

# EMS Lesson 3: Cell City

## (Post-Exhibit Visit)

### Objective:

By the end of the lesson, students will understand how various cell parts function and how they are related to the genetic process by creating a model and symbol to depict the function of the cell parts.

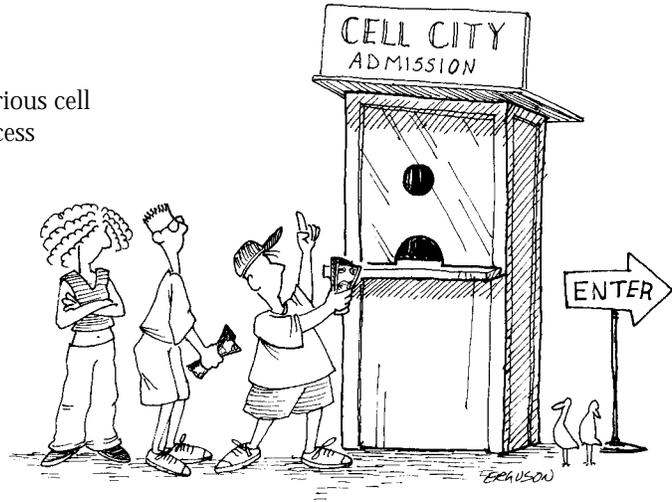
### Curriculum Link:

This lesson introduces students to the names and functions of cell parts as a foundation to the study of heredity. Following a visit to the exhibit, teachers may refer to the Cell Explorer as students create their own models of a cell.

### Exhibit Link:

*Cell Explorer:* Cells, Cells, and More Cells

In this section of the exhibit, students are able to view magnified sections of cells and identify the parts.



### Time Required:

*Teacher Preparation:* 20 minutes    *Class Time:* 30-45 minutes

### Materials Needed:

- Overhead projector, slides, or large diagram of an animal cell with parts labeled.
- Construction paper, yarn, glue, old magazines that can be cut up
- Colored markers, crayons, scissors
- Two pieces of white butcher paper cut approximately three ft. square with a large circle on each

### Lesson Steps/Activity:

1. On one large paper circle, have students think of a city and how it operates. Draw and label figures within the circle that represent key buildings and people that are important for a city to run smoothly. Prompt students with questions like the following: Who protects the city? Where do we get electrical power? Where do we get food? How do you know when you are out of city limits? etc.
2. Display a picture or diagram of an animal cell with its parts labeled. (See additional resources.)
3. Discuss the fact that each cell part has an important function, just like parts of a city. Explain that some parts of a cell are directly involved in the genetic process, while other parts take a supporting role but are still necessary to the whole cell. Tailor the complexity of the discussion and the number of cell parts discussed to student ability level.
4. Divide the class into small groups, and assign a cell part to each group. Instruct them to research the cell part to determine its function. Challenge them to think of a creative way to depict the function. Example: the cell membrane could be pictured as a gatekeeper, border guard, etc., because it determines what enters and leaves a cell.
5. Have each group cut out, draw, or construct a picture to represent the cell part's function. When each group is finished, have them attach their creation to another three-foot paper circle, which represents a cell, and explain the function and the symbol to the class. Pay special attention to the cell parts' genetic functions.

### Extensions & Modifications:

Elementary:

- Have a supply of resource books available in the classroom for the students to use.
- After each group has attached its part to the large cell diagram, have all the students enter the cell parts and their definitions in a science journal or vocabulary list.
- In the science journal, suggest that each student use an analogy or metaphor that was presented in class for each cell part, or make up their own.

Middle:

- Give all the students the cell part names and have each student group research the function of the parts and come up with a unified theme or metaphor to represent the functions.
- Require each group to compose two test questions and answers from their research. When all the groups are finished, use the questions and/or answers to play a form of Jeopardy! or some other game of team competition

Important terms: cell, nucleus, cell membrane

Additional Middle School terms: organelle, mitochondrion, cytoplasm, ribosome

### **Writing Prompts/Discussion Questions:**

1. What do you think would happen to a cell if (name the cell part) were missing or not functioning properly?
2. How is a cell like a city?
3. What do you think is the most important part of a cell? Why?
4. Why do you think we used analogies in this lesson to learn about the different parts of cells? Was it helpful?
5. A cell is microscopic — much smaller than what we can see with the naked eye. Are you surprised that so much happens in a cell, despite its size?

### **Additional Resources:**

Biotech Adventure: <http://biotech-adventure.okstate.edu/low/basics/>

CELLS Alive!: <http://www.cellsalive.com/>

Both of these sites detail the parts of a cell.

### **National Standards Addressed:**

5-8 Content Standard C – The Molecular Basis of Heredity

- Living systems at all levels of organization demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, organs, tissues, organ systems, whole organisms, and ecosystems.
- All organisms are composed of cells — the fundamental unit of life. Most organisms are single cells; other organisms, including humans, are multicellular.
- Cells carry on the many functions needed to sustain life. They grow and divide, thereby producing more cells. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.