

Subject/Grade: 7 & 8 Science		Lesson Title: Functional Relationship among cells		Teacher: Ian Bonnell	
Stage 1: Identify Desired Results					
Outcome(s)/Indicator(s):					
<p>CS8.1 - Analyze the characteristics of cells, and compare structural and functional characteristics of plant and animal cells.</p> <p>(g) Observe and identify cell structures (e.g., cell wall, cell membrane, vacuole, nucleus, cytoplasm, mitochondria, and chloroplast) and identify which are found in plant cells and which are found in animal cells.</p> <p>(h) Explain the function of cell structures (e.g., cell wall, cell membrane, vacuole, nucleus, cytoplasm, mitochondria, and chloroplast), including how each structure contributes to the health of plant and animal cells</p> <p>CS.8.3 - Distinguish structural and functional relationships among cells, tissues, organs, and organ systems in humans and how this knowledge is important to various careers.</p> <p>(c) Analyze why cells and tissues are specialized in multi-cellular organisms.</p> <p>e) Construct a representation of the relationships among cells, tissues, organs, and organ systems in humans using examples from the respiratory, circulatory, digestive, excretory, and nervous systems.</p>					
Key Understandings: ('I Can' statements)			Essential or Key Questions:		
<p>I can name the basic structures of plant and animal cells</p> <p>I can explain the main functions of basic organelles/structures of plant and animal cells and visualize their uses</p> <p>I can create an organism based on the basic principles of cell division and specialization</p>			<p>What are the major parts of a cell?</p> <p>Why do cells differentiate?</p> <p>What do we need cells for?</p>		
Prerequisite Learning:					
<p>Understand that cells make up every living organism, cells are living</p> <p>Understand that cells have many components that make up their structure</p>					
Instructional Strategy(ies)					
Inform, discuss, create, assess					
Stage 2: Determine Evidence for Assessing Learning					
<p>Formative, students create a cell and its parts.</p> <p>Formative, students divide the cell into more cells.</p> <p>Formative, students create organs with the divided cells.</p> <p>Summative, students have created an organism with the requirements for life.</p>					
Stage 3: Build Learning Plan					

<p>Set (Engagement):</p> <p>1. Review the organelles 10 mins Cells are alive, are the building blocks of life Nucleus - controls the activity of the cell Cytoplasm - clear thick fluid inside the cell that protects and supports the organelles Cell membrane - barrier between a cell and its environment that lets materials in or out of the cell Mitochondria - produces energy for the cell Ribosomes - makes protein for the cell Lysosomes - contain enzymes to break down and digest food, old cell parts, bacteria, toxins Vacuole - stores food, water, and waste Golgi bodies - packages, and exports proteins Endoplasmic reticulum - tubes that carry materials throughout the cell</p>	<p>Instructional Strategies: Direct instruction Video Summarizing Group Work Activity Play-doh creation</p> <p>Materials/Resources: Play-doh - enough for the kids to make organs and cells 8 Worksheets with the Characteristics of life Computer for the videos</p> <p>Possible Adaptations/Differentiation: Students could work on their own if they are concerned with covid</p> <p>Management Strategies: Pull focus back together after breaking for group activity</p> <p>Write answers on board as we go</p> <p>Safety Considerations: Covid protocols with group work - masks on and sanitizer before using play-doh</p>
<p>Development: Length of Time: 10 mins Ask the students to get in groups of 4-5. Sanitize hands. As a group they will create a cell using playdoh. Make it composed of the organelles but allow the students to create each organelle in a way that they will remember it. Ex a mitochondria generates energy (powerplant), nucleus (brain)</p> <p>Each student should create one or two of the organelles.</p>	
<p>Discuss mitosis or the division of the cells. 5 min</p>	
<p>Get the students to split their cell and ensure all the organelles are split as well into the new cell. 5 min Split it again so there is one cell each with all the components.</p>	
<p>Show a video explaining differentiation https://www.youtube.com/watch?v=gwAz_BtVuLA 4:30 min</p>	
<p>Discuss differentiation and stem cells. 5 min</p>	
<p>Now, we're going to say that each cell you are holding is a differentiated cell and will form an organ of the body. Turn your playdoh into an internal organ. Everyone will have to create a different internal organ that can be put in a new organism, so discuss with each other, who is doing what.</p> <p>https://www.youtube.com/watch?v=0NnFhY_STFQ - Characteristics of life 2:05</p>	
<p>Now create an organism with the organs inside - 10 min</p>	

As a group, the students must fill out the sheet about their organism. Does it have the characteristics of life. Students must fill out at least one item per characteristic.

Learning Closure: Share the organism, its name and 1 characteristic that allows it to live
Length of Time: 3 min

Stage 4: Reflection

The students really enjoyed this and it was a good way to bring some fun to science. You have to allow a little more noise because there is a lot of interaction. I would definitely rethink the organism part. The students struggled to figure out how to put their organs into an organism. Also, they found it hard to answer the worksheet.
Next time, I would assign groups for this activity. One group struggled with everything, and another was a bunch of rockstars. Pre-planned groups might make things go smoother.