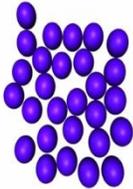
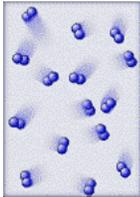


Grade 8 Fluids Review

Don't forget about the particle Theory and States of Matter! It is going to be an important part of your unit test!

| | Picture | Movement | Attraction | Energy | Shape/Volume |
|--------|---|---|-------------------------------------|---|---|
| Solid |  | Particles remain in fixed position and vibrate. | Particles have a strong attraction. | Particles have little energy. | Particles have a fixed shape and volume (neither change unless acted upon by an external force) |
| Liquid |  | Particles slide and glide, though they do not move far. | Particles have a medium attraction. | Particles have a medium amount of energy. | Fixed volume (does not change). Shape is determined by the container. |
| Gas |  | Particles move in straight lines randomly and as far as possible. | Particles have a weak attraction. | Particles have lots of energy. | Volume and shape are determined by the container. |

Particle Theory of Matter

1. All matter is made up of tiny Particles.
2. Particles are always moving.
3. There are spaces between particles.
4. Particles of a pure substance are identical.
5. Particles of a pure substance are attracted to one-another.
6. When matter is heated, it expands; when cooled, it contracts.

Fluids

What is a fluid?

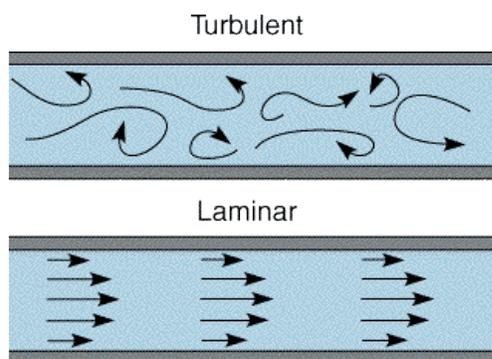
A fluid is a substance that flows. It can be a liquid or a gas, but is never a solid.

Characteristics of a Fluid

- Can flow over, under or around objects.
- Takes on the shape of their container.
- When at rest, the surface is flat.

But sand and salt can flow....why are they considered fluids???

Types of Flow



Turbulent Flow: - An irregular mixing flow pattern that is unpredictable.

Turbulent flow in lakes and rivers adds oxygen to the water which is needed by marine organisms.

Laminar Flow: A smooth patter of flow that is smooth and regular.

Laminar flow along vehicles reduces drag and makes them more fuel efficient.

Flow Rate and Viscosity

Flow Rate: Measures the volume of fluid moving past a certain point in a given amount of time. We use flow rate to measure fluids moving through or out of a pipe. **The formula for flow rate is volume (mL) ÷ time (seconds) = ml/sec.**

Flow rate depends on:

- The type of fluid that is flowing.
- The force pushing on the fluid.
- The size of the pipe or opening that the fluid is flowing through.
- The type of surface over which the fluid is flowing.

Viscosity: Refers to the “thickness” of a fluid or its resistance to flow. It is a measure of easily the particles of a fluid are able to slide past each other.

Viscosity depends on:

- The size of the particles
- The attraction between particles
- The temperature of the fluid



What is the connection between viscosity and flow rate?

Cohesion and Adhesion Affect Flow Rate and Viscosity too!

Cohesion: the force of attraction between the particles of a particular substance. Fluids with slow flow rates, such as maple syrup, have greater cohesion between particles.

Adhesion: the force of attraction between particles of a fluid and particles of other substances.

Why do fluids travel faster near the centre of pipes and tubes than at the edges of pipes and tubes?

Mass, Volume and Density

Mass: The amount of matter that makes up a substance.

Volume: The amount of space that an object or substance takes up.

Density: Is a measure of the amount of mass in a given volume of a substance. In order to make a fair comparison, the same volumes must be compared.

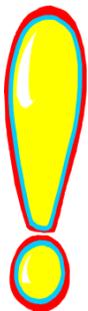
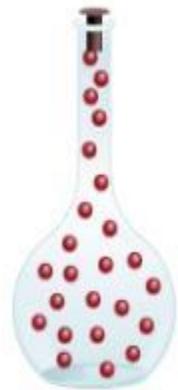
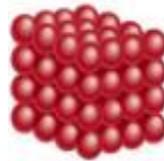
Density and the Particle Theory

Density depends on the mass of the particle and how tightly the particles are “packed”.

Since particles of solids are usually closer together than the particles of a liquid, solids are often more dense than liquids. The spaces between gas particles are larger than those in solids and liquids, which means that there are fewer particles in a given volume of a gas.

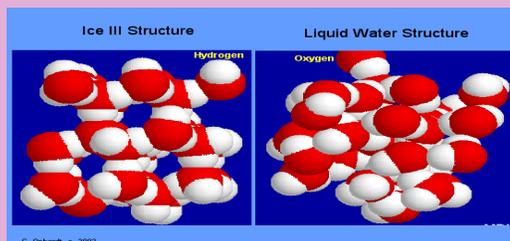
Formula for Density

$$D = \frac{M}{V}$$



Remember.... Particles of water in the LIQUID state are CLOSER than they are in the solid state.

WHY DOES ICE FLOAT????



Using these tools, do you remember how we calculated the density of irregularly shaped objects?



Buoyancy

Buoyancy: is the upward force that a fluid exerts on an object. It determines whether an object sinks or floats.



POSITIVE BUOYANCY

-Buoyant force is greater than the force of gravity.



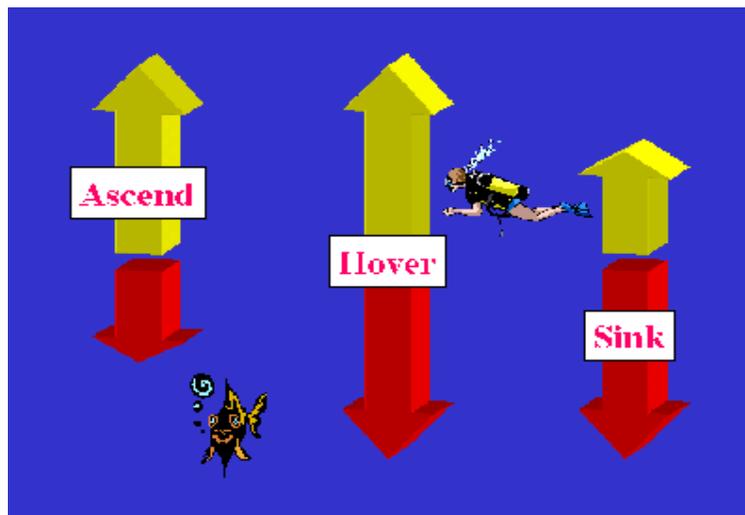
NEUTRAL BUOYANCY

- Buoyant force and the force of gravity are equal.

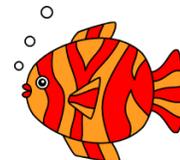


NEGATIVE BUOYANCY

-The force of gravity is greater than the buoyant force.



How do fish and scuba divers control their buoyancy?



Review Questions...to help you study

1. What are fluids? Give three different examples of fluids.
2. Make a Venn diagram to compare laminar and turbulent flow.
3. How can we detect turbulent blood flow in our body?
4. The more viscous a fluid, the slower the flow rate. Do you agree or disagree. Support your answer with some of the labs/demonstrations that we did in class.
5. What is flow rate? How do we calculate it and what are the units of measure?
6. Does warming a viscous fluid generally increase or decrease its flow rate? Use the particle theory to explain why this might be so.
7. If the particles of a certain substance show considerable adhesion and cohesion, is this fluid likely to have a fast or slow flow rate? Justify your answer.
8. The way that a fluid flows depends on several factors. Briefly describe the factors – use as much scientific vocabulary that you can.
9. How can we calculate the density of a substance that has an irregular volume?
10. How does a fish change its density in order to change its position in the water?
11. How is a ship buoyant in water when it is built of mostly steel?
12. Define positive, negative and neutral buoyancy. Give an example of each.
13. You are the captain of a fully loaded ship sailing from warm tropical waters into the cold North Atlantic. As you sail north, will you need to dump some waste water, or would you keep it on board to travel safely?
14. What is the formula to calculate density? Which units of measure are used for a solid? Liquid?
15. If 30mL of a fluid has a mass of 63g, what is its density? Will it sink or float in water?
16. Would a ship in Lake Ontario (fresh water) float higher or lower in the water than in the Atlantic Ocean (salt water). Give reasons to explain your answer.

Check this website out for further review!

<http://www.proprofs.com/quiz-school/quizshow.php?title=grade-8-fluids&quesnum=1>