**Design a Model of a Cell**

**Objectives:**

* Design a model of a plant or animal
* Design and describe analogous models of cell organelles

**Background**: Cells contain many interconnected organelle systems, responsible for carrying out essential functions. Each organelle has a distinct structure, which allows it to carry out it’s unique and essential function.

You will create a 3D model of a cell, using a variety of materials to represent each organelle. Some of the materials will be assigned to represent a specific organelle, and your group will choose the best materials to represent the rest.

**Materials:**

Pre-Determined Materials:

* Shoebox (cell wall)
* Gallon Ziploc Bag (cell membrane)
* Jell-O, pre-made and liquid (cytosol)
* Medium and small Ziploc Bag (Vacuoles)

Other Materials:

* Grapes
* Paper Clips
* String (various sizes)
* Yarn
* Straws
* Pipe cleaners (various sizes)
* Pepper
* Cotton Balls
* Plastic Egg
* Peas
* Pasta (various types)
* Beans (various sizes)
* Tooth pics
* Beads (various sizes)

**Procedure:** You will work with your table group of 4 to complete this model

Begin by creating the basic cell:

1. Fill a quart Ziploc ¼ full with pre-made jell-o.
2. Select a smaller size Ziploc bag to be your vacuole, fill it with water, and place it into your cell.
   1. Be able to defend the size you chose!

Create your cell!

1. As a group, decide which material will represent each organelle
   1. Make sure that you understand **why** your group is using each material!
   2. Keep track on your worksheet as you go
2. Place your organelles into your cell-bag, in a logical way
   1. You can connect them, tie them, whatever you want!
3. Fill up the cell-bag with liquid jell-o, and seal it.
4. If you have a plant cell, place it into the box (cell wall)
5. Individually defend your groups reasoning for choosing your materials on your worksheet

**Cell Model Materials Chart**

|  |  |  |
| --- | --- | --- |
| **Organelle** | **Material used to represent it** | **Rational** Explain your reason for choosing your material! |
| Cell Wall | **Shoe Box** |  |
| Cell Membrane | **Gallon Ziploc Bag** |  |
| Vacuole | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ size Ziploc bag** |  |
| Cytosol | **Jell-O** |  |
| Cytoskeleton |  |  |
| Nucleus |  |  |
| Nucleolus |  |  |
| Chromatin |  |  |
| Ribosomes |  |  |
| Rough Endoplasmic reticulum |  |  |
| Smooth Endoplasmic reticulum |  |  |
| Golgi apparatus |  |  |
| Vesicles |  |  |
| Lysosomes |  |  |
| Centrioles |  |  |
| Chloroplasts |  |  |
| Mitochondria |  |  |

**Cell in a Baggie Analysis:**

**As a group-** On a separate sheet of paper, describe how the cell functions. **Do not say any of the names of the organelles:** say the **material used to represent them instead!** Explain how each part of the cell is used to create proteins, lipids, and energy, and describe how every part interacts with the others. In this paragraph, be sure to include:

1. Every material you used (**with out saying the name** of the organelle!)
2. How proteins, lipids, and energy are produced or changed
3. How each part interacts with any others
4. Be written **as a paragraph**, not as a list!

Leave your paragraph next to your Cell Baggie!

**Gallery Walk of Cells:**

**Individually-** Visit two different cells, and fill out the table below, identifying each of their materials!

|  |  |  |
| --- | --- | --- |
| **Organelle** | **Material used to represent it** | **Material used to represent it** |
|  | **Animal Cell Group Initials:**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Plant Cell Group Initials:**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| Cell Wall | **NA-------------------------------------------------** | **Shoe Box** |
| Cell Membrane | **Gallon Ziploc Bag** | **Gallon Ziploc Bag** |
| Vacuole | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ size Ziploc bag** | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ size Ziploc bag** |
| Cytosol | **Jell-O** | **Jell-O** |
| Cytoskeleton |  |  |
| Nucleus | **Ornament** | **Ornament** |
| Nucleolus |  |  |
| Chromatin |  |  |
| Ribosomes |  |  |
| Rough ER |  |  |
| Smooth ER |  |  |
| Golgi apparatus |  |  |
| Vesicles |  |  |
| Lysosomes |  | **NA-------------------------------------------------** |
| Centrioles |  | **NA-------------------------------------------------** |
| Chloroplasts |  |  |
| Mitochondria |  |  |

**Analysis Questions:**

1. What is one **not pre-determined** organelle that was really easy to determine? Why?
2. What is one **not pre-determined** organelle that was really hard to determine? Why?