

Student Worksheet: Make a 3D Cell Model Using Tinkercad

1. STEP 1: Watch the video on cells and make sure to pay attention! We're going to play a game soon to check your understanding.
2. STEP 2: Listen to the song and make sure it gets stuck in your head. 😊
3. STEP 3: Play the Check Your Understanding game and make sure you understand the main differences between plant cells and animal cells!
4. STEP 4: Go to tinkercad.com and create an account.
5. STEP 5: Play around with Tinkercad while we watch the short video so that you can familiarize yourself with the software.
6. STEP 6: Choose which type of cell you are going to make a model of: A plant cell or an animal cell.
7. STEP 7: Make your 3D cell model in Tinkercad. Use the tips I gave you and play around with it. Ask if you have questions! Make sure you include and label all of the organelles that need to be included for your cell type.
8. STEP 8: Once you have completed your cell model, go to teachablemachine.withgoogle.com and follow along with the following steps while we watch the video.
9. STEP 9: Once you are on Teachable Machine, click Get Started.
10. STEP 10: Click Image Project.
11. STEP 11: Click Standard Image Model.
12. STEP 12: Name your two classes. Click the pencil icon next to Class 1 and name it whatever you want it to be. Then, do the same with Class 2. (Note: They do not have to be Plant Cells and Animal Cells yet, this is just a trial run to get yourself comfortable with the machine!)
13. STEP 13: Either upload or take photos with your webcam into both of your classes. Once you have uploaded all the photos you want, click Train Model.
14. STEP 14: Test out your trained model. For example, if you followed Kim's example from the video of one of your classes being you with a mask and the other being you without a mask, put yourself in front of the webcam with and without a mask and see if it works!
15. STEP 15: We are going to run the teachable machine again, this time with our cell models as the training images! Go back to teachablemachine.withgoogle.com
16. STEP 16: Follow steps 6-8 again, same as before.
17. STEP 17: Name your classes again, but this time name one of them "Plant Cells" and the other one "Animal Cells"
18. STEP 18: Upload all plant cell models into the Plant Cells class and all animal cell models into the Animal Cells class.
19. STEP 19: Then, click Train Model.
20. STEP 20: Google photos of animal cells and plant cells and upload your photos into the appropriate class. Take note of if the teachable machine identified the correct type of cell, and what the confidence levels were for each class.
21. STEP 21: Answer the questions on the next page.

Discussion/Reflection Questions:

1. Name at least one thing you learned about plant or animal cells that you did not know before this lesson.

2. How easy or difficult did you find it to make your cell model on Tinkercad?

3. Did your teachable machine correctly identify the cells most of the time? What was the highest confidence level it gave for a correct identification? What was the highest confidence level it gave for an incorrect identification?

4. If your teachable machine did not correctly identify the cells most of the time, why do you think that is? Do our cell models need to be improved? Do you think it would work better if we included more example photos in the training of the teachable machine model? Walk me through your thinking.