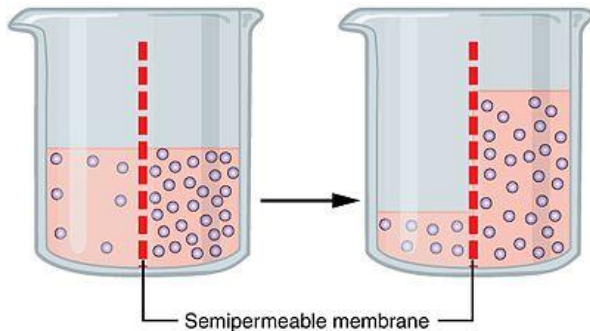


DIY Air Force Activities: Observing Osmosis



Materials:

- 4 cups water
- 1 $\frac{3}{4}$ cups sugar
- 5 gummy bears
- 5 similar sized glasses or mugs (capable of holding 1 cup of water each, water level should be high enough to submerge the bears)
- Cooking pot and spoon



Osmosis occurs when the molecules of a solvent (the liquid in a solution) pass through a semipermeable membrane, or a thin barrier which lets some things through and not others. The molecules move from a less concentrated solution to a more concentrated one. This spontaneous process results in two solutions of equal concentration. Osmosis affects our daily lives, even if we don't realize it. It happens in our bodies all the time. The membranes in our cells allow water in and out; osmosis drives a variety of biological processes! In the following experiment you will use gummy bears to observe osmosis at work!

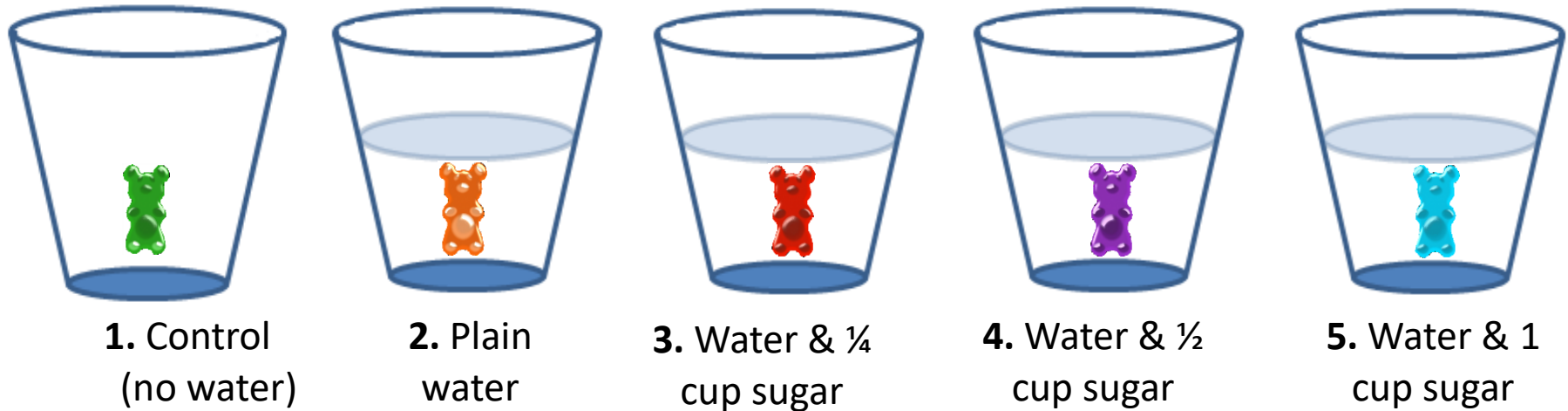
Directions: **Adult assistance is required to heat the water. Be careful not to get burned!**

1. Number your glasses from 1-5. *** see page 2 for set-up
2. Have an adult heat 4 cups of water to near boiling, then pour 1 cup into glass 2-5.
3. In glass 1, add **NOTHING**, this is your control; in glass 2 add **NO** sugar; in glass 3 add $\frac{1}{4}$ cup sugar; in glass 4 add $\frac{1}{2}$ cup sugar, in glass 5 add 1 cup sugar. Stir glasses 3-5 until all the sugar is dissolved. **Allow your solutions to cool to room temperature.**
4. Once your liquids have cooled, add one gummy bear to each glass. Leave them for 24 hours. Check on them periodically and record your observations. Eat any unused bears!

What happens? How can you use what you have learned about osmosis to explain what you see?

Air Force Associations:

The Air Force Research Lab (AFRL) is using a process called reverse osmosis to develop innovative advanced filtration technologies. Their Expeditionary Waste Water Processing System (EW2PS) unit was designed to handle solid waste and recycle grey water in an energy efficient manner! This provides a sustainable, untethered supply of fresh, clean water to troops in need.



Set up your experiment like the image above. Record your results and use what you know about osmosis to explain what you observe! Use your control to compare and evaluate any changes.