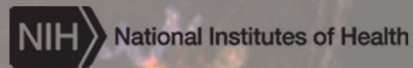


POWERS OF MINUS TEN

Cell City Lesson Plan



The Partnership in Education



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Cell City Lesson Plan

GRADE LEVELS: 5th-7th

TIME: 45 minutes- 1 hour

SUBJECT: Biology

CONCEPTS: Cells, organelle structure and function

LEARNING OBJECTIVES:

- * Identify cell organelles' structure and function
- * Compare cell organelles' function to that of a building/ organization in a city
- * Create models of cell organelles and city buildings/ organizations based on function

NEXT GENERATION SCIENCE STANDARDS:

- * MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
- * MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
- * SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
- * MP.2 Reason abstractly and quantitatively.

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OVERVIEW

In this lesson, students will use the app, Powers of Minus Ten to explore the interworkings of cells and their organelles. Exploration of the app is guided with the use of a scaffolded worksheet as well as class discussion. Later in the lesson, student groups will be assigned a specific organelle and use the information contained in the app to draw similarities and differences between the buildings of a city to the cell organelles. Students will construct a clay model of an organelle as well as a model of a city building. Finally student groups are asked to present their work via a class presentation followed by a creative- writing assessment.

MATERIALS:

- * Power of Minus Ten app (POMT)
 - * If it is not possible for each student to have a device with the POMT app installed, please project the app so that all students can view it.
- * Modeling clay- 5 colors
- * Copies of:
 - * “Cell City” student worksheet/ 1 per student
 - * “A Day in the Life” student worksheet/ 1 per student
- * Presentation Area for student models
 - * See the “Cell City” worksheet for more information.

BACKGROUND INFORMATION:

In order for this lesson to be successful, students should have mastery of the following concepts:

- * Cells are the building blocks of living things.
- * All living things are made up of cells.
- * Cells have specific jobs inside the body.
- * Cells have organelles that help them complete these jobs.

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PRE-ACTIVITY—5 minutes

1. To start the lesson, make sure that each student has access to a device with the POMT app installed on it.
 - * If this is not available, please make sure that each group has access to at least 1 device for the activity.
2. Project the device image so that all students can follow along with your instructions.
3. To begin, show students how to launch the POMT app and how to log in using “Single Player” mode.
 - * Demonstrate for the students how to adjust the magnification level to zoom in and out of the cells.
 - * Show students where they can find information for each organelle of the cell.
 - * Demonstrate how to move, tilt, and rotate the screen to explore the cells.
4. Once you have instructed students on how to navigate the app, pass out the “Cell City” sheet to each student.
5. Divide students into 5 groups
 - * If available, each student should have a device with the POMT- Cells app. If this is not possible, please make sure that each group has access to at least one device with the app installed.
6. Distribute 1 can of modeling clay to each student group. (Each group should only have 1 color of clay.)

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ACTIVITY—45 min

1. Assign an organelle to each student group.

- * Mitochondria
- * Nucleus
- * Ribosome
- * Endoplasmic reticulum
- * Golgi Apparatus
- * Lysosome
- * Vesicle
- * Centriole

2. Using the Cell City worksheet, allow students to work in their groups to complete the guided worksheet.

If students are having difficulty, discuss the example of a nucleus.

* “Think about the nucleus. What does it do in the cell? It gives orders and makes the rules for other organelles to follow. It’s a center of information. Can you think of any building in a city that makes the rules for the city? A courthouse enforces the rules of a city, just like the nucleus in a cell does. ”

* Answers will vary, as there is no “wrong” answer or comparison as long as appropriate justification is given.

3. Allow students about 30 minutes to complete the worksheet and create their models.

* See “Cell City” worksheet for more details.

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After students have created their models, allow student groups to present their models to the class in a designated presentation area. Make sure the area is large enough to display each group's models. The area should be divided into 2 sections: one for the organelle models and one for the city building models.

4. Using the questions below, guide students through their presentation:
 1. "What organelle did you create?"
 2. "What city building/organization did you create?"
 3. "What are some important functions of the organelle?"
 4. "What role does the organelle play in the cell?"
 5. "Why did you choose that specific city building/organization?"
 6. "What role does that building play in a city that is similar to the organelle in a cell?"

5. After all student groups have presented and added their models to the display, proceed to the Post-Activity.

POST ACTIVITY—10 minutes

After all student groups have completed their presentations, conduct a class discussion, using the following guided questions:

- a. What information did you learn that was new about your organelle?
- b. What is the function of a certain part of their cell?
- c. What does size have to do with cell functions?
 - i. Were you surprised at any information of the part of the cell?
 - ii. What did you observe from the building of a cell or town/city in relation to the function of a whole cell, or certain parts of the cell?

Assessment:

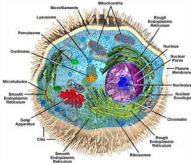
Following the class discussion, provide each student with a copy of the "A Day in the Life" worksheet that can be completed as a homework assignment.

Cell City

Name _____

ORGANELLE

1. What is your organelle?



2. Where is it found?

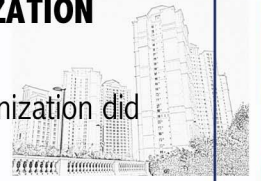
3. What does it do?

4. What does it look like? (Draw a picture!)

Can you think of a city building or organization that does the same job as your organelle? Have a discussion with your group members to come up with some ideas!

CITY BUILDING/ORGANIZATION

1. What is city building or organization did you choose?



2. Where is it found in a city?

3. What function does it have in a city?

4. What does it look like? (Draw a picture!)

What are three similarities between your organelle and your city building/organization?

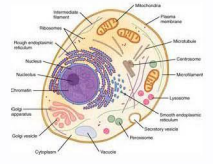
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Now it's time to create some models. Using the clay provided, please create 2 models:

**1 model of your organelle and
1 model of your city building**

You will be presenting these models to the class.

A Day in the Life



Name: _____

Writing Prompt: *Imagine that you are a protein in a cell. Using what you have learned about cell organelles, tell the story of how you were made, which organelles you interacted with or visited, what you did there, and what happened to you afterwards. Be creative in your description and be sure to use vocabulary and information you learned from the lesson in your writing. Make sure your answer is at least 5 sentences long.*



Tip: Good writers use complete sentences, correct punctuation, grammar, and spelling in their answers.