

Name: _____ Block: ____ Date: _____

Cartesian Diver Hydraulics

How do you think the Cartesian diver works?

Remember the Kinetic Molecular Theory

1. All matter is made up of very small particles
2. Particles exist in vacuum (there is empty space between them)
3. Particles are constantly moving
4. Adding energy causes particles to move faster and spread apart

Complete this section when you are at the syringe hydraulic station

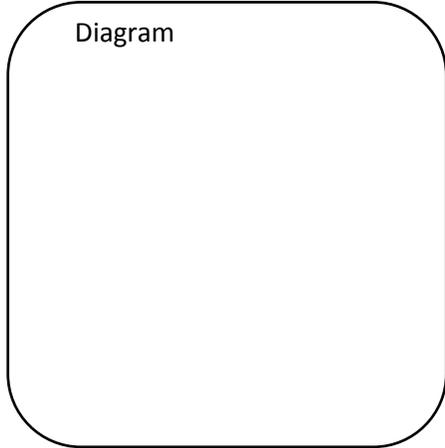
1. Do not touch the water yet!
2. Create a syringe system with air instead of water
Does the air syringe system work? Why or why not?
3. Press on both sides of the air syringe system, **what do you notice?**
4. Now create a hydraulic syringe system with water.
Draw a labelled diagram of your hydraulic syringe system in the box provided
5. Press on both pistons of the water syringe system (not too hard!)
Why do you think the syringe system works better with water compared to air?
6. Gently pull on both pistons of the syringe system. **What do you observe?**
If you do not observe anything, pull a little harder until you notice a change within the tubing.
7. When you pull on both pistons you are expanding the air bubbles in the water.
8. Air bubbles can also be compressed. **Why might it be bad to have large air bubbles within the brake system in your car?**

Diagram

Conclusion: Air is easily compressed, while water is incompressible.

Complete this section when you are at the Cartesian diver station

1. Take an empty bottle and fill it $\frac{3}{4}$ full with water from the tap.
2. Take an eye dropper and place the rubber piece over the end with the smaller opening.
3. Put the dropper in the water with the rubber piece at the top.
4. Fill the bottle to the top with more water and put the cap on.
5. Squeeze the bottle. Your diver should sink to the bottom and then return to the top when you stop squeezing. You may need to remove the cap to release air and then return the cap.
6. **Draw and label a diagram of your Cartesian diver in the box provided.**
7. **Why do you think the diver floats?**
8. Squeeze the bottle just enough so that the diver rests on the bottom of the bottle. Examine the diver on the bottom while you continue to squeeze more. **Describe what you notice about the diver as it rests on the bottom?**
9. Remove the cap and then gently squeeze the bottle, being careful not to spill any water. **Does the diver sink? Why or why not?**
10. **When you squeeze the bottle, does the volume of the bottle change? How can you tell?**
11. Now that you have examined the Cartesian diver more closely, **write a new explanation for why you think the diver dives when you squeeze the bottle. Think about KMT!**



Class Conclusion:

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Final Explanation for Cartesian Diver: