

3D Modeling in the Medical Field:



Design to Presentation



Description.

Biomedical Innovations focuses on innovative aspects of medical science and how they influence human life. 3D modeling is not new, but has become relatively popular due to innovative breakthroughs in 3D printing. 3D printing with strong and adaptable plastics is a cheap and efficient alternative to more expensive ways to making objects, especially medical devices (i.e., injection and cast molds, machining, carving, etc.). In recent years, 3D modeling and printing have allowed medical science to make huge advancements in not only designing medical devices, but allowing those who need them to have them available almost immediately after the design process. Better yet, patients who have a 3D printer at home can print their own devices as they require them as long as they have the model on file (usually a .stl file). The opportunities for 3D printing are endless. As of today medical science has started to print organs, ear implants, hand, arm and leg prosthetics, and a myriad of braces!

This unit is designed to give you the opportunity to acquire 3D modeling skills to develop a solution for a medical condition, as well as just to have fun being imaginative and creative in your learning. You will practice developing your own innovative solution for a medical problem by creating a 3D model of your own unique biomedical device that helps an individual with a medical condition. You are free to create any medical device you want just as long as it is your own unique innovation and, more importantly, displays critical thinking to solve a problem. You are encouraged to start your design process by looking at medical issues that are observed in your daily life. Start by observing others' or your own medical needs for inspiration. Through this project I hope you begin to understand your own capabilities for solving problems in life; what seems impossible, usually never is.

We will be using **Tinkercad** online software for 3D modeling. To use this software you only need your Chromebook or to be using the Chrome web browser. We will be going through the **Autodesk Project Ignite** website to organize and collaborate all of our 3D modeling projects. Instructions for beginning are provided on back.

Instructions:

You may complete this unit individually or in groups (maximum of 3 persons per group)

1. Go to **projectignite.autodesk.com**. Click Join a Classroom by Code.
2. In the Join Classroom field, enter the class code: **CBAS-MZ6G**.
3. Sign up for a new Autodesk account using your school email and a password you'll remember (Or just save the sign-in info to the computer).
4. Start this project by completing the lessons in the order as they appear on the class page, but DO NOT begin *Design Freestyle* (final lesson). The following lessons are MANDATORY (all others are optional):
 1. Let's Learn Tinkercad
 2. Introduction to Primitive Shapes
 3. Make a gear in Tinkercad
 4. Make a Print-in-place bearing in Tinkercad
 5. Design Freestyle
5. You can your group will need to submit a project proposal in writing to me through Google Docs*. You cannot begin until your proposal has been approved by me.
 1. *The only way I'll ever reject a project is if it's not school appropriate. Otherwise I'll only make suggestions.*
6. Use the final lesson, *Design Freestyle*, to develop a draft of your accepted 3D model proposal of a medical device. Let me know when this is complete.
7. Print the finalized model on one of the 3D printers in class. Make adjustments to this prototype as necessary.
8. Give a 3-5 minute presentation to the class. Describe the model and explain what it's purpose is. Be sure to explain any issues you encountered in the design and printing process, and give us an idea of what you could do to better the model going into the future.

The recommended time of completion for this unit is: 4 to 5 weeks
--