

Cartesian Diver

Equipment:

Water, used clear bottle with an air tight lid, and a dropper

Objective:

Develop a better understanding of Archimedes' and Pascal's principle, and to encourage scientific thoughts and experiments.

Procedure:

- Have the students bring in their own bottle
- Fill the bottle with water; put some water in the dropper so that it is about half full.
- Place the dropper in the bottle and then close the lid. Make sure it is closed securely in order to prevent leaks.
- Have the students squeeze their bottles and record the observations.

Some of the questions you can ask them to answer in their observations are:

- What happened to the dropper when you squeezed the bottle?
- What happened to the water inside the dropper?
- Explain your observations.

Let them experiment by forming a question and formulating a hypothesis, then testing it on their bottle and recording the answer and explaining it. Some questions to help guide their thoughts might be:

What happens if you squeeze at a different area?
Is it harder, easier, or the same?

Expansion:

For expansion have them try the same experiment on different size and shape bottles. Have them record their observations and then compare them to their other results and explain any differences or similarities.

Recycling can also be discussed. Have them discuss why the plastic bottles need to be recycled and why there are numbers inside the recycle symbol.

Assessment:

Assessment/ evaluation will be done by their written observations. To get full credit the students must include in their explanation Archimedes' and Pascal's principles and have applied them correctly to the situation.

Modification:

This lesson was created for high school. To modify it for a younger grade like middle school, then the assessment would be can that they can explain the concept like 'the dropper becomes more dense than water so it sinks', but does not have to identify the specific physics principle. Another modification would be that if the teacher felt they were not mature enough to create Cartesian Diver themselves then they could have already made them and just hand them to the students.