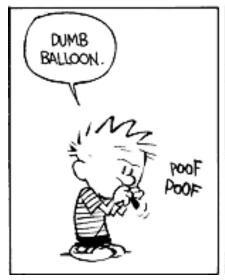# ■ <u>Theme Music:</u> Pearl Jam
Even Flow

■ <u>Cartoon:</u> Bil Watterson
Calvin and Hobbes

Foothold ideas: Buoyancy

■ ***Archimedes' principle***: When an object is immersed in a fluid (in gravity), the result of the fluid's pressure variation with depth is an upward force on the object equal to the weight of the water that would have been there if the object were not.

■ As a result, an object whose density is less than that of the fluid will float, one whose density is greater than that of the fluid will sink.

■ An object less dense than the fluid will float with a fraction of its volume under the fluid equal to the ratio of its density to the fluid's density.

Foothold ideas: Surface tension

- Due to the intermolecular interactions holding a liquid together, the surface of a liquid experiences a tension.

- The pull across any line in the surface of the liquid is proportional to the length of the line.

$$F_{\text{surface tension}} = \gamma L$$

Reading questions

■ What's the difference between tension and surface tension? Why wouldn't they be the same? Aren't molecules being pulled taut at surface similarly to tension? How do units differ?

■ I am confused by the statements, "pressure is repulsive and is in 3D so it acts on 2D surfaces" and "surface tension is attractive and is in 2D so it acts on 1D lines." What do you mean by "acts on"?