

3d Cell Model Challenge

Content Learning Targets:

- 1) Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function. (MS-LS1-2)

Background:

- This project could take place in the middle of a cell biology unit. The following project offers a way for students to model their cell in 3d using Tinkercad. This is one example of how 3d modeling could be used to help learners latch on to a concept through design. Modeling in 3D could just as easily be applied to building molecules and modeling eco/solar systems for example. Lastly, the project assumes students already have student friendly definitions and some basic knowledge of cell organelles before beginning their design. Students would also have had some basic training in Tinkercad.

Warm-up Ideas:

- Play this [Tinkercad Kahoot](#) to prime them with Tinkercad academic vocabulary.

Scaffolding the Modeling::

- Explain the learning target and that students will work in pairs to design a unique 3d cell model for either a plant or animal cell. Show them some examples cells student designers have already made in the Gallery section of tinkercad.
- Model how to install notes in Tinkercad by dragging the following icon onto the work plane ->
- If necessary, use a preexisting cell from the gallery, ungroup it, and figure out how the design was built (reverse engineering!)



Scaffolding the Academic Vocabulary:

- Read through the cell vocabulary as a class and practice saying the words.
- By now all students should have their own definition of each organelle in their science notebook. See the next page for an example of what their notebook could look like.

During the Project:

- Allow students to work as partners to design a cell in tinkercad. They can either buddy up on the computer/tablet or collaborate by clicking on the “Invite People” button on the top of an opened Tinkercad design. As students design, let them share on the overhead and collaborate as a class.
- Here is an optional [video tutorial](#) for those who need more structure.
- When done, allow the students to make a screencast or present their model and explain their learning to the class. Give them plenty of time to practice and make sure they have a copy of the scoring guide to refer to.

Project Scoring Guide:

Scoring Rubric				
4	3	2	1	0
Applies Standard My cell model shows each organelle, with clear labels. I was able to describe how each organelle performs a function within the cell. Moreover, I was able to apply the function to an analogous system (such as a factory, a car, or a city)	Understands Standard My cell model shows each organelle, with clear labels. I was able to describe how each organelle performs a function within the cell	Approaching Standard My cell model is mostly complete and I could explain how some of the organelles carry out functions within the cell	Not Yet My cell model is incomplete and I could only describe the functions of a few organelles.	No Evidence towards Standard
I get it, and I can apply it in some way.	I get it. I can do it by myself.	I get the main idea, but I still need some help.	I don't get it. I need some help.	I didn't do the task and/or show any understanding.
Learning Target: Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function. (MS-LS1-2)				

Cell Parts Chart

Name	What does it do?	Picture
Nucleus	Directs all the activities of the cell	
Cell Membrane	Protects the cell and allows nutrients to come into the cell.	
Cytoplasm	The gel-like fluid that holds the organelles.	
Ribosomes	Produces proteins that helps the cell grow.	
Endoplasmic Reticulum	Passages that transports materials.	

Cell Parts Chart

Mitochondria	Produce energy	
Golgi bodies	Packages materials to be sent or received.	
Lysosomes	Breaks down food and waste materials.	
Vacuoles	Stores food, water, and nutrients.	
Cell Wall	Provides shape for plant cells.	
Chloroplasts	Uses sunlight energy to make food (glucose).	