



## LESSON PLAN: Engineering with 3Doodlers

Age range: Recommended 14+

Group size: 1-12 people

### Required Materials:

- Blank Paper
- Markers
- Rulers
- 3Doodlers
- Doodle Mats



### SAFETY INSTRUCTIONS

**DO NOT TOUCH the tip of the 3Doodler Pen.** Always make sure that the pen is held upright when on. When plugged in and turned on, the pen will need time to warm up. **Do not use until the red light has switched to blue or green.** That means optimal temperature has been reached and you are ready to begin doodling. Press and hold either the 'Slow' or 'Fast' button depending on how quickly you want the plastic to come out. If you are not yet used to the 3Doodler pen or it is your first time trying, it is recommended to doodle while pressing the 'Slow' button. Some material may leak out for a few seconds after you remove your finger from the button. When you are done doodling or want to take a break, switch the pen to 'Off' and store pen on its side. Make sure the tip of the pen is not touching anything and that a doodle mat is underneath it





### Directions:

1. First, go over safety instructions with your group.
2. Once everyone agrees to the safety protocols, walk them through the following introductory lesson. This sample lesson is for fun glasses!
3. Using the rulers, have students measure their faces to determine the size of their glasses. Students should measure the approximate distance from one ear to the other, and the measure from the back of their ear to their eyebrow (they can also guess the measurement and create without measuring). Record measurements. They will be the size of the glasses frames and arms!
4. Students can choose how to design their glasses. Cat eye? Hipster? Aviator? Circle lenses? They can choose!
5. Load color plastic of choice into the 3Doodler pens. The plastic should be inserted in the opening at the top of the pen, located near the charger port (See Figure 1). Push until you hear a 'click' sound OR until you can see the plastic end has fit into the pen tip via the clear window at the bottom of the pen (See Figure 2).
6. Turn the switch to the 'PLA' option. **Wait as the pen warms up.** Students can begin designing once the light switches from red to blue.
7. Using the measurements, begin designing by pressing and holding the buttons. It is important to work slowly and with a steady hand. Create as thick a frame as needed, going over the lines as many times as necessary. **Wait until the plastic has cooled before removing the frames.**
8. Create the arms of your glasses. You need two arms for one set of glasses! They should be strong enough to support the frames of your glasses. Don't forget to create a hook at the end so they stay on your ears!
9. Once cooled, use the pen to free doodle the arms and frames together.

Congrats! You 3Doodled yourself a neat pair of glasses!  
Add flowers or spaceships to the frames for a cool look  
or try something entirely new!

