

Name:

Date:

Criterion C - Formative

This experiment is meant to help you see how surface area can impact diffusion. We will be submerging gummy bears in water and as they incubate, water will diffuse INTO the gummy bears as the concentration of water is greater in the water surrounding the gummy bear than in the gummy bear itself. We will measure this change by looking at initial and final mass.

Hypothesis:

How do you think the mass will change if the gummy bears cut into larger vs. smaller pieces?

.....

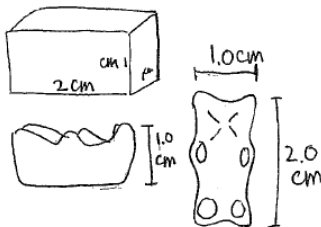
.....

.....

Method:

- Your team will receive 4 gummy bears. **Evidently you cannot consume any of them in the laboratory – in fact you need all 4 for the experiment.**
- The first will be left whole. The second will be cut down the middle creating two pieces. The third will be cut twice, creating three pieces. The fourth one will be cut into 4 pieces.
- Weigh each of the 4. For the cut gummy bears, weigh all the pieces that were one gummy bear together. Record this mass as the initial mass.
- Leave the gummy bears in water for 12-15 minutes. **WHILE** you are waiting, calculate the total surface area of the gummy bear and the total volume for each test tube.
- When time is up, dump the water out into a beaker, catching the pieces in your hand. Then put them on a paper towel to dry off.
- After letting them dry for a minute, gently blot them off and record the final masses. Again, if the gummy bear is in pieces, weigh all pieces together.

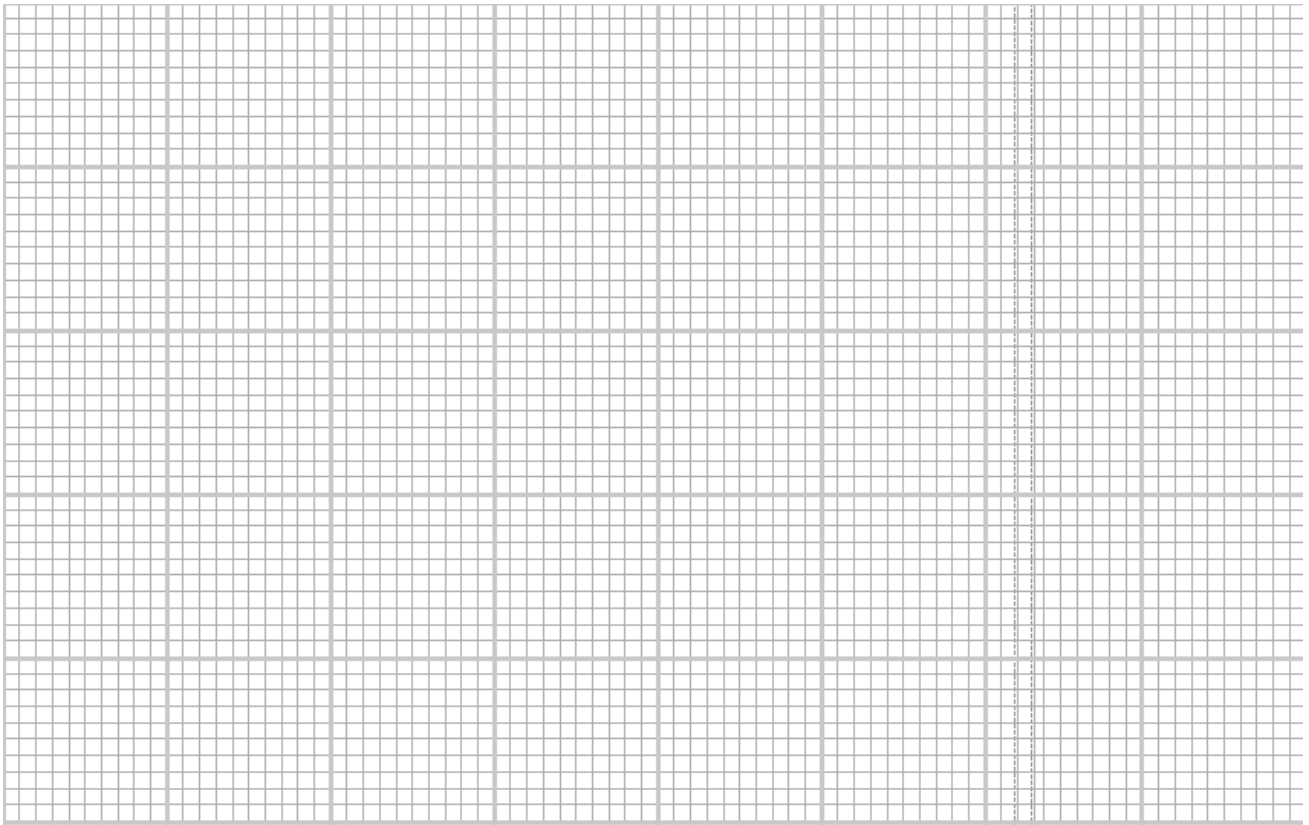
Assume that each bear is a block of 1.0 x 1.0 x 2.0 cm.



| Number of pieces (colour) | Initial mass (g) | Final mass (g) | Surface area (cm ²) | Change in mass |
|---------------------------|------------------|----------------|---------------------------------|----------------|
| 1- | | | | |
| 2- | | | | |
| 3- | | | | |
| 4- | | | | |

Analysis Questions:

1. Describe the changes in mass that the gummy bears experienced, indicating if the data supports or refutes your hypothesis.
2. How did the mass of the whole gummy bear change. Explain why this change in mass occurred with the appropriate scientific language.
3. Make a graph of the data in the grid below. Make sure to position the independent and dependent variables correctly on the axes and to label the axes as well.



4. Explain the science behind the relationship between surface area and change in mass exhibited by your data.

5. Evaluate the validity of this method in showing us the relationship between surface area and diffusion rate.