



## **Classroom Teacher Preparation**

### **Anatomy/Physiology 1: Cells & Organelles**

**Please use the following to prepare for the next SfS lesson.**

#### **Description:**

Students make a cell model to learn about the functions and interactions of a cell's organelles. In one option, students compete to assemble a cell model, with each pair or small group taking charge of one organelle and interactively instructing their classmates. In the second option, students base their model construction decisions on the information they learn, and justify those decisions to the class.

#### **Lesson Objectives – SWBAT (“Students Will Be Able To...”):**

**6<sup>th</sup>-8<sup>th</sup>**

- Explain the roles of the different organelles of plant and animal cells, and how organelles work together

#### **Disciplinary Core Idea (DCI)**

*LS1 From Molecules to Organisms: Structures and Processes – LS1.A Structure and Function*

- (6<sup>th</sup>-8<sup>th</sup>) All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions.

#### **Science & Engineering Practice (SEP)**

*Developing and Using Models*

- (6<sup>th</sup>-8<sup>th</sup>) Develop and/or revise a model to show the relationships among variables, including those that are not observable but predict observable phenomena.

#### **Crosscutting Concept (CCC)**

*Systems and System Models*

- (6<sup>th</sup>-8<sup>th</sup>) Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.

*Structure and Function*

- (6<sup>th</sup>-8<sup>th</sup>) Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.

#### **Preparation:**

This is an introductory lesson. No preparation is necessary.

#### **Room Set Up for Activities:**

Students will work in pairs or small groups (maximum of 12 groups). Each group will need a workspace for making their own model. In the game version, it is ideal if the workspaces are somewhat separated, so that one group can quiz another



student without eavesdroppers. (Though realistically, the noise level of twelve groups quizzing at once may be an effective aural block.)

### **Safety:**

There are no safety concerns with this module.

### **Related Modules:**

This lesson may be used to introduce and provide context for a sequence of modules on DNA and inheritance. Modules include:

*Anatomy/Physiology 2: Mitosis* – This module teaches the basics of mitosis using plant root tips. Students learn to identify cells in the different stages of mitosis, as well as how to use a compound light microscope and (for classes with ample time) prepare a wet-mount slide.

*Anatomy/Physiology 3: DNA Extraction* – Students extract DNA from strawberries (or another food) and learn about the significance of each step.

*Anatomy/Physiology 4: Phenotypes, Genotypes, & the Environment* – This module covers dominant and recessive genes, along with complete and incomplete dominance. Through the activity, students delve more into genetic variation within a population by focusing on the genotype and phenotype of fish color.

*Anatomy/Physiology 5: From Genes to Proteins* – This module is a hands-on simulation of how DNA ultimately creates the proteins in our bodies. Students are provided with DNA gene sequences, which they must first transcribe into mRNA and then translate into a protein (amino acid sequence) to build a new species, called the Scimon.

For other module sequences and groups, look here: [www.sciencefromscientists.org/sequences](http://www.sciencefromscientists.org/sequences)

### **Standards Covered:**

Please click the following link to our website to review the standards covered by this lesson, listed by state: [www.sciencefromscientists.org/standards/](http://www.sciencefromscientists.org/standards/)

Lessons are matched to both national NGSS and local state standards.

### **After Our Visit:**

*Extend this lesson by playing online games about cells.*

Access this Extension activity by visiting the Classroom Post found on our website at [sciencefromscientists.org/cohorts](http://sciencefromscientists.org/cohorts). Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at [sciencefromscientists.org/open-response-questions](http://sciencefromscientists.org/open-response-questions). They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

### **Additional Resources:**

- Review material, and add more detail, with the interactive site here: [https://www.cellsalive.com/cells/cell\\_model.htm](https://www.cellsalive.com/cells/cell_model.htm)
- Explore the size and scale of cells here: <http://learn.genetics.utah.edu/content/cells/scale/>
- Students can apply what they've learned about cells in general to understand how skin cells can be damaged by the sun: <http://www.pbs.org/wgbh/nova/body/what-causes-sunburns.html>