

The logo for 3Doodler EDU. '3Doodler' is written in a blue, bubbly, 3D font with a white outline. 'EDU' is written in a bold, yellow, sans-serif font.

# Design Challenge

## Handmade vs. the Machine

### Facilitator's Guide

#### 🚩 The Challenge

Replicate a machine-made object using only the 3Doodler and plastic strands.

#### 👁️ Overview

⌚ Total Time: 100 minutes (2 Class Periods)

This challenge asks participants to consider the aesthetic values of something handmade as compared to machine-made. Consider the pros, cons and impact of large-scale mass production, the availability of 3D printers to DIY (do-it-yourself) makers and crafting handmade objects, artifacts and jewelry throughout history.

## ⌘ Challenge Background

### 🔗 Take It Further

Consider working with a small mass-produced object to replicate. Then do your own take by personalizing the object with the 3Doodler.



Fig.1



Fig.2



Fig.3



Fig.4

As mass production became the norm for furniture, automobiles and clothing during the twentieth century, artists like Andy Warhol explored these themes in his prints of soup cans and movie stars. Mass production has been a part of meeting the consumer needs of the masses as economics increased for the middle classes during the post-WWII years. But the handcrafted and DIY maker movement in the 1970s had many returning to making things in their garages and on kitchen tables to express their creativity and individuality. This movement has increased as makers combine accessible technology such as low-cost 3D printing with low-tech methods of expressing creativity.

## ✂ Materials & Tools

### 🕒 Before You Start Doodling

We recommend using a DoodlePad or clear tape placed over paper as a foundation to keep your Doodles in place and so that you can peel them off with ease.



- A.** 3Doodler Pens and Plastic Strands of various colors (one per student, or have students work in pairs or small groups)
- B.** Tools (from your 3Doodler box) plus needle-nose pliers or scissors for snipping plastic ends
- C.** Clear plastic tape or DoodlePad for Doodling foundation
- D.** Paper for Doodling foundation and extra sketching/note-taking space
- E.** Drawing utensils (markers, pens or pencils)
- F.** Camera or video recording device to document the Challenge and results
- G.** Small machine-made/mass-produced objects for students to replicate using the 3Doodler

## ☰ Challenge Organization

### 📷 Challenge Documentation

Take photos & videos of your process using a camera. Document what to do and what not to do. Share your experience with the online community using #3DoodlerEDU!

Challenges are organized into 50-minute periods so they can fit into a traditional classroom structure, or be combined into a single workshop with breaks in between activities. This Challenge is designed to have participants work in short sprints to quickly explore the concepts.

## 🖥️ Class 1: Investigate & Build

🕒 Total Time: 50 min.

### 🔍 Investigate (🕒 20 min.)

**Step 1:** Look over the objects provided and select one to replicate.

**Step 2:** Decide how this machine-made object was produced. Was it through a mold, 3D printed or pressed? Look up the differences in the manufacturing process and discuss with the group.

**Step 3:** Measure and draw out the shapes that make up your object on graph paper to create a pattern.

**Step 4:** Note on your patterns the following features of your object:

- Are there multiple parts?
- How are they connected?
- Which colors were used?

### 📝 Facilitator's Notes

*In Class 1, have enough small mass-produced objects available on each table for participants to replicate. Consider including objects that are created through a variety of manufacturing methods, such as 3D printing, injection molds, pressed and handmade. You may want students to bring their own objects from home.*

### 🏗️ Build (🕒 30 min.)

**Step 1:** Select the 3Doodler plastic strand colors needed to start replicating the object.

**Step 2:** Tape over your patterns with clear plastic tape to use as your template and foundation for Doodling. You may also use a DoodlePad.

**Step 3:** Start Doodling your object. Plug in your 3Doodler pen, turn it on and choose the right temperature setting for your plastic (ABS/Flexy: HI, PLA: LO). Once the pen is warmed up, insert the plastic and push either button to begin extruding. Start Doodling your objects using the pattern you created as a guide.

### ✂️ Remember to Snip Those Ends

We recommend pliers or scissors for snipping plastic ends. Make sure to keep your plastic ends clean to prevent clogs and jams. Snip plastic after removing it from the 3Doodler pen to make sure it's clean for the next time.

## 🖥️ Class 2: Build (Cont'd), Present & Reflect

🕒 Total Time: 50 min.

### 🔧 Build (Cont'd) (🕒30 min.)

**Step 1:** From where you left off yesterday, take your Doodled replica and think about adding a new feature such as a color or adaptation to the object to customize it and make it your own.

**Step 2:** Finish building your personalized replica with the newly added feature.

### 🗣️ Present & Reflect (🕒20 min.)

**Step 1:** Gather around a display table and place your original machine-made object and your 3Doodled object next to each other.

**Step 2:** Go around the group in an orderly fashion and present what you made. Discuss what the process was like for you and what you learned about creating a handmade object.

Consider the following questions for discussion:

- What is your idea of something being handmade?
- Was working with the 3Doodler a handmade experience or a machine-made experience?
- How would you mass produce your handmade object?
- What are some benefits to making objects by hand?
- What are some potential problems with handmade production?

#### 📝 Facilitator's Notes

*In Class 2, participants will continue to work on their replica for the first 30 minutes and add a component which makes it their own. They will use the remaining class time to present the object and discuss how the new addition expresses their personal take on the object and the process.*

## 🔗 More Information:

For further information and inspiration about the maker movement, visit:

- <http://makerfaire.com/maker-movement/>
- <http://www.newsobserver.com/living/fashion/article10048604.html>
- <http://www.etsy.com>

### 🖼️ Images:

Cover Page: <http://the3doodler.com/wpcontent/uploads/2014/10/headband.jpg>

Fig. 1: <https://goo.gl/TJINQP>

Fig. 2: [https://upload.wikimedia.org/wikipedia/commons/4/47/Africa\\_lfe\\_Head\\_1\\_Kimbell.jpg](https://upload.wikimedia.org/wikipedia/commons/4/47/Africa_lfe_Head_1_Kimbell.jpg)

Fig. 3: [https://c2.staticflickr.com/4/3697/19461516766\\_8379a0f2d7\\_z.jpg](https://c2.staticflickr.com/4/3697/19461516766_8379a0f2d7_z.jpg)

Fig. 4: [https://upload.wikimedia.org/wikipedia/commons/e/ed/Lalique\\_%22Thistle%22\\_pendant.jpg](https://upload.wikimedia.org/wikipedia/commons/e/ed/Lalique_%22Thistle%22_pendant.jpg)