

Custom 2D art on a 3D printer

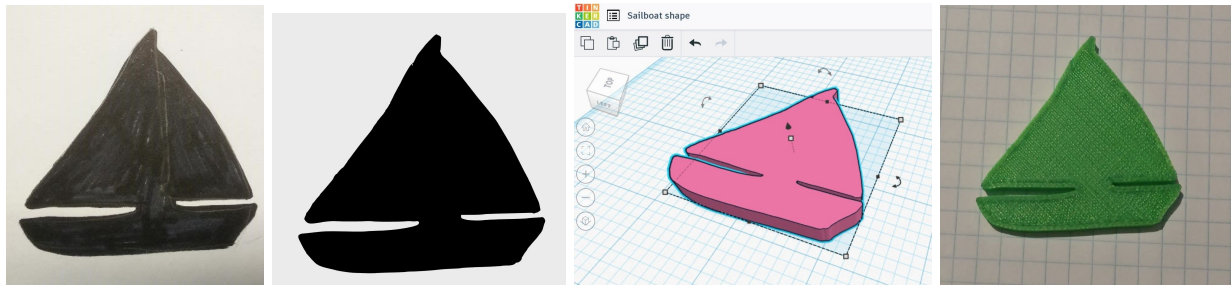
Tools, materials, technologies used:	Experience level required:
2D modeling software like Gravit (optional)	intermediate
online svg converter	beginner
3D modeling software like Tinkercad	beginner

Grade Level (of this example): 3-12

Content Standards: All core areas - See below for possible content exploration

Summary of Project: Students will use or design a 2D image to make a 3D printed relief item. The image should be personally and/or academically meaningful.

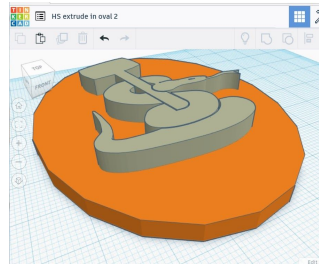
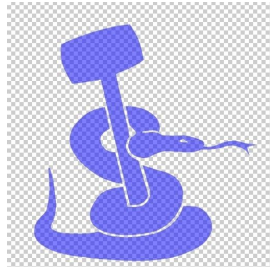
At its simplest, this project is an ideal introduction to the 3D printer. It requires no actual design as long as students have a high-contrast picture at hand that can be [easily converted to a vector file on PicSvg.com](#). Students simply load their .svg into Tinkercad and can use simple sizing and shape tools to create a printable cylinder.



Left to right: (1) hand drawing (2) drawing converted to SVG using picsvg.com, (3) SVG uploaded and modified in Tinkercad, (4) after 3D printing.

For richer learning through custom modeling, see **Possible Content Explorations** below. These will all demand thoughtful design, using a 2D modeling program like Gravit and research/discussion about your target content.

Alternative method for more complicated drawings - hand tracing to create SVG:



Left to right: (1) hand drawing (2) drawing traced over by hand in Gravit and exported to SVG, (3) SVG uploaded and modified in Tinkercad, (4) after 3D printing

Possible Content Explorations

- **ELA or Social Studies**
 - choose or create symbol that represent a character or important theme
 - design a logo for a social group in history, modern society, or a work of literature
 - a meeting or a service project for relevant social group might be an ideal way to present work - what about communicating with Native American advocacy groups to reworking sports teams names and logos that misuse Native imagery?
 - community collaboration - offer logo design and screen printing services for a group that has community ties to a student or to the school. Can tie in with exploratory chemistry project (below)
 - sports team logo design
 - sale/display of stamps and prints at a community or school event, with research-based student artists' statements on display

- **STEM: High School Biology**
 - 3D print animal feet to use as prints* / create a "footprint roller"
 - replication/mutation - give all students one starting shape, have them each change one line segment in a design using 2D modeling software
 - combine with [molding activity](#), have students design enzyme/substrate pairs with "lock-and-key" fit
 - have students design a model of an inhibitory drug that blocks enzymes or substrates from binding with each other as usual

- **STEM: Chemistry**
 - use 3D figure as printing block* with "disappearing" ink



Resources

- *With some fine tuning to create a flat surface, the printed figure may be used as an ink stamp or a clay imprint. Resources for smoothing your 3D prints:
 - [3 ways to smooth PLA](#)- overview
 - [Detailed step-by-step 3D print smoothing - best for high school](#)
 - [Product: Epoxy for smoothing PLA](#)
 - [Smoothing ABS with Acetone](#) - ONLY ATTEMPT IN FUME HOOD WITH SUPERVISED TEENS - see your chemistry teacher for help and encouragement!
 - Product: [rubberized coating](#) to create stamp surface