

# STEM Workshop: 3D Tech

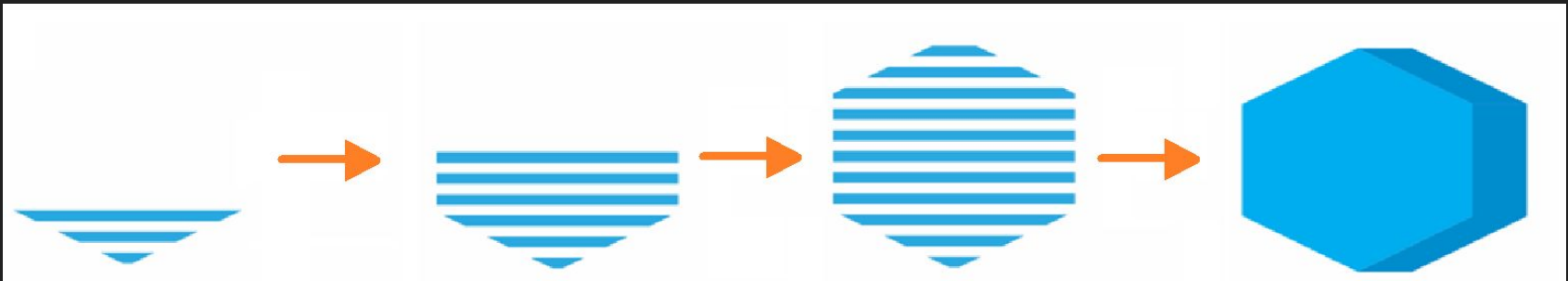
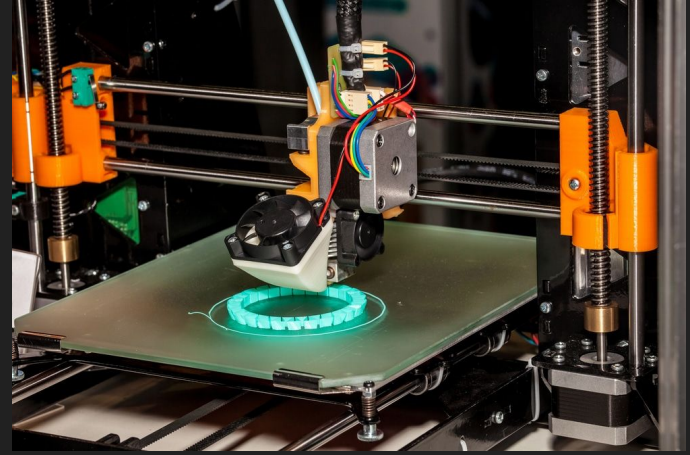
Lesson 3: Tinkercad Design and 3D Printing

Brought to you by the University of Maryland Balloon  
Payload Program!

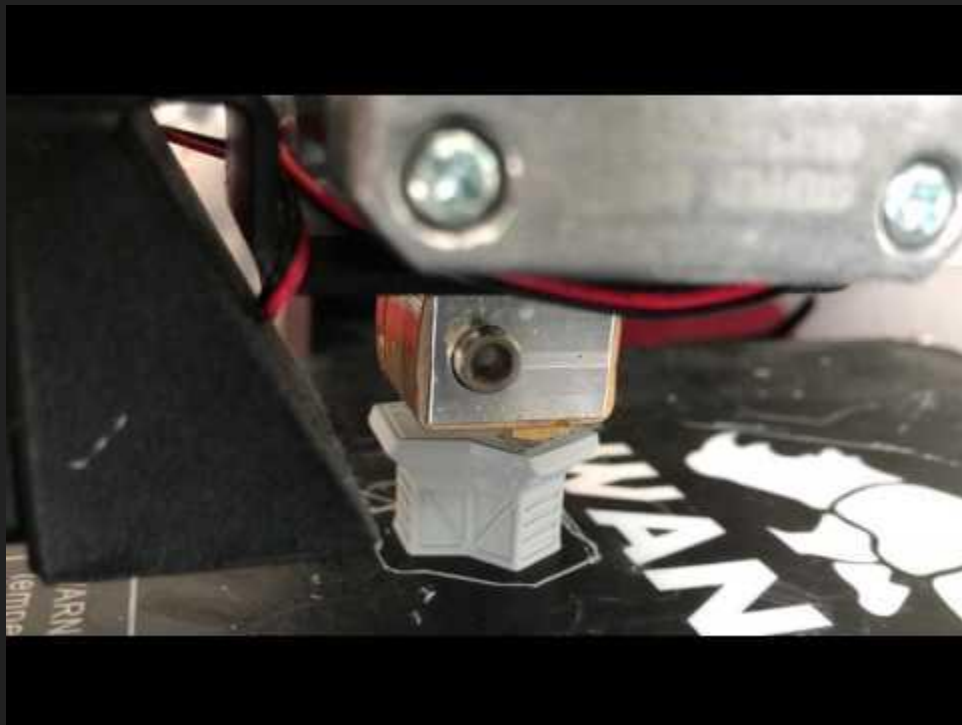
# 3D-Printing - What is it?

A.K.A : Additive Manufacturing

- Slow
- Messes up often
- Can create unique shapes



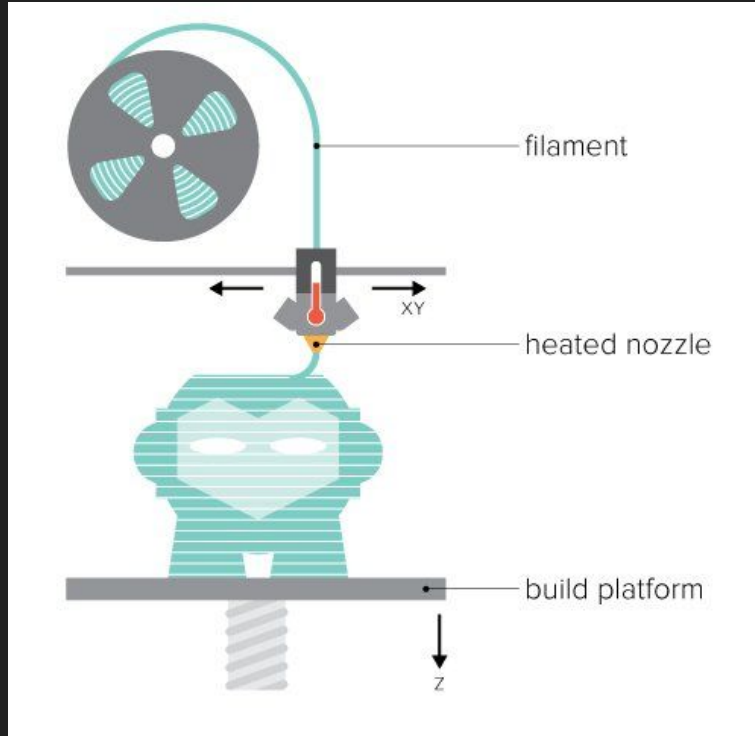
Let's see it up close!



# What can it make?



# The Basics of the machine:



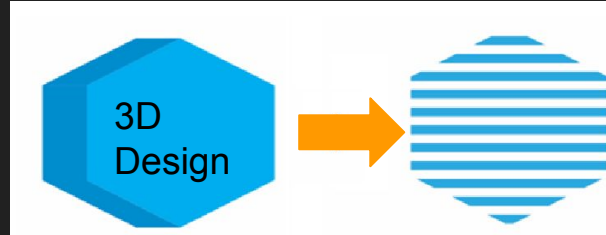
Caution, HOT!

# So, how do I actually make the printer... print?

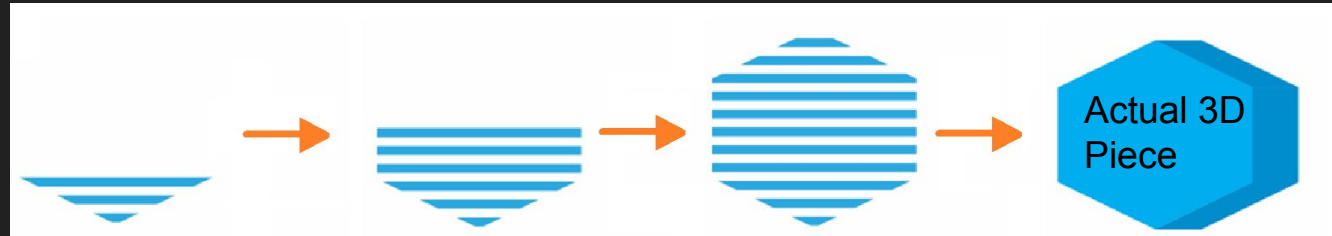
Slicers - special programs

They slice 3D models (.STL) into .gcodes, which are lists of simple commands that the printer can understand (left, right, up, etc.)

Slicer:

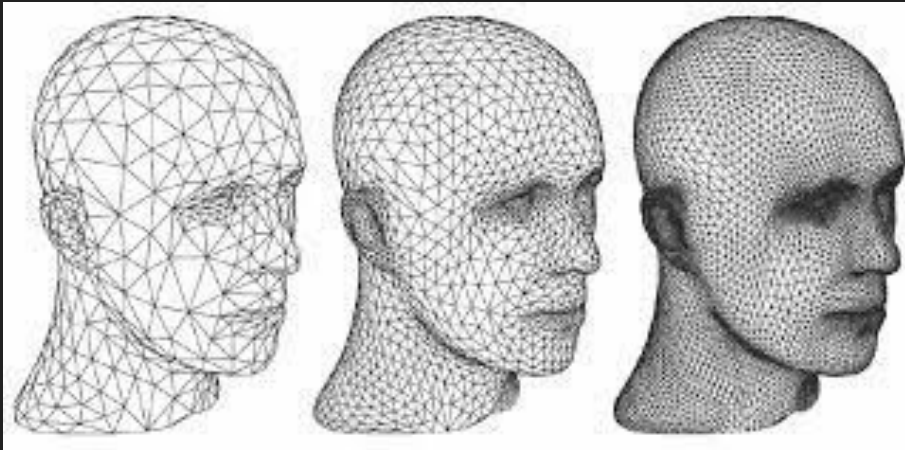


3D Printer:

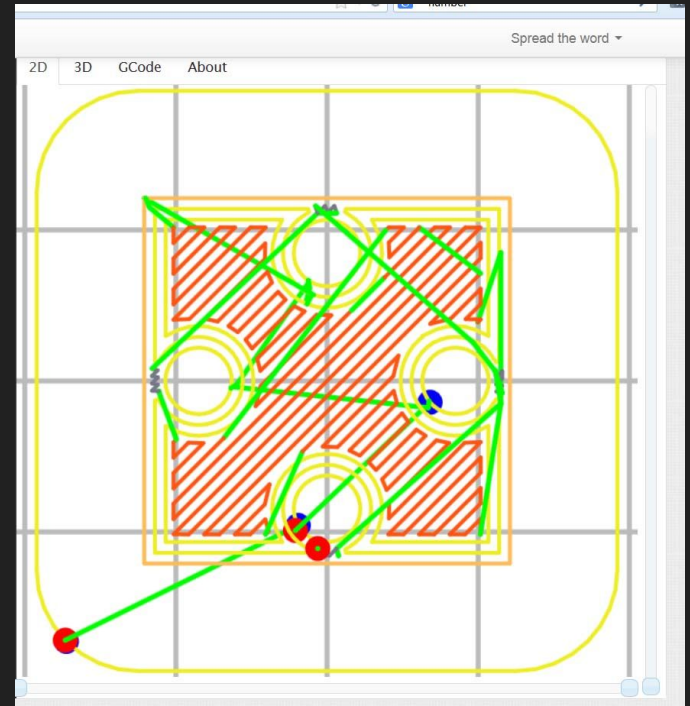


# Wait, what are .STL and .gcode?

.STL (for your computer

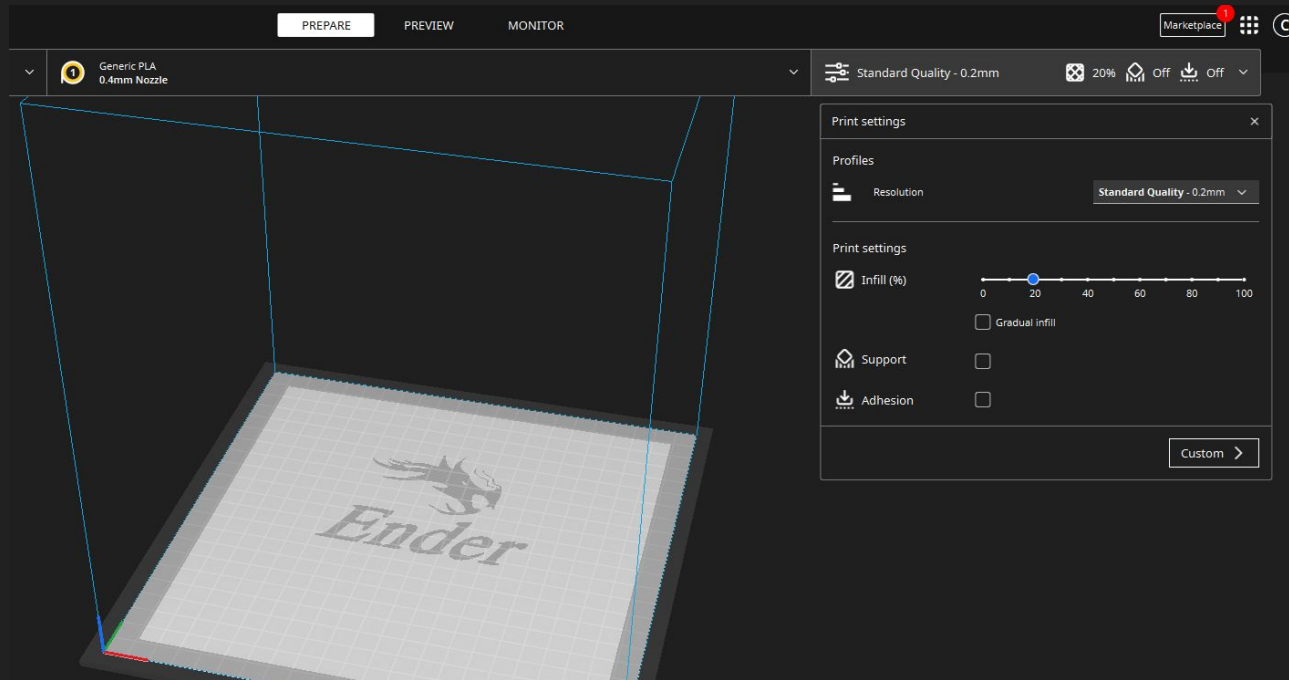


.gcode (for your printer)





# Slicer Example: Cura

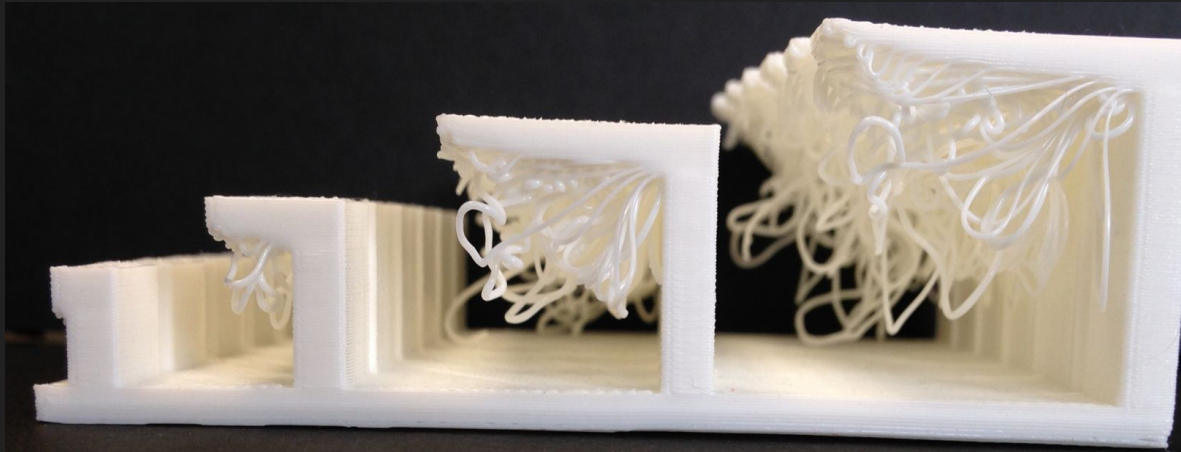
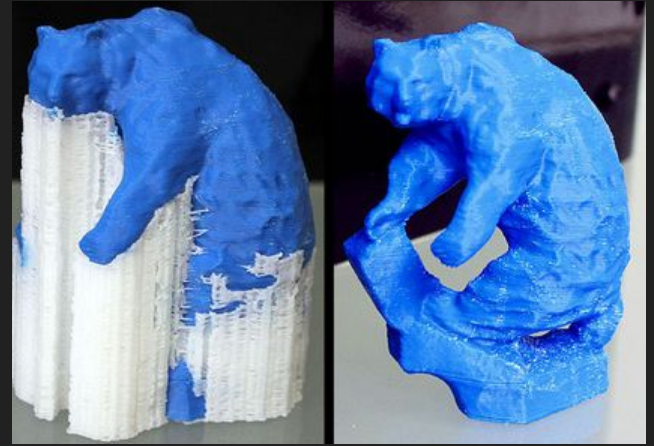




# Supports

You can't 3D print on air!

For hanging edges, you need supports



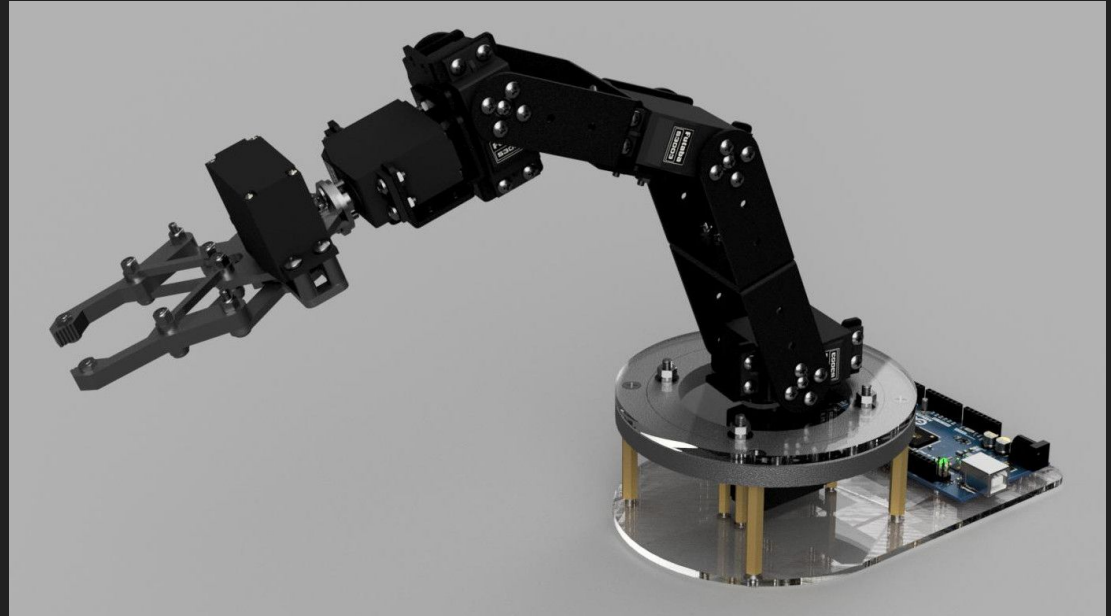
# What is 3D Modeling?

You can *virtually* create real 3D objects on your computer!

## Why?

- Simulation
- 3D printing
- Testing
- More!

\*A.K.A CAD:  
Computer Aided Design



# Let's 3D Model!



Username:

[umdstemworkshop@gmail.com](mailto:umdstemworkshop@gmail.com)

Password:

Spring2023

# What's going on here?

The image shows a screenshot of a 3D CAD software interface titled "Amazing Wluff-Turing". The interface includes a top toolbar with icons for file operations, a left sidebar with view controls, a central 3D workspace, and a right sidebar with a shape library. Annotations with arrows point to specific features:

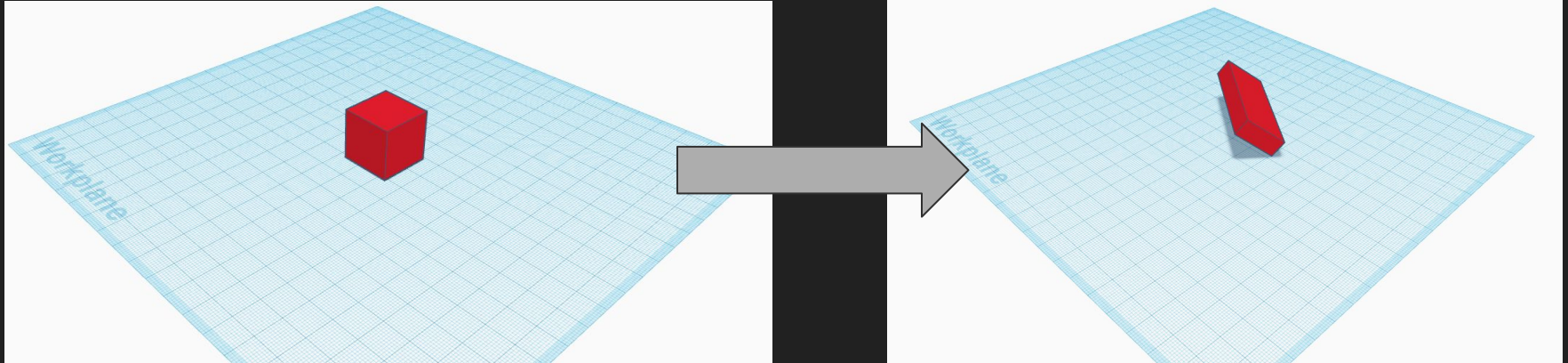
- Change your view (rotate around):** Points to the view control icons in the left sidebar, which include a home button, a rotation icon, and zoom in/out buttons.
- Zoom In/Out:** Points to the zoom in (+) and zoom out (-) buttons in the left sidebar.
- Your 3D Model:** Points to a red cube placed on a blue grid labeled "Workplan" in the central workspace.
- Pick more complicated shape types:** Points to the "Basic Shapes" library on the right sidebar, which contains various 3D primitives like spheres, cylinders, and cones.
- Pick shapes to add:** Points to a specific red cube in the shape library.

At the bottom right, there is a "Settings" section with a "Snap Grid" set to "1.0 mm".

# Add a Cube!

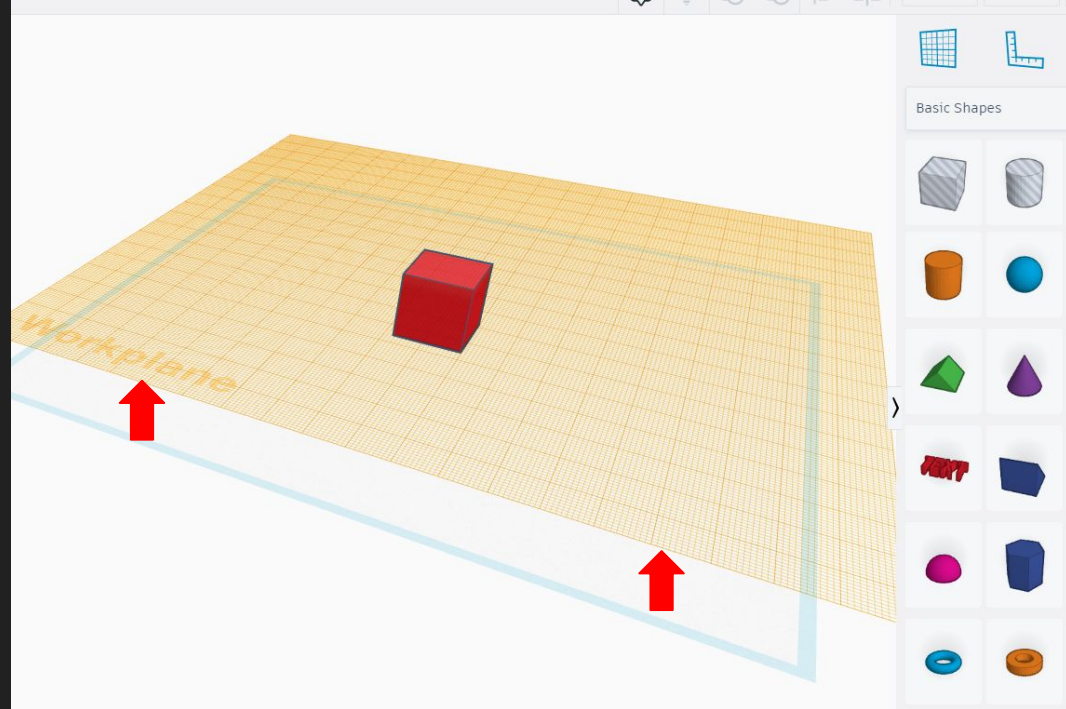
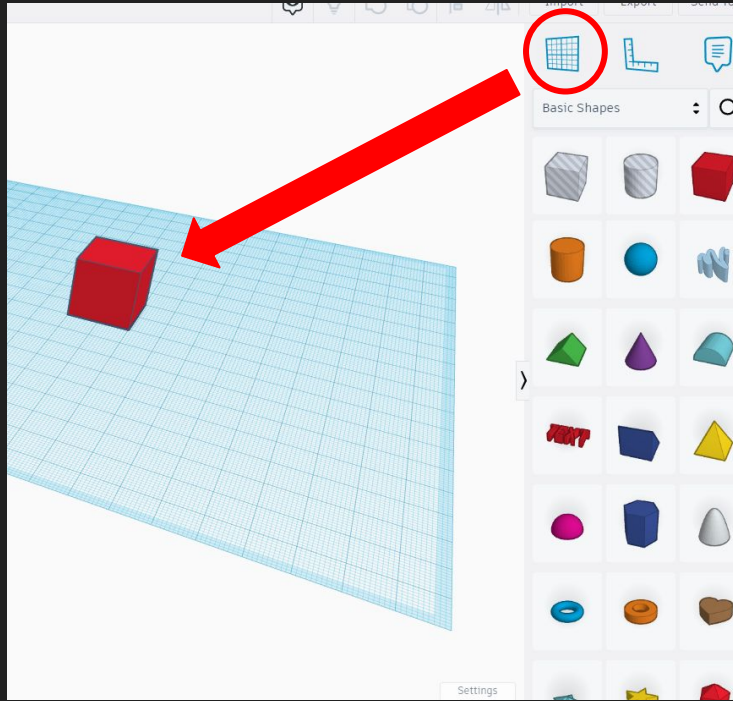
Let's learn how to:

- Move
- Change Size
- Turn

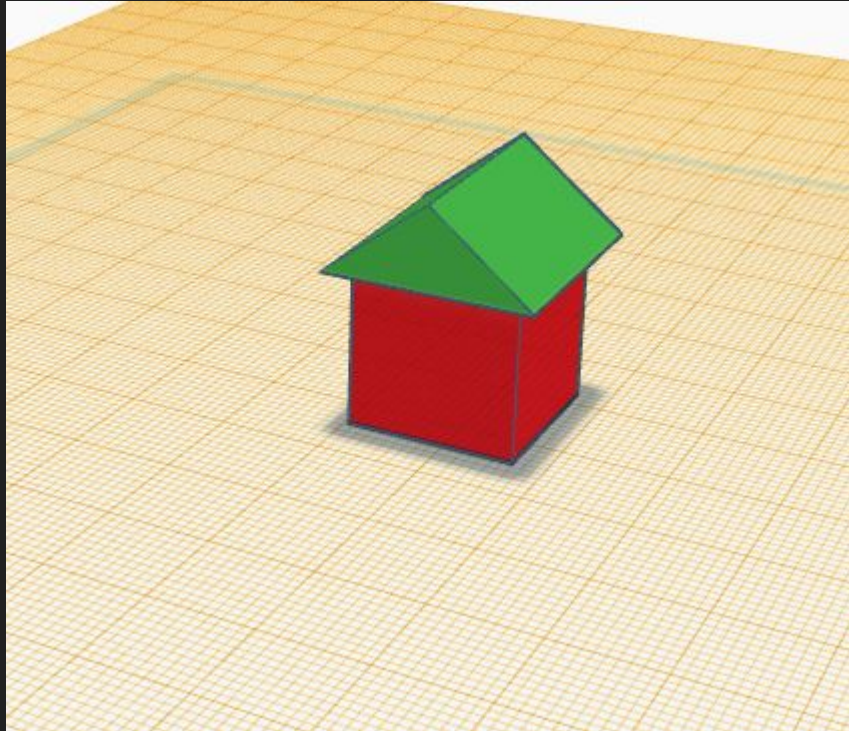




# Go Back to a Cube - Change the Workplane



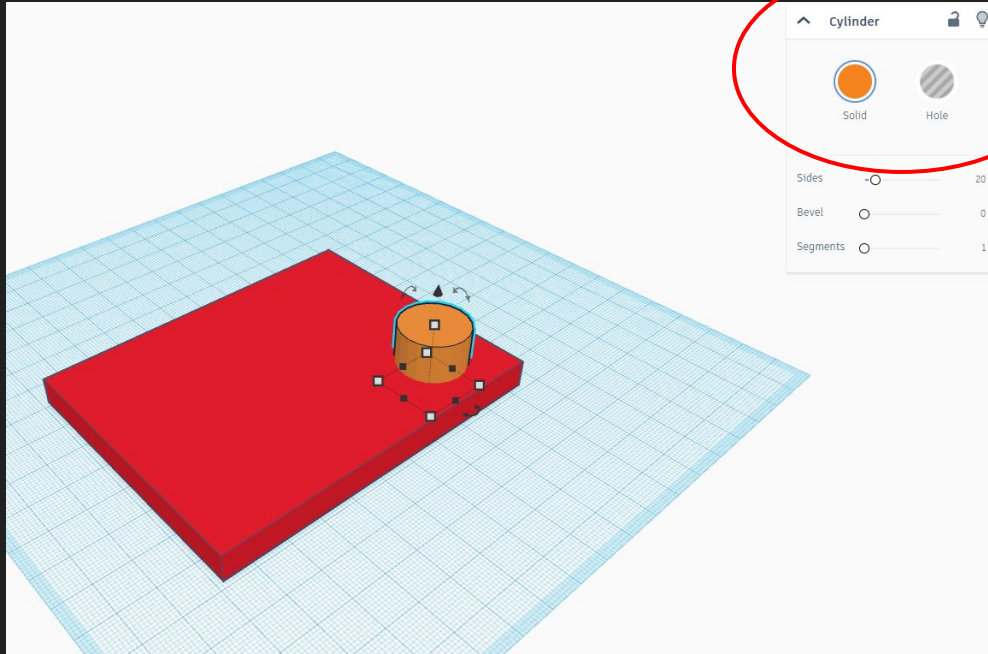
Now, add a Roof to make a House



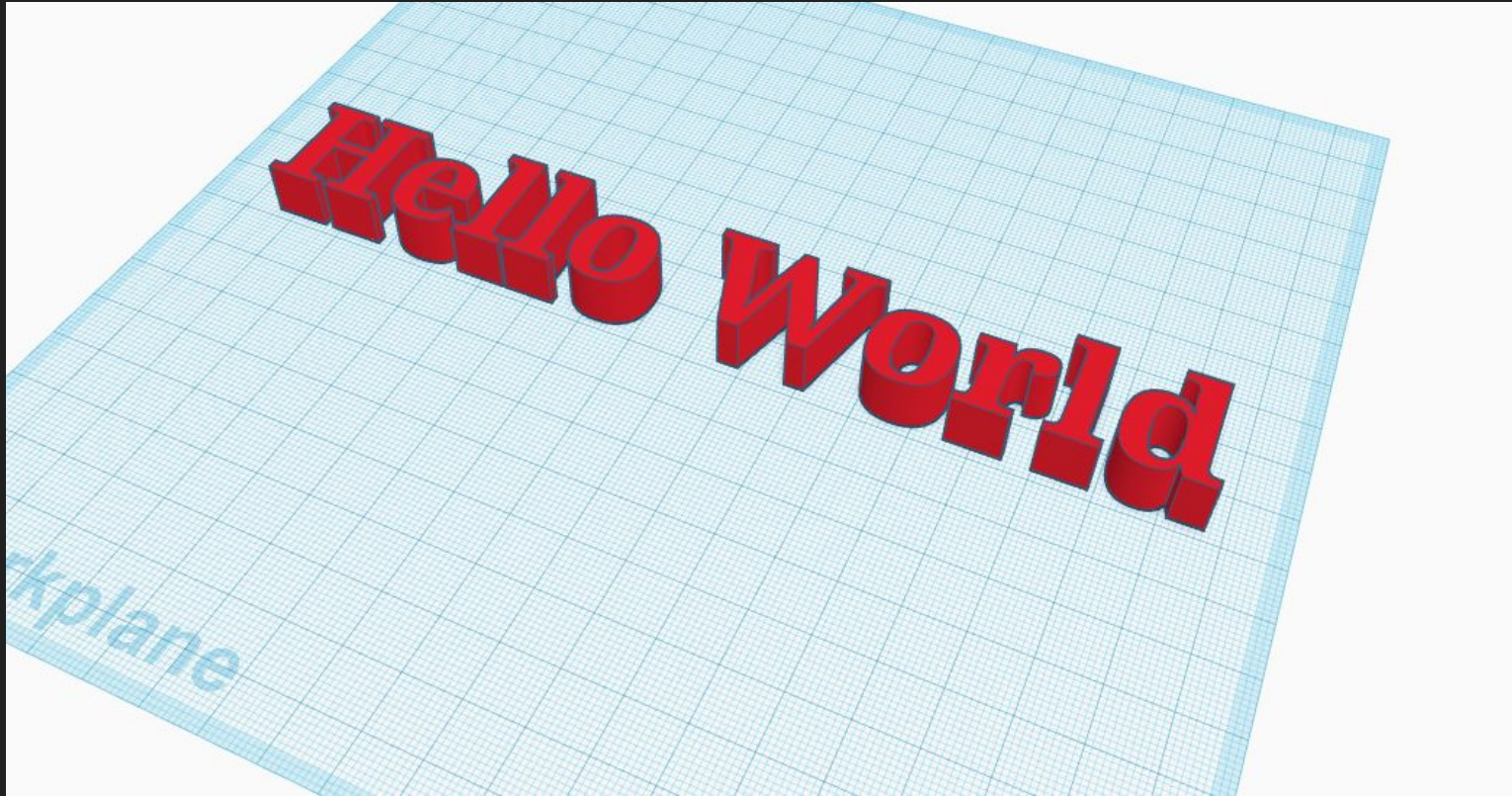


# The Hole Tool

You can *add* or *remove* shapes from each other!



You can also add text!



# 30 min - Workshop

Make whatever you want, and feel free to ask for help!

Task: Make a personal keychain!

If you don't want to, here are some other ideas:

- Roblox
- Robot
- Mansion
- Your favorite shape
- Your favorite planet