Why Do Cells Stay Small Student Sheet 

Brainstorm ideas that could explain why cells have a tendency to stay small.

How might the process of diffusion might be an important factor in limiting cell size.

What questions do you have related to cell size and/or diffusion?

Predict what will happen when the gelatin cell models are placed in vinegar.

Our calculation of the surface area and volume of our 3 cubes. **Surface area = 6a2 Volume = a3**

**.5 cm cube**

Surface area:

Volume:

**1 cm cube**

Surface area:

Volume:

**1.5 cm cube**

Surface area:

Volume:

**Observations and data collection for gelatin cubes in vinegar:**

**1.5 cm cube**

**Observations:**

**Time Required to Feed Entire Cell:**

After observing your cell models, collecting data, and researching about cell size, explain why cells tend to stay small. Make sure to include a discussion of diffusion, surface area and volume.

**1 cm cube**

**Observations:**

**Time Required to Feed Entire Cell:**

**.5 cm cube**

**Observations:**

**Time Required to Feed Entire Cell:**

The gelatin cell models that we made today are limited in terms of how they represent real cells and actual systems. Discuss at least 2 ways that gelatin cell models are lacking in the way they represent real cells.

**Cell Size Challenge Extension:**

1. Brainstorm ways that cells could increase their surface area in order to speed up diffusion.
2. Draw/design a cell that will increase the surface area of the cell.

The Challenge:

* Create two identical gelatin cubes that are no larger than 1.5 cm x 1.5 cm x 1.5 cm (just like the largest one you did earlier).
* Using your design, modify one of these cells to increase its surface area without changing the volume. Be careful to keep the cell intact as one single cell.
* Extra credit: Measure the surface area on this second cell and compare it to the first.
* Place the cubes into the cup of vinegar, make and record observations, collect data, and measure the time required for nutrients to feed each cell.
* Use your observations, data and research to explain why diffusion occurred faster in one of the cells than the other.