So, how dense is the surface of your desk?

Density - the amount of mass in a given volume


MASS
VOLUME
DENSITY

Density - the amount of mass in a given volume

So let's do this!

Go grab a bunch of small items. They don't have to be the same items, just a lot of little things that you can play with right now.

Possible items to go grab:

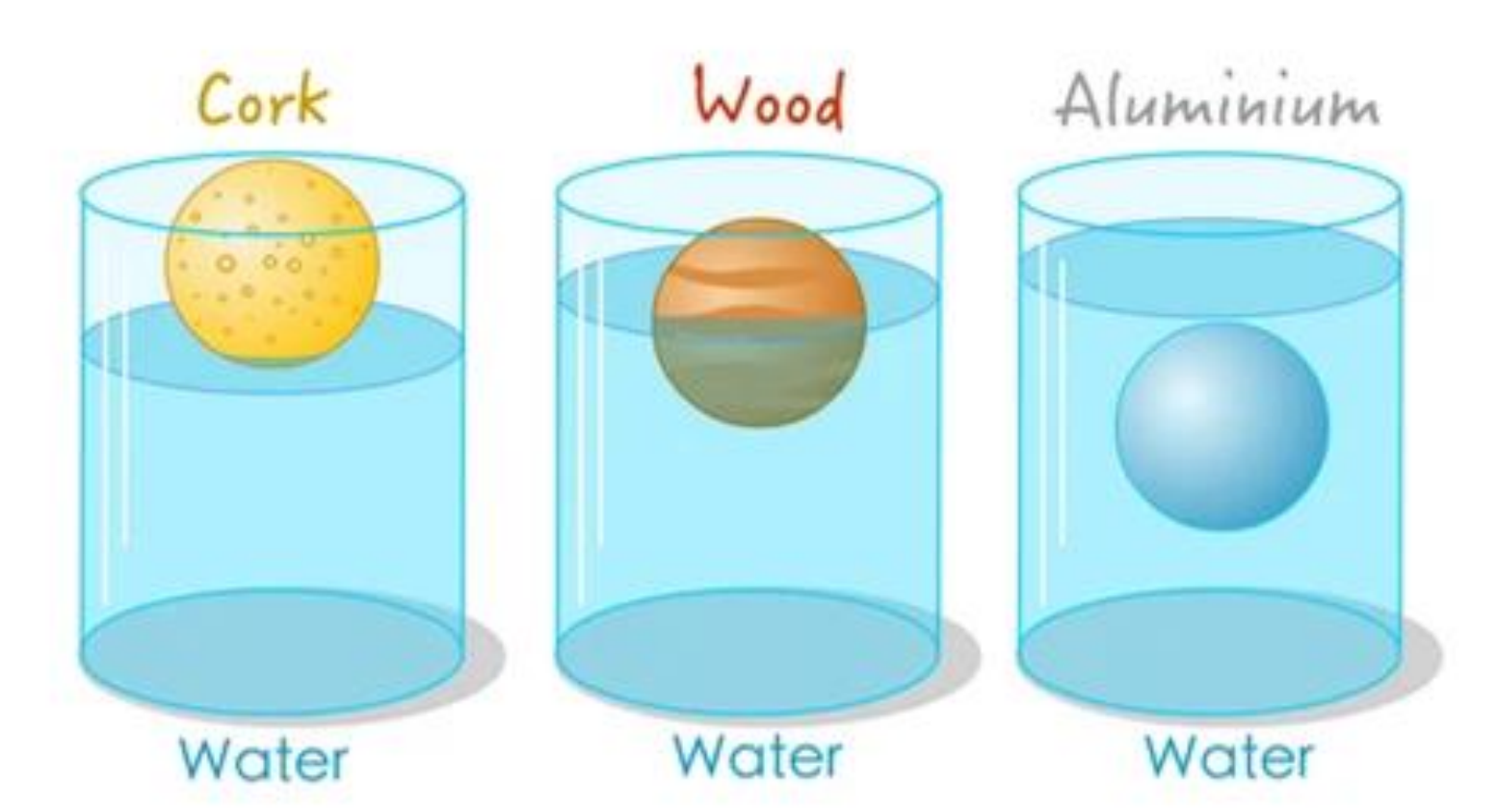
- Skittles!
- Beads
- Small hair ties
- LEGO pieces
- Puzzle pieces
- Bunch of art supplies

Can't get any items?
Grab a piece of paper and do this 2D instead.

Put all of your items into a massive pile.
This is your original density.

Now take out half of your items. What happened to the amount of mass? What happened to the amount of volume? How did that affect density?

Keep the same number of items, but spread them out a lot more. What happened to mass? What happened to volume? How did that affect density?


Cork
Wood
Aluminium
Water
Water
Water

Using Archimedes Principle for density!

How to Measure for Density

$$density = \frac{mass}{volume}$$

$$density = \frac{mass}{volume}$$

Sample Density Problems

1. A block of aluminum occupies a volume of 15.0 mL and had a mass of 40.5 g. What is its density?

2.7 g/mL

1. Mercury metal is poured into a graduated cylinder that holds exactly 22.5 mL and has a mass of 306.0 g. What is its density?

13.6 g/mL

1. What is the mass of a substance that fills a 200.0 mL container and has a density of 0.789 g/mL?

157.8 g

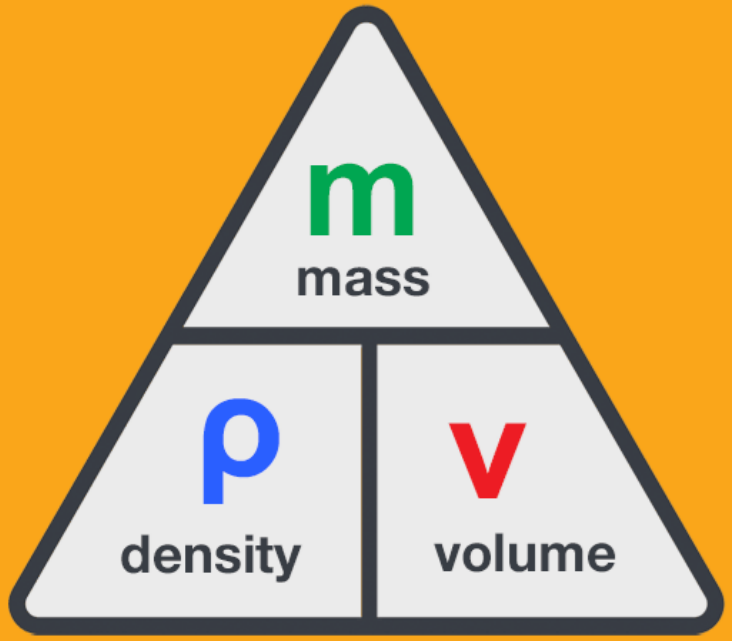
Density Formula

density

mass

$$\rho = \frac{m}{v}$$

volume



density = mass ÷ volume
mass = density × volume
volume = mass ÷ density

Using Density to Figure Out Substances

If you don't know what a substance is, use density to figure it out!

1. Find its density
2. Compare the found density to known densities
3. Find the density of your unknown substance!

Side note: This won't work if the substance isn't pure so then we just use technology to make life easier (mass spectrometer for the win!)

Solids	Density
Lead	11.37
Silver	10.57
Copper	8.92
Brass	8.90
Nickel	8.57
Iron	7.90
Aluminum	2.67
Marble	2.60 – 2.84
Granite	2.65
Rubber	1.10 – 1.19
Oak	0.80
Pine	0.35 – 0.50

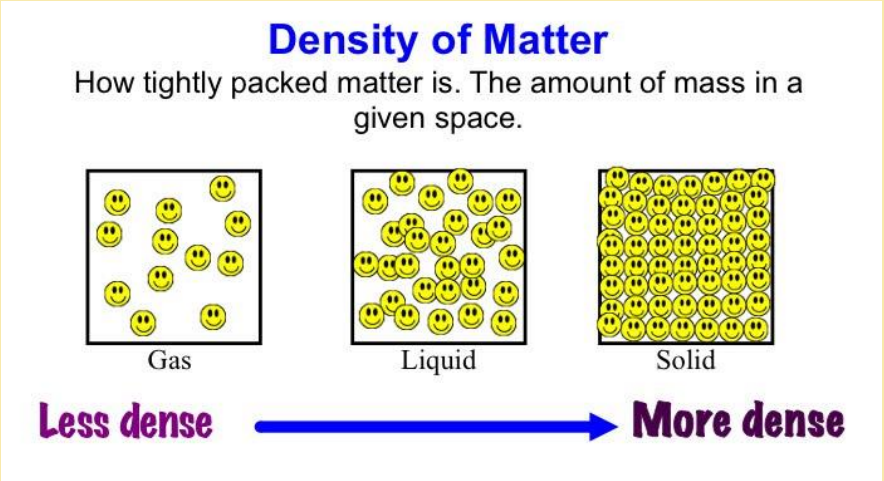
Figure this out!

A block of wood has a mass of 4 g and occupies a volume of 5 cm^3.

What type of wood can it be?

Density Links For You To Explore

- Practice density problems here
- Info on density here
- Info on tools used to find density here



Mental review

- [ ] Mass versus Weight
- [ ] How to measure mass/weight
- [ ] Definition of volume
- [ ] How to measure volume
- [ ] Definition of density and how to measure it

Done Early?

Test out your knowledge of measuring matter here

Read about measuring matter in chemistry specifically here

How about how to measure things like dark matter? Check is out here