**Observing Osmosis in Gummy Bears**

Pre-AP Biology

**Background Information:**

Molecules are in constant motion, and tend to move from areas of higher concentrations to lesser concentrations. Diffusion is defined as the movement of molecules from an area of high concentration to an area of low concentration. The diffusion of **water molecules** through a selectively permeable membrane isknown as OSMOSIS.

Selectively permeable means that some molecules can move through the membrane while others cannot.

Diffusion and osmosis are passive forms of transport; this means that do not need energy to move areas of high concentration to areas of low concentration. Active transport requires energy to transport molecules from low concentration to high concentration.

Osmosis is the movement (transport) of water (small dots) through a selectively permeable membrane from an area of high concentration of water to an area of low concentration

Gummy Worms are popular candies made of gelatin, starch, and sugar. They will act as example “cells.”

**Question**: How will soaking Gummy Worm candies in distilled water affect the size of the candy?

**Prediction** (explain your prediction based on the background information)**:**

**Materials**: two plastic cups, distilled water, salt water, two gummy worms, ruler, masking tape, balance, wax paper, paper towel, calculator

**Procedure**:

1. Use the masking tape to label your beaker with your names & class period.

2. Use the ruler to find the height & width of your candy worm.

3. Use a balance to find the mass of your candy worm. Use a piece of wax paper to protect the pan of

 the balance. Remember to subtract the mass of the wax paper.

4. Record these measurements in the Data Table.

5. Fill one cup ½ way full with distilled water and the other ½ way full with salt water

6. Put your candy worm in the water.

7. Set the beaker aside for one day.

8. After the candy worm has been in the distilled water overnight, **gently** take it out of the water and

 pat it dry. Be very careful because the candy is now extremely breakable.

9. Repeat steps 2 – 4.

**Data**:

The information below shows you how to calculate the percent change in the size of the candy for the gummy worm in the distilled water and the gummy worm in the salt water using the following calculations. Record your results in the table.

**% Change in Height =**

(After soaking height – Before soaking height / Before soaking height) x 100

( \_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_ / \_\_\_\_\_\_\_\_ ) x 100 = \_\_\_\_\_%

**% Change in Width =**

(After soaking width – Before soaking width / Before soaking width) x 100

( \_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_ / \_\_\_\_\_\_\_\_ ) x 100 = \_\_\_\_\_%

**% Change in Mass =**

(After soaking mass – Before soaking mass / Before soaking mass) x 100

( \_\_\_\_\_\_\_\_\_ - \_\_\_\_\_\_\_\_\_ / \_\_\_\_\_\_\_\_ ) x 100 = \_\_\_\_\_%

***Data Tables:***

***Change in Height of Gummy Bears***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Solution** | **Starting**  | **Ending**  | **Calculation** | **% Change** |
| Distilled Water |  |  |  |  |
| Salt Water |  |  |  |  |

***Change in Width of Gummy Bears***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Solution** | **Starting**  | **Ending**  | **Calculation** | **% Change**  |
| Distilled Water |  |  |  |  |
| Salt Water |  |  |  |  |

***Change in Mass of Gummy Bears***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Solution** | **Starting**  | **Ending**  | **Calculation** | **% Change**  |
| Distilled Water |  |  |  |  |
| Salt Water |  |  |  |  |

* Graph the percent changes on a bar graph. Remember to title and label both axes. Your x-axis should be labeled “Measurement (no units),” and your y-axis should be labeled “Percent Change (in %).” You will have six bars, three for each solution (change in height, width, and mass). You should include a key to distinguish between the six bars or simply label your x-axis very carefully.

**Questions & Analysis**:

1. What happened to the candy after soaking in distilled water overnight?

2. Why did you get these results?

3. What happened to the candy after soaking in the salt water overnight?

4. Why did you get these results?