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**PRE-AP OBSERVING OSMOSIS USING GUMMY BEARS**

**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.
* Selectively permeable means that some molecules can move through the membrane while others cannot.
* Movement through membranes is called transport.
* 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 to an area of low concentration.

**Question:** How will soaking Gummy Bear candies in different concentrations of sugar water affect the size of the candy?

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

1. If I soak a gummy bear in pure water (0% sugar), then the gummy bear will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. If I soak a gummy bear in 15% sugar water, then the gummy bear will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

3. If I soak a gummy bear in 30% sugar water then the gummy bear will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Procedure:**

1. Obtain your materials (3 small cups, 3 gummy bears, 0% sugar solution, 15% sugar solution, 30% sugar solution, paper towels, marker)
2. Label each cup with the % sugar solution that will be placed into the cup as well as the color of the gummy bear you will place into the cup (be sure to mark the color of gummy bear on your data sheet also)
3. Measure 25 mL of each solution and pour the solutions into their respective cups.
4. Measure the length of each gummy bear and record.
5. Measure the width of each gummy bear and record.
6. Measure the mass of each gummy bear and record.
7. Place the gummy bears into their respective cups.
8. Place the cups in your assigned spot and cover with a piece of paper.

**Data and Analysis:**

Table 1. Day one – height, width, and mass of gummy bears before being placed in solution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| % Sugar Solution | Gummy bear color | Height (cm) | Width (cm) | Mass (g) |
| 0%  |  |  |  |  |
| 15% |  |  |  |  |
| 30% |  |  |  |  |

Table 2. Day two – height, width, and mass of gummy bears after 24 hours being in solution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| % Sugar Solution | Gummy bear color | Height (cm) | Width (cm) | Mass (g) |
| 0%  |  |  |  |  |
| 15% |  |  |  |  |
| 30% |  |  |  |  |

Table 3. Percent change of gummy bears after being placed in different concentrations of sugar solution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| % Sugar Solution | Gummy bear color | % change height (cm) | % change width (cm) | % change mass (g) |
| 0%  |  |  |  |  |
| 15% |  |  |  |  |
| 30% |  |  |  |  |

Example calculation: day two height – day one height / day one height X 100 = % change height

Graph the percent changes on a bar graph. Remember to title and label both axes of the graph.

TITLE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Questions – please answer in complete sentences.

1. Describe what happened to the gummy bear for each of the following:
2. In 0% sugar water
3. in 15% sugar water
4. in 30% sugar water
5. Why did you get these results?
6. What do you think would happen to the candy if you let it soak in salt water overnight? Explain

your answer.

**Conclusion:**

Write a short paragraph to explain the results of this investigation using the concept of osmosis. Include specific data to support what you say.

