Classroom Teacher Preparation

Anatomy/Physiology 2: Mitosis

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

Description:

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. This lesson is geared towards older (7^{th} & 8^{th} grade) or advanced students.

Lesson Objectives – SWBAT ("Students Will Be Able To…"):

7^{th}-8^{th}

- Identify and define the major phases of mitosis (prophase, metaphase, anaphase, telophase) as well as interphase and cytokinesis
- Understand why cells undergo mitosis
- Use a compound light microscope

Disciplinary Core Idea (DCI)

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

- (6^{th}-8^{th}) 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)

Analyzing and Interpreting Data

Preparation:

This lesson focuses on the process of cell replication and requires students to be familiar with the structure and function of both plant and animal cells with an emphasis on the cell's nucleus.

It is recommended that AP01: Cell City and AP03: DNA is Everywhere are taught prior to this lesson unless students are familiar with the structure and function of cells and of DNA.

Room Set Up for Activities:

The activity for this lesson will be completed in pairs or in groups of 3. Microscopes will be used, and access to outlets and/or extension cords is needed.

Safety:

For classes that are 60 minutes or longer, the activity for this lesson allows students to prepare their own onion root tip slides. To observe cells undergoing mitosis, hydrochloric acid (HCl - a corrosive acid) and toluidine blue will be used. Toluidine blue is not considered a dangerous chemical, but it will stain clothes and skin. Gloves and goggles are to be worn by students and teachers at all times. All materials should be handled with gloves, and students are not to ingest or inhale any substances.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Cells**. Other modules in this sequence include:

Anatomy/Physiology 1: Cell City – By competing to construct a model, students learn about its components and their functions. The metaphor of the cell as a city is used to make the information more accessible. It is highly recommended that Cell City be taught prior to Mitosis.

Anatomy/Physiology 3: DNA is Everywhere - This lesson covers some basics of the role of DNA before students extract a visible sample of the molecule of life from food (strawberries, bananas or peas).

Anatomy/Physiology 6: Blood Composition - This is an introductory lesson detailing the components of blood and highlighting the process and importance of blood typing. The lesson starts with an introduction to the cells and fluids making up our blood, followed by a simulated blood typing activity.

For other module sequences and groups, look here: 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: http://www.sciencefromscientists.org/standards/

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

After Our Visit:

Extend this lesson by recreating the phases of mitosis using shoelace licorice.

Access this Extension activity by visiting the Classroom Post found on our website at 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. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

- Crash Course Biology – Mitosis: https://www.youtube.com/watch?v=L0k-enzoeOM

WGBH Videos and Activities: The PBS educational site is a great, **free** resource for educators but you must create an account to use the materials. The first time you log in to the PBS Learning Media website you will be asked to create an account and provide an email and password. Once you have logged in, select "keep me logged in" to avoid having to repeat the process.

- Short introduction to mitosis: http://www.pbslearningmedia.org/resource/tdc02.sci.life.stru.dnadivide/mitosis/
- An interactive look at mitosis vs. meiosis: http://www.pbslearningmedia.org/resource/tdc02.sci.life.gen.mitosis/how-cells-divide-mitosis-vs-meiosis/