

7.3.1 e3 Brain vs. Bones Narrative

Time: 90-120 minutes	Anchor Phenomena: Dr. Semmelweis noticed a difference in patient death rates when doctors started washing their hands.
Big Idea: All living things are made of cells.	
CCCs Structure and Function,	Practices Planning and carrying out investigations

EPISODE SNAPSHOT: Students **investigate** that cells in a multicellular organism may be differentiated to perform specific functions for the organism. They use their observations to observe how different structures affect function. Students also need to identify and use the tools that allow them to observe cells.

GATHERING

The cells that make up a multicellular organism can look very different from each other. The teacher provides images of different types of cells, such as red blood, nerve, bone, skin cells, and muscle cells. *(Teacher hint: These can be shown either as a slideshow using a projector, or the teacher can set up microscopes around the classroom with prepared slides. Not many companies produce slide of cells because cells are so small. Most prepared slides are of tissue. Since students will need to know what tools are used to see cells and how to use them, the use of microscopes is preferred.)* *(Teacher hint: To begin with, the slides are only numbered, not identified as any particular cell. The type of organism the cells come from may be identified before the cells are observed, although this isn't necessary - it can be identified later.)* Students use the graphic organizer to write down observations and draw pictures of what they see in the microscope. *(Teacher hint a second investigation of the differentiation of an organism's cells could be done using plant cells such as root and leaf cells).*

REASONING

Students make observations and drawings of each of the slides on the graphic organizer, and write questions their observations bring up. Students also try to identify possible locations for that type of cell. Teacher leads students in classroom discussion based on the questions their observations brought up. Two questions that may guide classroom discussion are:

- Why do they look different?
- Do the cells all do the same thing? *(Teacher hint The focus now is on how the different structure of the cells allow them to provide a different function for the organism. The idea that cell organelles perform specific functions to keep themselves alive can be touched on here, but will be addressed in 7.3.2).*
- Do they have the same parts? *(Also addressed in 7.3.2)*

As students fill in their graphic organizers, they construct explanations from their observations of the cells. Teacher guides discussion of what type of cell is found on each slide. Teacher shows students the PBS video about cell differentiation and may also go through the reading found on the same page under Support Materials, Background Essay.

COMMUNICATING

Students will be divided in groups and assigned a type of cell they observed earlier. They create a small poster (can be 11x17 or regular copy paper size) with an illustration of the cell and a description of the function of the cell and the organ/structures it's part of. Included template could be printed and given to students to fill in, or students can create their own posters. Students present their poster to the class - as each one is presented, students take notes on the functions of each cell in their graphic organizer.

Assessment: Proficiency is indicated by recognizing the differences among cells and then recording the correct information about each cell.

Materials, resources, handouts, etc:

PBS Cell Differentiation:

<http://www.pbslearningmedia.org/resource/tdc02.sci.life.stru.different/cell-differentiation/>,

[7.3.1 e3 BrainVsBones graphic organizer](#)

[Cell poster template](#)