

# POWERHOUSE SCIENCE CENTER

3615 Auburn Blvd., Sacramento 95821 (916) 674-5000

## Topics

Life Sciences

## Grades

6-8

## Duration

60 minutes

## Vocabulary

microscope, microscopic, magnify, focus, stereomicroscope, compound microscope, cell, microscope slide, coverslip, forceps, nucleus, cell membrane, cell-wall, cytoplasm

## Next Generation Science Standards

### Practices

Planning & Carrying Out Investigations

Developing and Using Models

### Core Ideas

LS1.A: Structure and Function

ETS – Links Among Engineering, Technology, Science and Society

## Cellular Adventures

### Overview

What is the smallest complete part of you? Students develop ideas on ways they could observe cells. They conduct an investigation to prove that all living things are made of cells. They follow microscope slide preparation techniques to extract onion cells and observe them under a microscope. Students record their observations and conclude that cells are the smallest complete part of all living organisms. In addition, they compare and contrast their slides to prepared slides of human cheek cells and record the differences between a typical plant and animal (human) cell.

### Objectives

- Students infer that all living things are composed of cells
- Students learn microscope use techniques
- Students observe that the cell is the basic structural and functional unit of all living organisms
- Students identify basic cell organelles
- Students record their observations in the lab journal
- Students distinguish the differences between a plant and animal cell

### Teacher Preparation

- Please arrive at Powerhouse with enough time to allow students and chaperones to use the restroom before the program begins.
- If program starts late, content will be altered to fit available time.
- The teacher is required to remain in the lab throughout the presentation.
- Students will be working with chemicals. They should wear appropriate clothing.
- Students will work in pairs. Be sure to assign pairs who will work well together.

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## **Next Generation Science Standards**

### **Crosscutting Concepts** Structure and Function

Scale, Proportion and  
Quantity

**Performance Expectations**  
MS LS1 – From Molecules to  
Organisms: Structures &  
Processes

## **Vocabulary**

**Microscope:** an instrument  
used to see objects that  
are too small to be seen  
by the naked eye

**Microscopic:** so small as  
to be visible only with a  
microscope

**Magnify:** make  
(something) appear larger  
than it is

**Focus:** A means of moving  
the specimen closer or  
further away from the  
objective lens to render a  
sharp image

**Cell:** basic structural and  
functional unit of all living  
things

**Microscope slide:** a small  
flat rectangular piece of  
glass on which specimens  
can be mounted for  
microscope study

## **Cellular Adventures**

### **Teacher Preparation Continued:**

- Students will be writing descriptions on a lab sheet. If this presents a challenge to any of your students, please be sure to inform Powerhouse in advance.

### **Extended Learning Activity**

Students make models of a typical cell showing the different organelles. Below are links to instructions:

#### *Edible Model:*

[http://grad.bio.uci.edu/ecoevo/ahebling/Research/GK-12\\_files/  
EdibleCell.pdf](http://grad.bio.uci.edu/ecoevo/ahebling/Research/GK-12_files/EdibleCell.pdf)

#### *Non-edible Model*

[https://www.weirdunsocializedhomeschoolers.com/ways-to-make-a-cell-  
-model/](https://www.weirdunsocializedhomeschoolers.com/ways-to-make-a-cell-model/)

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## Vocabulary Continued:

**Coverslip:** a small and very thin piece of glass used to cover the specimen on a microscope slide

**Forceps:** a pair of pincers or tweezers used in a lab

**Nucleus:** a dense organelle found in most cells, containing genetic material

**Cytoplasm:** semi-fluid substance within a cell excluding the nucleus

**Cell membrane:** a membrane surrounding the cytoplasm of a cell

**Cell wall:** a rigid layer lying outside the cell membrane in plant cells

## Quote:

“A cell is regarded as the true biological atom.”  
-George Henry Lewes

## Cellular Adventures

### Resources

University of Utah Genetic Science Learning Center

*-Interactive exploration of cells*

<http://learn.genetics.utah.edu/content/cells/insideacell/>

*-Worksheets*

<http://teach.genetics.utah.edu/content/cells/InsideaCellWorksheet.pdf>

GeneEd - Genetics, Education, Discovery

[https://geneed.nlm.nih.gov/topic\\_subtopic.php?tid=1](https://geneed.nlm.nih.gov/topic_subtopic.php?tid=1)

University of Utah, Genetic Science Learning Center

<https://teach.genetics.utah.edu/>