

Which Grape is Heavier?

The Action Take a peeled and an unpeeled grape and see which one floats in soda pop.

Grade Level
Grade 4 – Cells and Systems
Grade 7 – Force and Motion
Grade 8 – Plant Growth
Grade 9 – Fluids and Pressure
Grade 10 – Greenhouse Effect
Grade 10 – Research Projects
Chemistry 20 – Behaviour of Gases
Biology 30 – Chemical Basis of Life
Biology 30 – Cell Structure and Function

Materials
Fresh Grapes
Clear Soda Pop (e.g. 7-Up)
A clear drinking cup

Instructions Fill a glass with clear soda pop.
Get two grapes – peel the skin off one grape.
Pose a question (depending on desired learning outcome the question may be different): Why does one grape float while the other does not? (Hydrophilic versus hydrophobic) Which grape will float? (Density – the unpeeled one!) Which of the two grapes is heavier? (Mass versus weight – the unpeeled is heavier!)
Drop both grapes into the soda pop.

Safety If using a knife to peel the grape, be cautious.

Hints Make sure the grapes are well ripened. Unripe grapes do not work as well.
Bruised grapes may not float.
Need clear soda pop and glass so students can see results.
Use clean cup and allow students to drink pop and eat grapes to see why the experiment works (peeled grapes will absorb the carbon dioxide and will taste fizzy).

Science Principle Hydrophobic versus hydrophilic: The Peel of the grape is hydrophobic (water repelling). Thus, the carbon dioxide bubbles have a surface to adhere to. The peeling of this skin leaves the grape with a hydrophilic (water attracting) surface and the

carbon dioxide has nowhere to adhere.

Density: The grapes start with similar densities, but when the carbon dioxide bubbles adhere to the surface of the unpeeled grape, the lighter density of the carbon dioxide gas changes the overall weight of the grape.

Mass versus Weight: Even though the unpeeled grape has a greater mass, when the carbon dioxide gas adheres to the skin it makes it lighter in weight than the peeled grape with no adhering carbon dioxide gas and so the unpeeled grape floats.