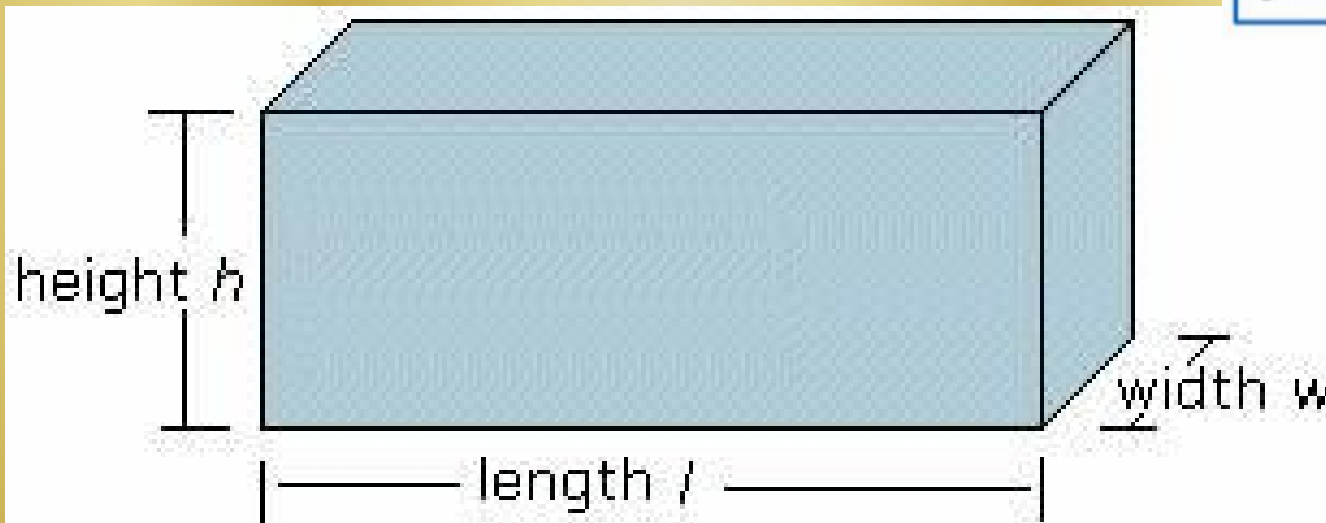
Measurement of the amount of space an object takes up

- Measured in milliliters (ml) or cm^3

$$V = L \times W \times H$$

or

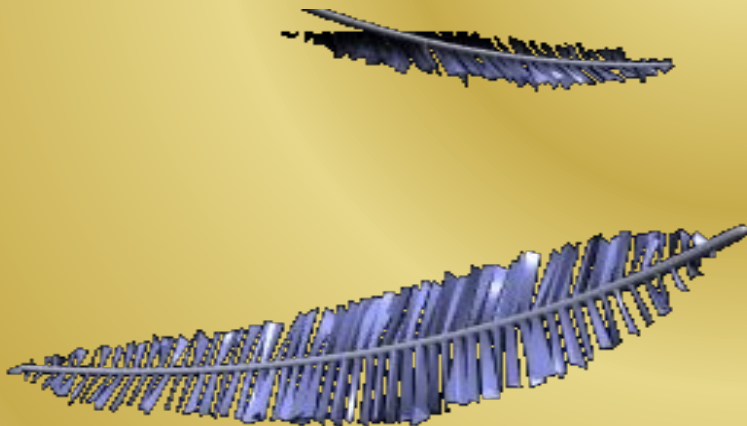
$$V = LWH$$



Which do you think would have the greater volume? The greater mass?

Why?

1 kg of feathers



1 kg of rocks

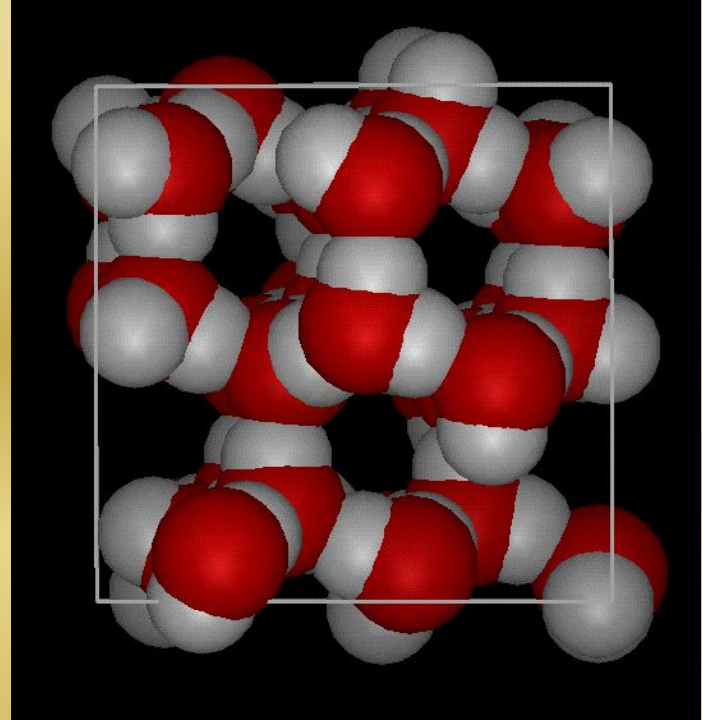
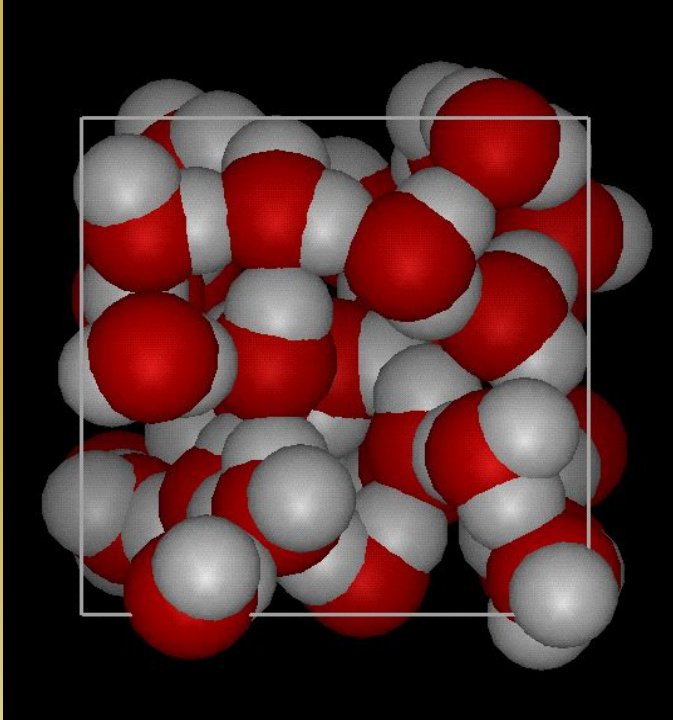


Density

Density is defined as mass per unit volume.

It is a measure of how tightly packed and how heavy the molecules are in an object.

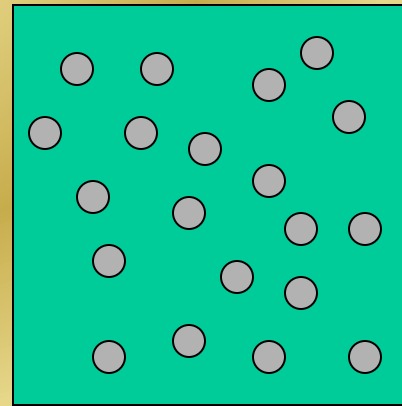
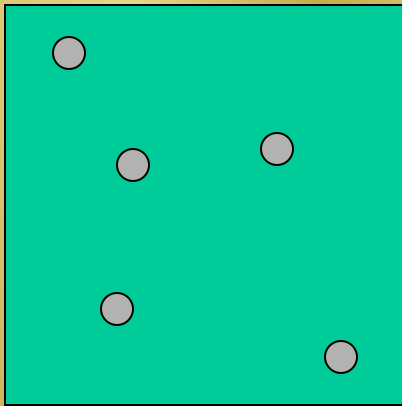
Density is the amount of matter within a certain volume.



Which one is more dense?

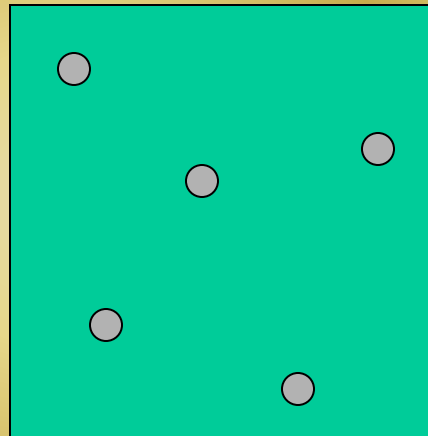
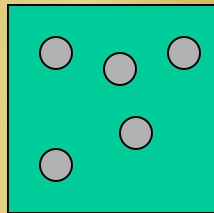
Demonstration: People in a square

How about this: Which square is more dense?



Which one is more dense?

Now which one is more dense?

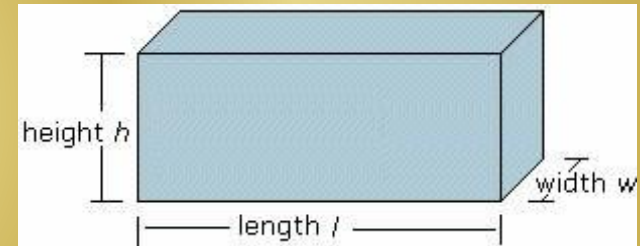


To find the density

1- Find the mass of the object



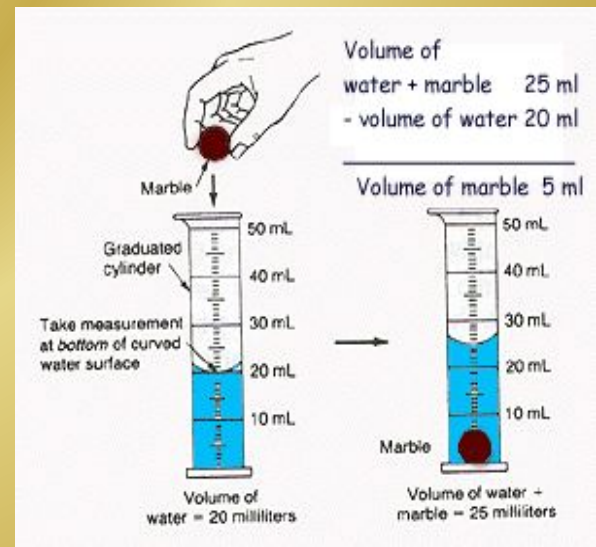
2- Find the volume of the object



3- Divide

$$\text{Density} = \frac{\text{Mass g}}{\text{Volume } \text{c}^3}$$

**ALWAYS
REMEMBER
UNITS!**



- To find density:**
- 1) Find the mass of the object**
 - 2) Find the volume of the object**
 - 3) Divide : Density = Mass \div Volume**

Ex. If the mass of an object is 35 grams and it takes up 7 cm³ of space, calculate the density.



- To find density:**
- 1) Find the mass of the object**
 - 2) Find the volume of the object**
 - 3) Divide : Density = Mass ÷ Volume**

Ex. If the mass of an object is 35 grams and it takes up 7 cm³ of space, calculate the density

Set up your density problems like this:



Given: Mass = 35 grams

Volume = 7 cm³

Formula: D = M / V

Unknown: Density (g/ cm³)

Solution: D = 35g/7 cm³

D = 5 g/cm³

Let's try some density problems together

Work on these problems with your neighbor

1. Frank has a paper clip. It has a mass of 9g and a volume of 3cm^3 . What is its density?
2. Frank also has an eraser. It has a mass of 3g, and a volume of 1cm^3 . What is its density?
3. Jack has a rock. The rock has a mass of 6g and a volume of 3cm^3 . What is the density of the rock?
4. Jill has a gel pen. The gel pen has a mass of 8g and a volume of 2cm^3 . What is the density of the rock?



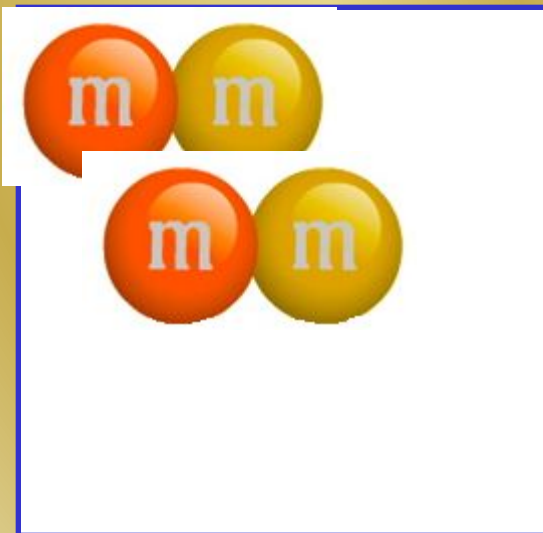
Ways to Affect Density

Change Mass AND Keep Volume Same

Increase the mass → increase density

Decrease the mass → decrease in density

Which container has more density?



B



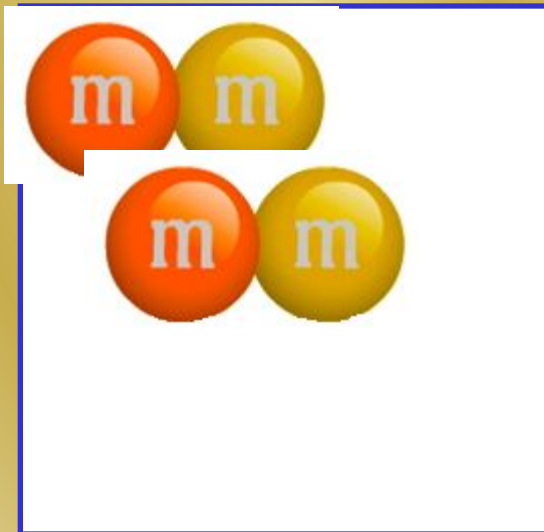
Ways to Affect Density

Change Volume AND Keep Mass Same

Increase the volume → decrease density

Decrease the volume → increase density

Which container has more density?

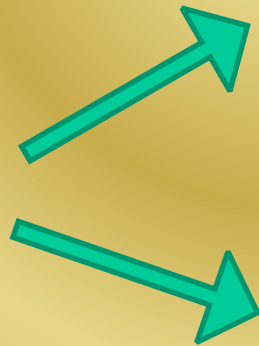
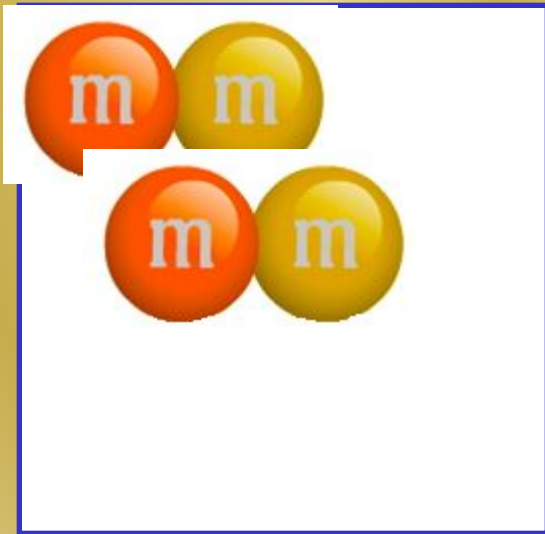


B

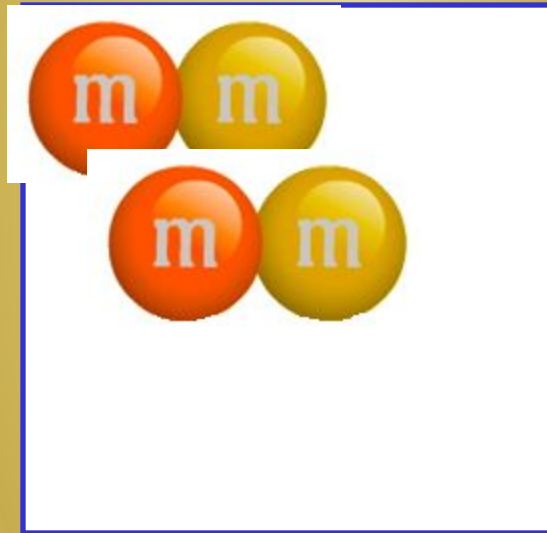


In your notebook illustrate the answer to the following question:

What 2 ways will INCREASE density?



What 2 ways will INCREASE density?



Keep the same mass AND decrease the volume



Keep the same volume AND increase the mass

Super Scientist

Question of the Day

- Jake has a book, a ruler, and a balance.
- **How can Jake find the density of the book with the tools he has?**



Review

What is the formula for density?

What happens if you pour together liquids that have different densities?

Will the liquid on the top have the highest or lowest density?

Will the liquid on the bottom have the highest or lowest density?