

Discovering Density (Teacher Instructions)



Curriculum Connections:

This demonstration connects to the BC curriculum for grade 6 science.

Density is part of the content:

“mixtures: separated using a difference in component properties”
(BC Curriculum, 2024).

Materials:

- Safety goggles
- Gloves
- Aprons
- Eye dropper x 5
- Liquids: honey, corn syrup, dish soap, water, vegetable oil, isopropyl alcohol 99%, lamp oil
- Food colouring
- 5 Test tubes
- Bowl and spoon (for corn syrup).



Safety considerations:

- *Keep materials out of reach of students unless wearing appropriate PPE*. Lamp oil is categorized under WHIMIS as poisonous and the isopropyl alcohol 99% is categorized as poisonous and flammable per WHIMIS.

Steps in the demonstration:

- 1) Gather all materials.
- 2) Apply safety equipment: goggles, gloves, and an apron.
- 3) Fill 5 separate test tubes with the following: dish soap, water, vegetable oil, isopropyl alcohol 99%, lamp oil. Add green food colouring and mix into the isopropyl alcohol 99%.
- 4) Place an eye dropper in front of each test tube.
- 5) Add corn syrup to a small bowl. Add in red/blue food colouring to the corn syrup to turn it purple and place a spoon in front.
- 6) Leave the honey in its original container.
- 7) You are ready to start the demonstration.
- 8) Give an explanation of density: “Density is a measure of how much mass is contained in a given unit of volume (Density=mass divided by volume)” (Spangler, 2020).
- 9) Direct students to open and begin their worksheets and answer the first page “making predictions” (see attached).
- 10) Begin the experiment and have students answer the second page “observations” as you add the layers (see attached).

- 11) Add layers as follows: honey, corn syrup, dish soap, water, vegetable oil, isopropyl alcohol 99%, lamp oil.
- 12) Once the layers have been completed, allow students to come to the front and take a closer look (reminding students not to touch the supplies).
- 13) Have a group discussion explaining the science behind the demonstration. Since “Density is a measure of how much mass is contained in a given unit of volume” what we see here is that when we layer liquids from highest density to lowest density, they form distinct layers (Spangler, 2020). This is because the higher the mass is in a given volume, the higher the density (sinks). The lower the mass is in a given volume, the lower the density (floats) (Spangler, 2020). This means that in our demonstration the honey had the highest density and the lamp oil had the lowest density.
- 14) Ask students to answer the last two pages of the worksheet: “Explanation” (see attached).
- 15) Do a class share out of connections to real-world scenarios where density must be considered.
- 16) If time permits in your class, allow students to work in small groups to re-create the demonstration. Emphasize the importance of the safety considerations.

Explanation of the science: Since “Density is a measure of how much mass is contained in a given unit of volume” what we see here is that when we layer liquids from highest density to lowest density, they form distinct layers (Spangler, 2020). This is because the higher the mass is in a given volume, the higher the density (sinks). The lower the mass is in a given volume, the lower the density (floats) (Spangler, 2020). This means that in our demonstration the honey had the highest density, and the lamp oil had the lowest density.

Connection to real-life ideas:

Blood Test



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Salad Dressing



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Extensions:

- Ask students to find small objects around the classroom to add to the experiment to see which items have heavier or lighter densities.
- Students use alternative liquids to create their own density rainbow. Discover what works and what doesn't work.

Adaptations:

- Assign groups. Allow students to work together to complete their worksheets.
- Pick 3/6 questions to answer or the option to write point form.
- Option to verbally answer questions rather than write them down.

References

Curriculum. (2024). <https://curriculum.gov.bc.ca/>

Google. (n.d.). Google Images. <https://images.google.com/>

Seven-layer density column. Steve Spangler. (2020, September 27).
<https://stevespangler.com/experiments/seven-layer-density-column/>