# PROPERTIES OF MATTER: DENSITY

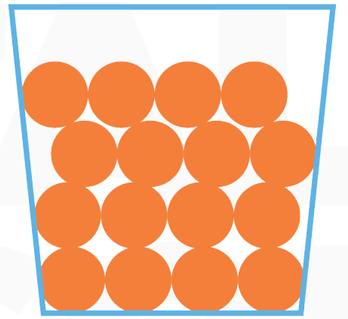
PROMISE

SANFORD RESEARCH

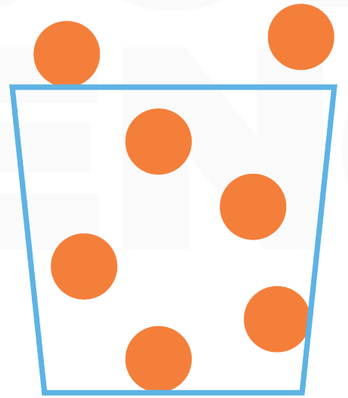
# WATCH THIS! WHAT DO YOU NOTICE?

# RECALL: WHAT IS MATTER?

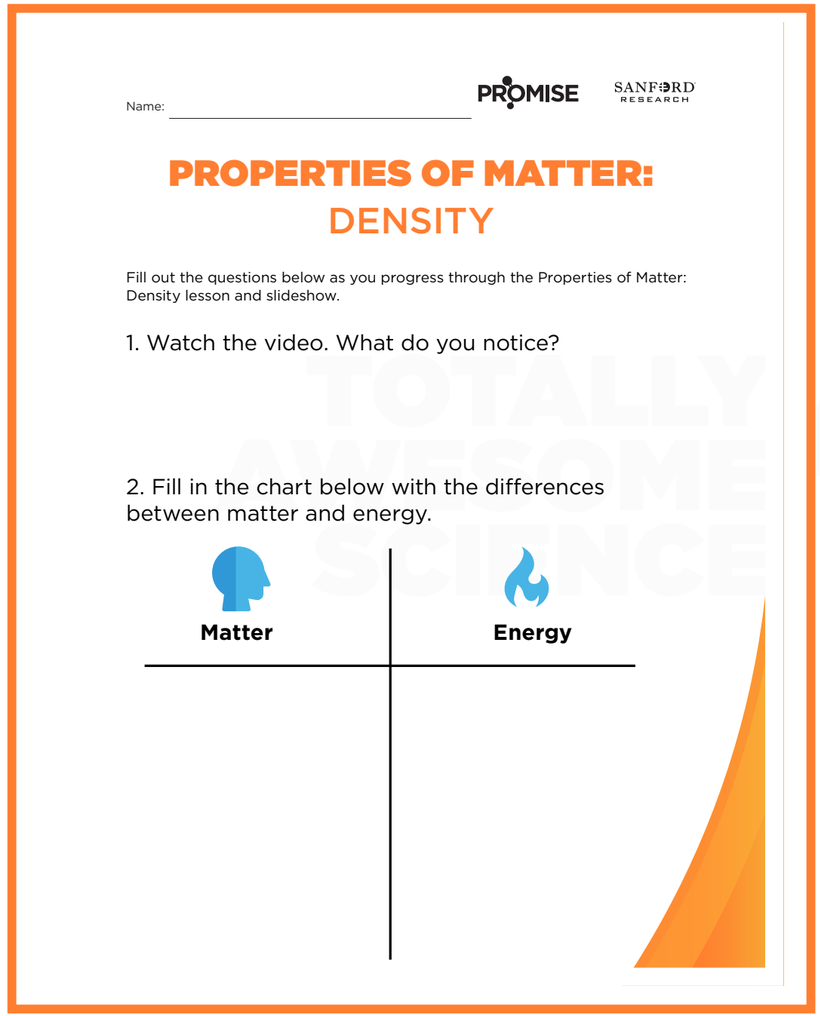
Matter is made of particles called atoms. Put atoms together to get something you can touch.



When the atoms are close together they are more solid. When atoms are far apart they are less solid.



# MATTER vs ENERGY



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PROMISE SANFORD RESEARCH

## PROPERTIES OF MATTER:
## DENSITY

Fill out the questions below as you progress through the Properties of Matter: Density lesson and slideshow.

1. Watch the video. What do you notice?

2. Fill in the chart below with the differences between matter and energy.

| Matter | Energy |
| --- | --- |
| | |

Discuss with a partner and fill in your lab notebook!

What is the different between matter and energy?

# MATTER vs ENERGY

Matter:
- Takes up space
- Has mass
- Physical substance

Energy:
- Felt as heat
- Movement
- Sound

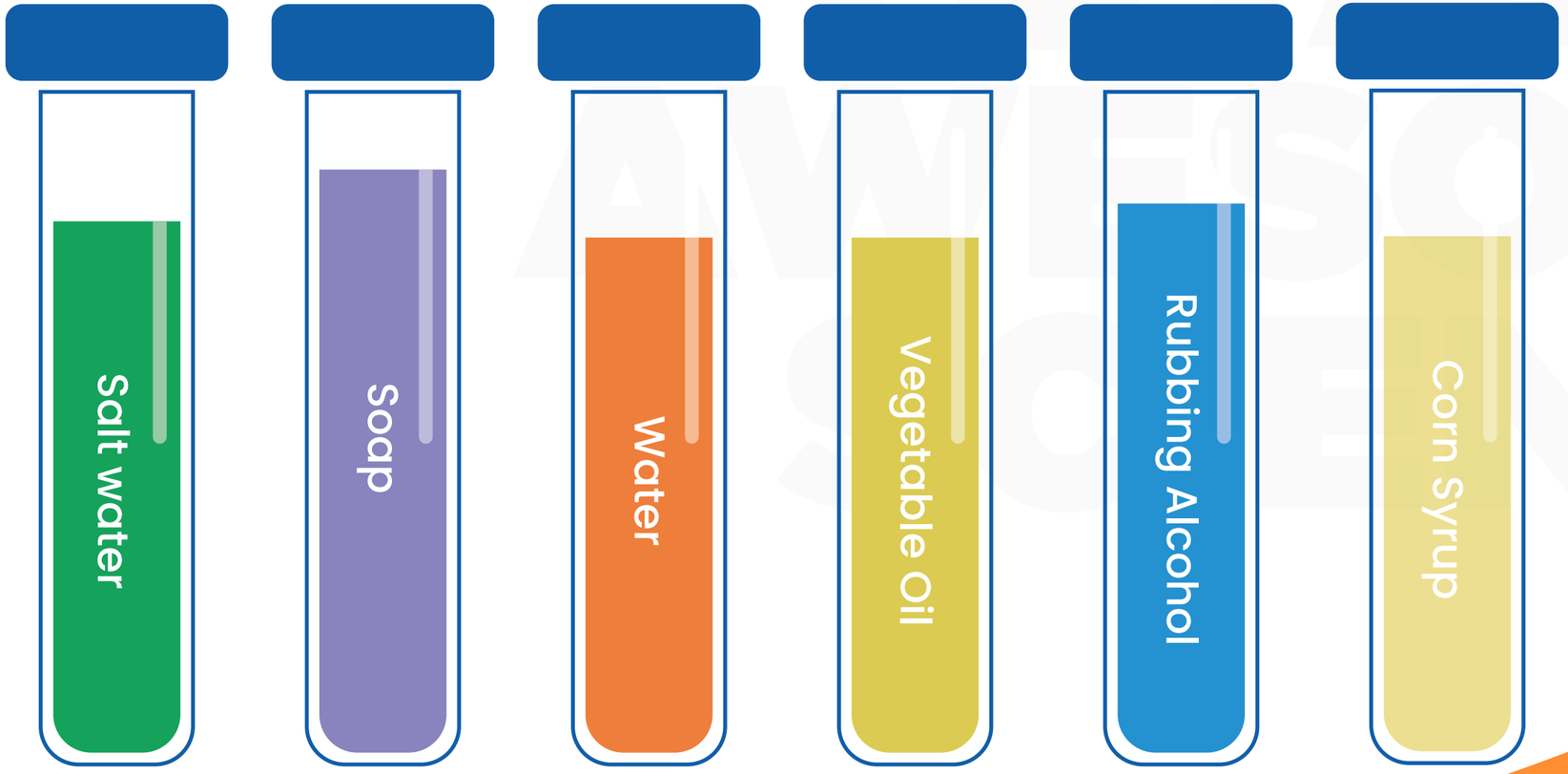
# WHAT IS DENSITY?

Density has to do with how close the atoms are inside the object.

Low density materials feel lighter and high density materials feel heavier.

# EXPERIMENT TIME!

Grab a graduated cylinder and the liquids listed below!



# EXPERIMENT TIME!

## EXPERIMENT TIME:

3. Hypothesize what will happen when you combine the six liquids.

I predict that _____

_____

4. Draw what your mixture looks like below.

You will layer the different liquids on top of each other.

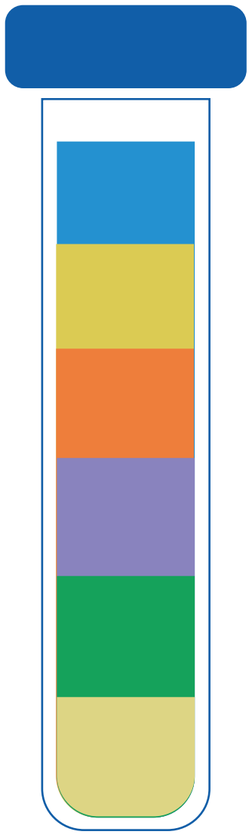
Grab your lab book and hypothesize what will happen!

# EXPERIMENT TIME!

Add 1 mL of liquid to your graduated cylinder in the following order:

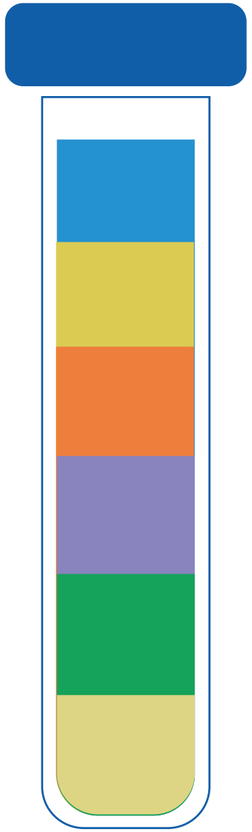
1. **Corn syrup**
2. **Salt water (mix well)**
3. **Dish soap**
4. **Water**
5. **Vegetable oil**
6. **Rubbing alcohol**

# EXPERIMENT TIME!



- Was your prediction correct?
- Were you surprised by anything?
- Did your liquids stack nicely or did they all mix together?
- Which liquid is the most dense?
- Which liquid is the least dense?

# EXPERIMENT TIME!



You made a density tower! You can use this to determine the density of solids.

Let’s see if three different objects sink or float when dropped in water and what happens when they are dropped in the density tower.

# EXPERIMENT TIME!

5. Check the boxes with “sink” or “float” based on your predictions. Then check the box after you test the results.

| | *Prediction* | | *Test It!* | |
|---|---|---|---|---|
| | Sink | Float | Sink | Float |
| **Object 1** | ☐ | ☐ | ☐ | ☐ |
| | Sink | Float | Sink | Float |
| **Object 2** | ☐ | ☐ | ☐ | ☐ |
| | Sink | Float | Sink | Float |
| **Object 3** | ☐ | ☐ | ☐ | ☐ |

6. Once you put the object in the density tower, it will land between two liquids. Can you describe the density?

**Object 1 is more dense than** _____
**but less dense than** _____

**Object 2 is more dense than** _____
**but less dense than** _____

**Object 3 is more dense than** _____
**but less dense than** _____

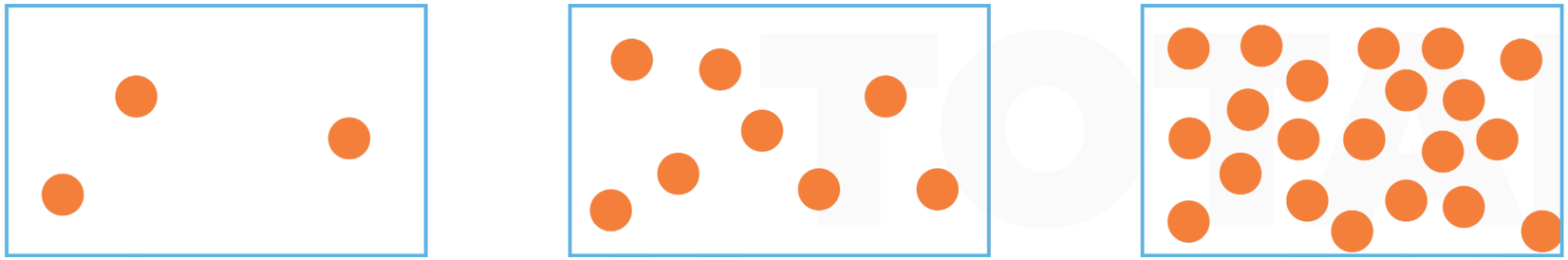
Grab your lab notebook and predict what will happen when you drop each object in water. Then record the results. Repeat in your density tower.

# SINK vs FLOAT

What determines if an object sinks or floats?

If an object is less dense than a liquid, it will float. If it is more dense, it will sink.

# SINK vs FLOAT

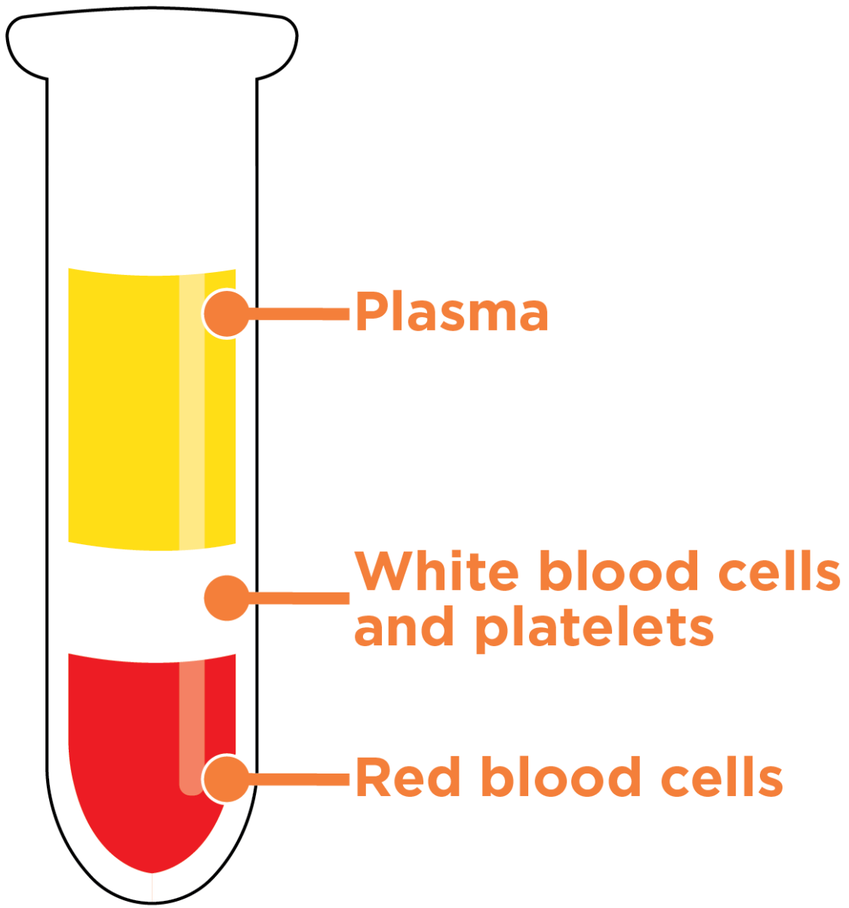


If we looked at the atoms in objects they would be spaced out differently.

Objects that are very dense have a lot of atoms packed tightly together.

# REWATCH THE VIDEO! CAN YOU DESCRIBE WHAT IS HAPPENING?

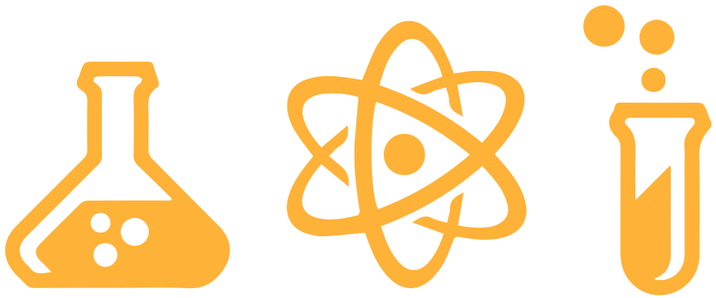
# DENSITY'S USE IN SCIENCE




Density is used to separate parts of a mixture, like blood.

When you have blood drawn, scientists spin it until it separates into 3 layers: plasma, white blood cells, and red blood cells.

# ANSWER THE REMAINING QUESTIONS IN YOUR LAB NOTEBOOK!



7. Rewatch the video from the beginning of the lesson. Can you describe what is happening? Can you describe it using the word “density?”



**Here’s what I did today!**

Today I visited the virtual Sanford Research PROMISE laboratory at Sanford Research. I learned that density can be used to describe matter. If something is very dense, it has many atoms packed closely together. I created a density tower out of different liquids and I saw that each liquid had a different density. I also learned that plastics are separated by density and that doctors can use density to separate different parts of our blood.