**Name:**

**Osmosis in Gummy Bears** **(20 points)**

**Diffusion** is the movement of molecules an area of *high concentration to an area of lower concentration*. When molecules do that it's called moving down a concentration gradient. To visualize diffusion, think about placing a few drops of green food coloring in water. At first most of the water is clear with a small amount of dark green food coloring concentrated in the center where the drops are placed, but over a few minutes the molecules of food coloring spread out in the water until they are evenly distributed among the water molecules and the entire glass appears a light green color. The same thing happens in the air when someone sprays perfume inside a room. At first the molecules of perfume are concentrated and strong-smelling in a small area, but over time they diffuse through the air in the room until they are evenly distributed and the entire room smells weakly of perfume.

**Osmosis** is the diffusion of water through a membrane. During osmosis *water moves from an area of higher concentration of water molecules to an area of lower concentration of water molecules*. Often, whether inside a living organism or in a laboratory experiment, water contains other molecules, or solutes. The higher the concentration of solutes, the lower the concentration of water, so *water will move from low solute concentration to high solute concentration*.

1. Define the terms: **(2 points)**

Diffusion:

Osmosis:

2. In diffusion and osmosis, in which direction are particles moving (from high concentration to low concentration or from low concentration to high concentration)? **(1 point)**

3. Define the following terms: **(3 points)**

Hypertonic solution:

Hypotonic solution:

Isotonic solution:

**Procedure: Day 1**

- Each group should take three gummy bears. Use the ruler to measure and record the starting length (in millimeters) of all three gummy bears. Record these measurements in Table 1
- Weigh each gummy bear and record the mass (in milligrams) in Table 1.
- Gather three 100 mL beakers and label them #1, #2, and #3.
- In beaker #1, add one inch of regular water and place one of the gummy bears inside.
- In beaker #2, add one inch of salt water, as well as one gummy bear.
- In beaker #3 add nothing except the third gummy bear.
- Cover all three glasses with plastic and leave overnight.

**Table 1: Gummy Bear Measurements Before Soaking**

| **Gummy Bear Measurements** | **#1** | **#2** | **#3** |
|---|---|---|---|
| Starting length (mm) | | | |
| Starting Mass (mg) | | | |

4. Predict what you think will happen to each of the gummy bears. **(3 points)**

**Procedure: Day 2**

- Measure the final length of each gummy bear, and calculate the ending length in Table 2.
- Determine the change in length(final length – starting length) of each gummy bear and record your results.
- Measure the final mass of each gummy bear and record the mass in Table 2.
- Determine the change in mass (final mass – starting mass) of each gummy bear and record your results.

**Table 2: Gummy Bear Measurements After Soaking (3 points)**

| **Gummy Bear Measurements** | **#1** | **#2** | **#3** |
|---|---|---|---|
| Final length (mm) | | | |
| **Change in Length (mm)** | | | |
| Final Mass (mg) | | | |
| **Change in Mass (mg)** | | | |

5. Using your table for reference, describe what happened to Gummy Bear #1, #2 and #3. **(1 point)**

6. Did your observations match your prediction? If no, explain what you think accounts for the difference. **(2 points)**

7. a)What kind of solution (hypertonic, hypotonic, or isotonic) was the tap water? How do you know? **(1 point)**

b) Was water moving into Gummy Bear #1 or out of the gummy bear? _____ **(1 point)**

c) What is this process called? _____ **(1 point)**

8. a) What kind of solution (hypertonic, hypotonic, or isotonic) was the salt water? How do you know? **(1 point)**

b) What water moving into Gummy Bear #2 or out of the gummy bear? _____**(1 point)**

c) What is this process called? _____**(1 point)**

9. Like Gummy Bears, cells are also permeable to water. How can you predict whether water will move into a cell or out of a cell? **(2 points)**