

Cell City Project

Name _____

7th Grade PSI

Score _____ /16 points total

Essential Question:

How do the structures and functions of a cell compare to the structures and functions of a city?

Hypothesis Starter:

1. How does a living animal cell and its organelles compare to a city, school, factory, or ballpark? Think about what components of a city, school, factory, or ballpark use energy, produce substances and manage waste?

Purpose:

This project is designed to help students deepen their understanding the cell, cell organelles, and cell organelle functions by drawing a metaphor to everyday life.

Overview:

Floating around in the cytoplasm of a cell are small structures called organelles. Like the organs in your own body, each one carries out a specific function necessary for the cell to survive. In order to survive, the cell must be able to interact with its surroundings, use energy, produce materials and manage waste. You will build their cell city, school, factory, or ballpark in a poster or model format and present the final product to the class. This is an individual lab activity and does not require groups or stations.

Your poster / model must include:

1. A creative title with the word “cell” somewhere in it.
2. It must have the shape of an animal cell.
3. All of the parts of the “city” should be labeled with the cell part and the analogy you chose to represent it (put parentheses around the cell part).
4. Your poster / model must be colorful, neat and creative.
5. The poster should be done on a piece of 14” by 22” poster board.
6. Include all of the organelles listed on the attached sheet and the appropriate analogies.

Procedures:

- _____ Step 1: Select your analogy. (A cell is like a _____)
- _____ Step 2: Complete the cell city analogy worksheet below.
- _____ Step 3: Make a rough draft of your poster / model idea (shape of an animal cell).
- _____ Step 4: Create your poster on 14” by 22” poster board or model.
- _____ Step 5: Label your poster / model with the cell part and analogy.
- _____ Step 6: Select a creative title (the word “cell” is in the title).
- _____ Step 7: Attach the completed cell city analogy worksheet and grading rubric to your poster.

Cell Analogy Worksheet

| <i>Cell Organelle</i> | <i>City, School, Factory, or Ball Park Analogy</i> |
|-----------------------|--|
| Lysosomes | |
| Cell Membrane | |
| Nuclear Membrane | |
| Nucleus | |
| Endoplasmic Reticulum | |
| Ribosomes | |
| Golgi Bodies | |
| Mitochondria | |
| Nuclear Envelope | |
| Centrioles | |

Project Questions:

On a sheet of paper or in your laboratory notebook, answer the following questions from your project.

1. What organelle was the most complex to draw the analogy to the component of a city, school, factory, or ballpark?
2. Why did you choose your location to use to draw your analogies?

Conclusion:

On a sheet of paper or in your laboratory notebook, write one or two paragraphs that summarize your function and purpose of your cell city, school, factory, or ballpark:

1. Write a letter to a visitor. List at least five places they have to visit while touring your city, school, factory, or other location. Explain how each location functions like a cell organelle. Conclude by highlighting three specific reasons one should visit your cell city, school, factory, or other location.

Presentation Rubric

| Task | (1) | (2) | (3) | (4) |
|------------------------------|---|--|---|--|
| Subject Knowledge | Student does not have grasp of information; student cannot answer teacher/peer questions about the subject | Student is uncomfortable with information and is able to answer only rudimentary questions | Student is at ease with expected answers to all questions, but fails to elaborate | Student demonstrates full knowledge (more than required) by answering all class questions with explanations and elaboration. |
| Mechanics/ Note Cards | Student's presentation: *did not have note cards *information extremely vague or incomplete *incorrect information | Student's presentation: *could only speak by reading the note cards *information vague | Student's presentation: *heavily relied on the use of note cards *All information was covered completely. | Student's presentation: *note cards are completed/student did not use note cards during the presentation *All information was covered completely |

Project Rubric

| Criteria | (1) | (2) | (3) | (4) |
|-----------------------------------|--|---|--|--|
| Labeled all cell parts accurately | *Analogy of cell parts to city parts were less than 80% accurate or incomplete *Some structures placed in poster / model were not accurate with the cell part represented | *Analogy of cell parts to city parts were 80% accurate *3 or more structures placed in the poster / model were not accurate with cell part represented | *Analogy of cell parts to city parts were 95% accurate *1-2 structures placed in the poster / model were not accurate with cell parts represented | *Analogy of cell parts to city parts were 100% accurate *ALL structures placed in the poster / model were accurate with cell part represented |
| Creativity | *The poster / model's parts did not show evidence of creative thinking or the city was incomplete | *The poster / model showed evidence of creative thinking but not consistent in all cell parts included in model | *The entire poster / model showed evidence of creative thinking | *The entire poster / model showed dynamic evidence of creative thinking |