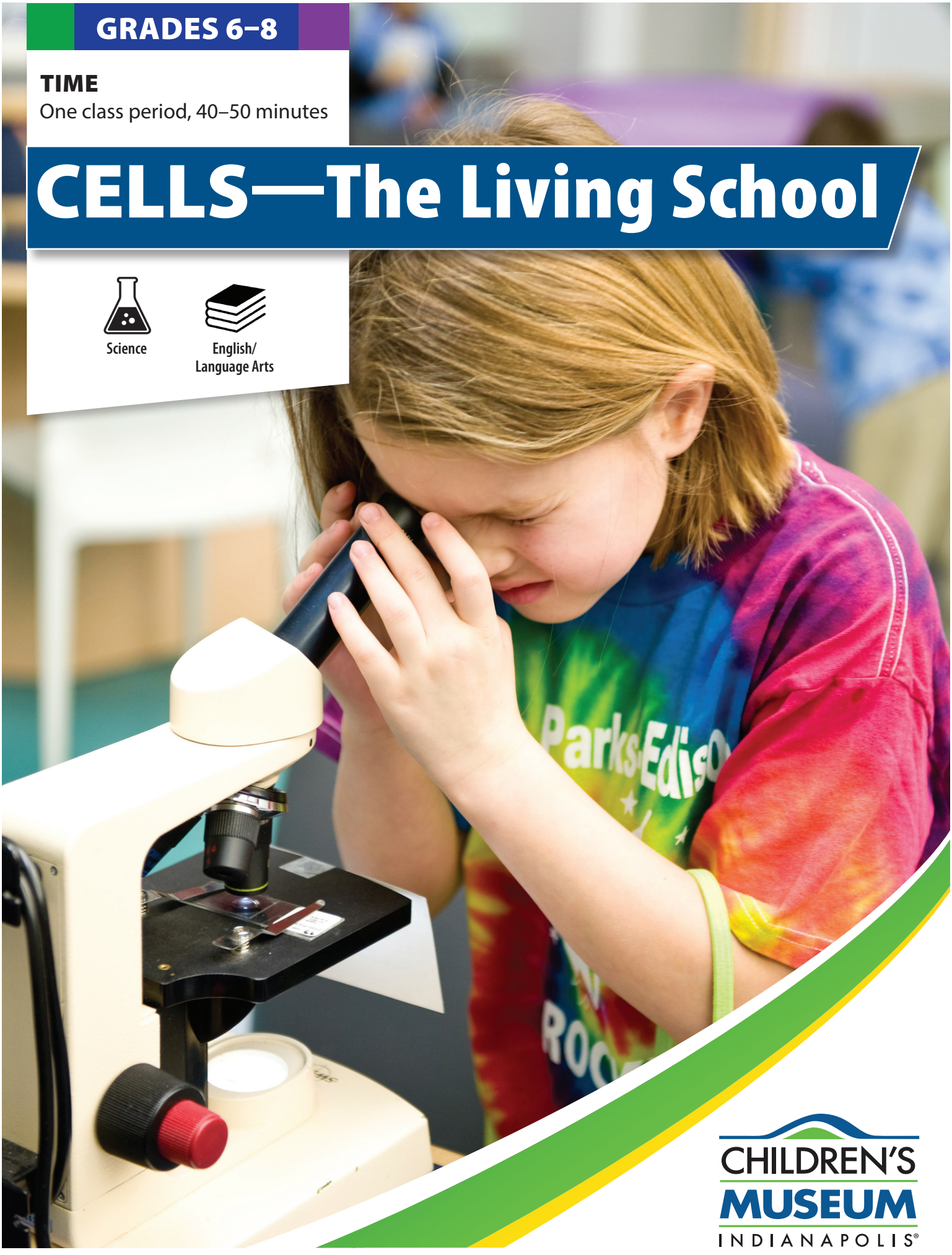
GRADES 6–8

TIME
One class period, 40–50 minutes

CELLS—The Living School

Science

English/
Language Arts



CHILDREN'S MUSEUM INDIANAPOLIS®

CELLS—THE LIVING SCHOOL

The Children's Museum's lessons are designed to weave creative space experiences and museum education together.All lessons are interdisciplinary and can be used asindividual creative space experiences or in combination tocreate a cohesive unit. Lessons are optimized when used in connection with museum field trips.

Until the invention of the microscope over four centuries ago, scientists knew very little about **cells**. Today we know that cells are the building blocks of life. In this lesson, participants compare a cell to their school. Without the **nucleus**, **cell wall**, **cell membrane**, **cytoplasm**, **endoplasmic reticulum**, **ribosomes**, **mitochondria**, and **Golgi apparatus**, the cell would be incomplete and unable to function. Just like a cell, the parts of a school work together to run the school. Without the office, hallways, creative spaces, cafeteria, restrooms, participants, faculty, and staff, the school would not exist. The tools and scientific processes participants use in this lesson can be found in The Children's Museum ScienceWorks gallery. Participants use all five senses as well as technology, chemistry, math, and other tools to help them study, record, and analyze their observations in the world-class STEMLab and SciencePort. Learn more about our resources at childrensmuseum.org

INDIANA ACADEMIC STANDARDS

Science: Life Science: 7.LS.1, 7.LS.2, 7.LS.3, 7.LS.4, 7.LS.5

English/Language Arts: Speaking and Listening: 6.SL.1, 6.SL.2.1, 6.SL.2.2, 6.SL.2.3, 6.SL.2.4, 6.SL.2.5, 6.SL.4.1; 7.SL.1, 7.SL.2.1, 7.SL.2.2, 7.SL.2.3, 7.SL.2.4, 7.SL.2.5, 7.SL.4.1, 7.SL.4.2; 8.SL.1, 8.SL.2.1, 8.SL.2.2, 8.SL.2.3, 8.SL.2.4, 8.SL.2.5, 8.SL.4.1, 8.SL.4.2

OBJECTIVES

Participants will:

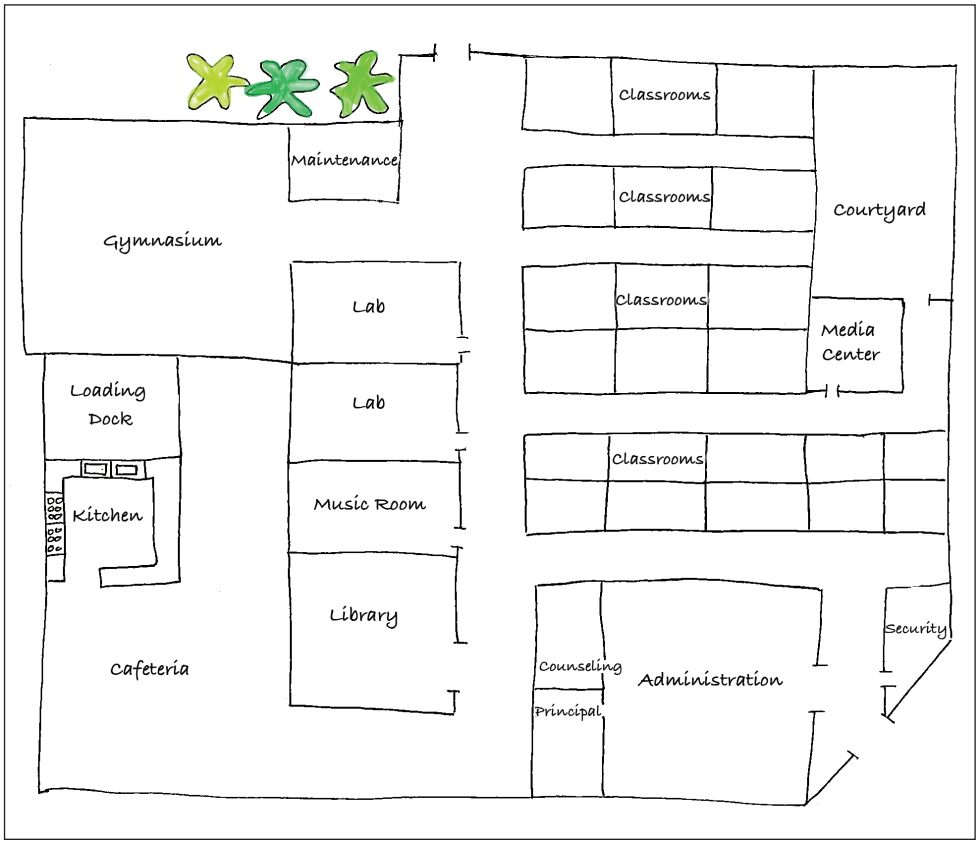
- Explain that all living things are made of cells.
- Recognize the parts and functions of a cell.
- Apply their knowledge of cells to design a new "school cell," using the school as a template.
- Present the school as a cell and evaluate and justify its relationship to an actual cell.

FOCUS QUESTIONS

- Where is the genetic information located in a cell? Why is this important to the cell?
- How is your school like an animal cell?
- What other things can you compare to a cell?
- What would happen if one of the parts of a cell is not working?

MATERIALS

- Map of your school
- Supplies for participant presentations (poster material, media technology, model-making material)



Creating a School Cell

PROCEDURES

PART 1

- Break the participants into groups of four or five to complete this experience in teams.
- Review the parts and functions of an animal cell.
- Instruct participants to drawn a map of their school and include very important parts such as: gymnasium, cafeteria, creative spaces, labs, music rooms, administration, security office, maintenance.
- Inform participants the school represents an animal cell and the map represents a drawing of the cell.
- Challenge participants to describe analogies between parts of a cell and parts of a school. Use The Living School worksheet (located on the back page) to help participants map their thoughts.
    - Example: The school office represents the nucleus. The nucleus controls the activities of the cell. The office controls the activities of the school. Some examples are scheduling, discipline, school policies and procedures, and extracurricular activities.
- Instruct participants to label the respective cell parts on their school map and describe their reasoning in several well-organized paragraphs on a separate sheet of paper.
- Allow participants the remainder of the class time to generate their school cell.
- Inform participants they will be presenting their school cell in part 2 of the lesson.

PART 2

- Help participants review strategies for making and participating in oral presentations.
- Allow each group to use the map and their notes to present their school as a cell.
- As a class, evaluate each presentation. Decide which school structures represent the most accurate description of a cell based on participant explanations.

CELL PARTS AND FUNCTIONS

For more information about cell parts and functions go to nationalgeographic.org/article/cells-and-versatile-functions-their-parts/

ADULT TIPS

- Jell-O is a malleable material that can be used for a 3D model of a cell. Place premade Jell-O in a plastic bag and insert items into it, such as buttons, candy, or beads, to represent the parts of a cell. Ensure the items used are not too heavy, such as a marble, or they will not suspend in the Jell-O.
- Encourage participants to be innovative and ask what other ways they can showcase a cell. Ask them to prepare a presentation with their creation. Assist participants who struggle with ideas by asking them about fun materials they could use (e.g., modeling dough, slime, papier-mâché) and ask them about unique visuals that make presentations interesting (e.g., pop-up books, 3D designs).

The Superpower Cell

Cells have the amazing superpower of healing themselves when they are damaged. Proteins assist with cell repair and, as cells divide and replicate, can heal the damage. Unfortunately, we live in a world that can sometimes cause stress on our cells. One example of an environmental stress is exposure to UV radiation in sunlight. This radiation has been proven to damage skin cells when there is long-term and direct exposure to the skin. To protect against cell damage, and to give our cells a fighting chance, awareness of external threats is crucial. Applying sunscreen to our skin at all times of the year, eating a balanced diet, and exercising regularly all help our cells do what they do best—keep us healthy!

VOCABULARY

- **cell**
- **cell membrane**
- **cell wall**
- **chloroplast**
- **cytoplasm**
- **Golgi apparatus**
- **endoplasmic reticulum**
- **nucleus**
- **organelle**
- **ribosomes**
- **vacuole**

WORKSHEET: THE LIVING SCHOOL

DIRECTIONS: Connect the different cell parts and their functions to parts of your school. *(For example, a cell membrane protects the cell just as walls protect the school.)*

Animal Cell Part	School Part	How Are They Similar?