Observing Osmosis Lab KEY

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 from a diluted solution to a concentrated solution is known as OSMOSIS.

• 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 they do not need energy to move from areas of high concentration to areas of low concentration.

• Active transport requires energy to transport molecules from low concentration to high concentration.

• Gummy Bears are popular candies made of gelatin, starch, and sugar.

Question: How will soaking a gummy bear candy in distilled water affect the size of the candy?

Hypothesis: Explain your prediction using an “If … then …” statement, and based on the background information! (2 Marks)

If a gummy bear is soaked in distilled (pure) water for 24 hours, then the gummy bear will increase in size (i.e. get bigger).

Materials:

✓ Beaker/Plastic Cup  ✓ Masking Tape
✓ Water  ✓ Triple Beam Balance/Balance
✓ Gummy Bear  ✓ Paper
✓ Ruler  ✓ Calculator
Procedure:

1. Use the masking tape to label your cup with your name and class.
2. Use the ruler to find the height & width of your candy bear.
3. Use a triple beam balance or electronic balance to find the mass of your candy bear.
4. Fill your cup ½ way full with water.
5. Put your candy bear in the water.
6. Set the beaker aside for one day.
7. After the candy bear has been in the water overnight, gently take it out of the water and pat it dry. Be very careful because the candy is now extremely breakable.
8. Repeat steps 2 – 3.

Data Table 1. Measurements of the change in size (height, width, and weight) of a gummy bear after being soaked in water for 24 hours. (Title – 1 Mark)

<table>
<thead>
<tr>
<th></th>
<th>Before Soaking in Water</th>
<th>After Soaking in Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (mm)</td>
<td>19 mm</td>
<td>27 mm</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>8 mm</td>
<td>22 mm</td>
</tr>
<tr>
<td>Weight (g)</td>
<td>2.3 g</td>
<td>10.6 g</td>
</tr>
</tbody>
</table>
Observing Osmosis Lab Questions
(To be completed independently!)

Analysis:

What happened to the candy after soaking in distilled water overnight? Explain your observations i.e. what did the gummy bear look, smell, feel like? (1 mark)

After 24 hours of soaking in distilled water, the gummy bears looked and felt very different than they had on the previous day. They had become noticeably larger (expanded in size) and were much more delicate. We also noticed that the gummy bears had lost some of their original colour.

Why did you get these results? In layman’s terms (plain English, not scientific) explain your observations. Why did the gummy bear change the way it did? (1 mark)

In terms of size, the gummy bear had become larger because it absorbed water overnight. Water had soaked into the gummy bear causing it to expand.

The colour loss and delicateness were both due to the fact that the gummy bear is made mostly out of sugar, and that some of the sugar dissolved in the water overnight, causing it to lose its structural integrity.

Conclusion:

Was your hypothesis supported or rejected? Write a short paragraph to explain the results of this investigation using the concept of osmosis. Include specific data to support what you say. (3 marks)

My hypothesis was supported – I stated that the gummy bear would get bigger after being soaked in water for 24 hours. This was confirmed by my measurement data; the gummy bear’s height, width, and weight increased from the first to the second day. The height increased from 19 mm to 27 mm, the width increased from 8 mm to 22 mm, and the weight increased from 2.3 g to 10.6 g, all of which are significant changes. This occurred due to a process called osmosis: the movement of water from a high concentration to a low concentration. The water in the cup has a high concentration of water molecules, while there is a low concentration of water molecules inside the gummy bear. When the gummy bear was placed in the cup of distilled water, the water molecules moved into the candy by osmosis to equalize the solute concentration on both sides, ultimately causing it to expand.