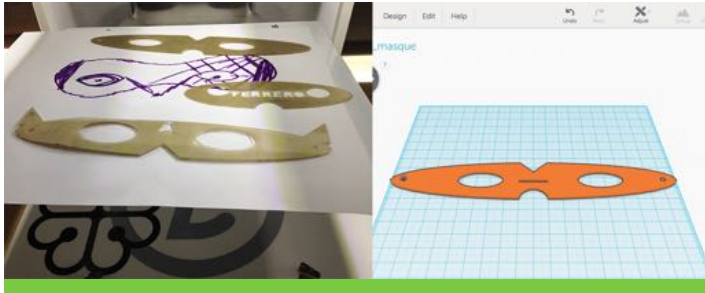


The masks / lvl. 2



🕒 2h30 | 👤 10 | 📌 📌 📌 📌 📌

Public

7-12 y-o

adult

Software

DoodleToSTL

Tinkercad

Description

Learning goals:

- master the basics of Tinkercad
- learn about symmetry

This workshop is an introduction to the design of a simple object.

Participants will use Tinkercad to create a mask proportional to their facial dimensions. At the end of the workshop, each participant will have designed an original mask. There may not be enough time to 3D print a mask for each participant.

Timing

1. Introduction and presentation of 3D printing - 15 mins

Introduction of the world of 3D printing with video (<http://www.dragontape.com/#!/6319966877908992>) and presentation.

2. Overview of the activity - 5 mins

Briefly explain the flow of steps for the day's activity.

What will the participants do? : Create a custom mask

Which software will be used? : Tinkercad

3. Log in each participant to the software Tinkercad - 5 min

Ask each participant to log into the software Tinkercad.

Provide usernames and passwords.

4. Prepare the mask template

Distribute a piece of paper (8.5x11 in) and a felt maker to each participant.

Demonstration: place the paper in front of your face (landscape orientation) and use the felt marker to mark dots at the edges of your eyes, edges of nose bridge, each temple, top of the eyebrow, and tip of nose.

Using a ruler or measuring tape, write down the key dimensions for your mask:

- Total length (between temples)
- Total height (top of nose to top of eyebrow)
- Width of the nose bridge
- Width of eyes

Using the marked dots as references for scale, imagine and draw the mask.

Keep the drawn mask nearby as a reference for the subsequent steps.

Typical dimensions of an adult mask: 200 x 40 x 1 mm

4. Introduction to Tinkercad - 15 min

Facilitation plan

The facilitator will run through the entire 3D modeling process to demonstrate the software TinkerCAD.

Participants watch while the facilitator describes what they are doing.

The facilitator asks participants to follow along, up until the 3D printing step.

After launching the 3D print of the demo model, participants create their own 3D model. The facilitator moves around the room to assist and re-explain concepts as necessary. Demonstrate common questions or repeat challenging concepts to all participants. Often participants want reminders for how to select, group, and subtract objects.

Key concepts to show participants

- The workplane
- Zoom in/out (scroll)
- Rotation of the viewpoint (right-click and move mouse)
- Reset the viewpoint ("Home view" button)
- Pan view (hold shift + right-click, and move mouse)
- Sidebar with various parts and how to place them on the workplane
- The geometric primitives ("Basic Shapes" tab) available in the sidebar
- The solid vs hole state of a shape
- Selecting an object (left-click)
- Selecting multiple objects (hold shift + left-click)
- Using a selection box (hold left-click and move mouse, release left-click)
- Group / ungroup multiple objects (adding / subtracting)
- Handles for scaling and translating objects

For more information, see the instructions here : [TinkerCAD](#)

5. Create a model in TinkerCAD - 15 mins (facilitator)

Example mask

1. Place a cylinder on the workplane and scale it to 200 x 40 x 1 mm
2. Place another cylinder and scale it to the eye dimensions (about 40 x 20 x 10 mm)
3. Move the eye to the right location as per your previous measurements.
4. Copy and paste the first eye, and place the 2nd eye as per your previous measurements.
5. Select both eyes and change them into the hole state.
6. Select and group together the three objects: both eyes and the overall mask.
7. Place the round roof object on the workplane and rotate it 90° so that it is on its side on the workplane.
8. Scale the round roof object so it will match the width of your nose bridge.
9. Move the nose bridge object into the right location as per your measurements.
10. Change the state of the nose bridge object to hole.
11. Select and group together the mask and nose bridge objects.
12. Repeat steps 7 to 11 with other shapes to continue designing or cutting patterns in your mask.
13. Export the STL file
14. Import the STL file in Tinkerine ou Cura
15. Set the printing parameters and start the 3D print!

6. Create the model in TinkerCAD - 45 min (participants)

After having demonstrated the process, ask each participant to create their own mask.

Once they start playing with TinkerCAD, move around the room to assist and answer questions.

Demonstrate common questions or repeat challenging concepts to all participants (selecting, grouping, and subtracting objects).

After 45 minutes, ask participants to export their files.

7. Saving the STL file

Ask participants to rename their files

- click on the nonsense name in the top menu bar
Download the STL file :
- Export : Everything in Model, STL

Use a USB key to gather the STL files from participants.

8. Import the files in Tinkerine or Cura - 5 min

Open the preferred slicer software

Import the STL file

Adjust the print settings (fill, wall thickness, speed, height, ...)

Save the file (.Gcode) to the SD card

