Building a Cell

Strand Living Systems
Topic Investigating cells
Primary SOL 5.5 The student will investigate and understand that organisms are made of one or more cells and have distinguishing characteristics that play a vital role in the organism's ability to survive and thrive in its environment. Key concepts include
a) basic cell structures and functions.
Related SOL 5.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
j) models are constructed to clarify explanations, demonstrate relationships, and solve needs.

Background Information

Animal and *plant cells* have many of the same parts, or structures, but also some that are different. Plants cells have the following parts: *nucleus, cell wall, cell membrane, vacuole, chloroplasts*, and *cytoplasm*. Animals cells have the following parts: *nucleus, cell membrane, vacuole, and cytoplasm*. Plant and animal cells are different in *shape*. Plant cells tend to be rectangular while animal cells tend to be spherical or at times irregular.

Materials

- Disposable bowls
- Two sizes of tight-closing plastic bags
- Vegetable oil (clear detergent, clear corn syrup, or another clear fluid with a jelly like consistency can be used; however, be mindful of student allergies.)
- A variety of small items, such as buttons, pasta noodles, beads, pipe cleaners, and dried kidney beans to mix into the oil
- Copies of the attached worksheet "Cell Identification"
- Drawing paper and/or journals

Vocabulary

nucleus, cell wall, cell membrane, vacuole, chloroplasts, cytoplasm, plant cell, animal cell

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Tell students they will be creating a diagram (a picture representation) of a plant or of an animal cell with a key. They will also build the actual model of the cell model. Before students can create their model, they must make a diagram of the cell on paper.

Procedure

1. Pass out drawing paper or ask students to take out their journals to create their diagram.
2. Place all materials in a central location and describe the different materials so that students can decide which materials they will use in their model.
3. Students will first design the cell model by drawing a diagram. Students must draw the materials to represent each of the cell's parts and include a key that identifies the cell's structures. Color will help students distinguish the different materials. On the side of the paper, have the students list the functions of each part of the cell.
4. As students finish their diagrams, check the cell for accuracy and then allow the students to start working on their models.
5. Explain to the students that they will be using the bowls or plastic bags to represent the cell wall and/or membrane of their cell and that the oil will represent the cytoplasm in both kinds of cells. The materials mentioned earlier will represent the different parts of the cell. Explain to the students that they can only use the materials as part of their cell model that they used in their diagram.
6. Students will build their models.

Conclusion

1. When students have completed building their models, have students pair up and exchange cell models with a partner.
2. Ask students to identify the partner's cell type (plant or animal) based on the structures in the cell. Ask them to identify the cell structures included in the model by looking at their partner's diagram.
3. When all students are finished, hold a class discussion on the structures of the plant and animal cells, focusing on the function of the cell wall and the cell membrane. Then focus on the chloroplasts in the plant cells to point out the differences between the two types of cells.

Assessment

- **Questions**
  - What does the oil represent in the cell models?
  - Identify the nucleus, cell wall, cell membrane, vacuole, chloroplasts, and cytoplasm.
  - What are the functions of the cell wall and the chloroplasts in a plant cell? Why are they not present in an animal cell?
- **Journal/writing prompts**
  - Explain how you built your cells, what materials you used, and why you chose the particular items you used for each structure. Explain why vegetable oil (or another substance) was used for the cytoplasm.
  - Create a poem or song to define the plant or animal cell parts.
  - Write a reflection on the differences and similarities of your cell and your partner's cell.
  - Compare and contrast plant and animal cells.

- After class sharing, write a reflection on what you learned from your classmates' models.

- **Other**
  - Assess the students' drawings and keys, checking to be sure all parts of the cell are identified, the function of each part is listed, and the cell is identified as plant or animal.
  - Assess the students informally by having each of them describe the parts of their cell to the whole class and having the class identify the described cell as either plant or animal.
  - Use the "Cell Identification" worksheet as a quiz on the following day to make sure that students can identify plant and animal cells by removing the key and having students label the parts/structures of the cells or by having students write the functions of each of the structures.
  - Allow half the class to share their models, and then have the other half put their models on another group's table. Ask those students to work in partners or in a group to create a key and identify the cells as plant or animal.

Extensions and Connections (for all students)

- Group students together to give them the opportunity to write a play in which each group is a plant or animal cell and each student in a group is one of the cell's structures. Have the groups present their plays to the class so that the audience must guess whether the cell is animal or plant.
- Have students decorate the class door or a bulletin board as a plant or animal cell.

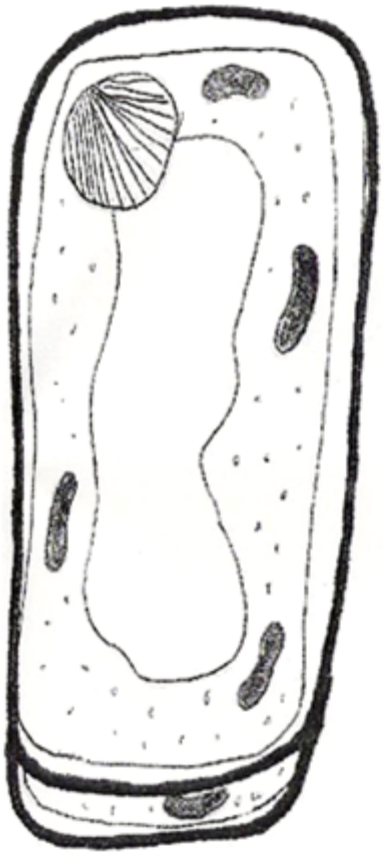
Strategies for Differentiation

- For students who need a challenge or for students who have food allergies, allow them to collect their own materials prior to the lesson.
- Allow students to work independently, in pairs, or groups depending on their need for support.
- Display some of the better drawings from the lesson on the wall or bulletin board with sticky notes covering the labels. For students who are struggling, use as a station for students to review plant and animal cell parts.
- Have students build digital models using computer software or an Interactive Whiteboard.

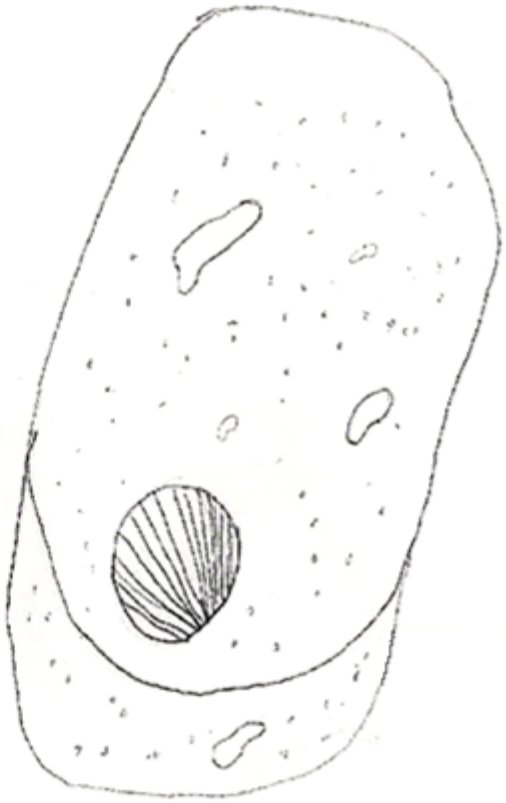
Cell Identification Worksheet

Name: _____ Date: _____

Cell Comparison



Cell 1



Cell 2

Cell Type: _____ **Cell Type:** _____