

Teaching 3D Modeling with TinkerCAD

What Is TAP?

- TAP is an outreach program for students to connect with all ages through projects.
- These projects are supposed to be fun and engaging while being educational.
- It is intended to build leadership, communication, and technical skills in program participants.
- We want to increase the number of students in the ITEC concentrations

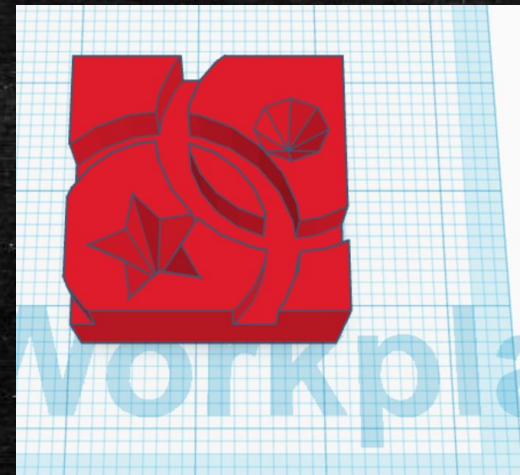
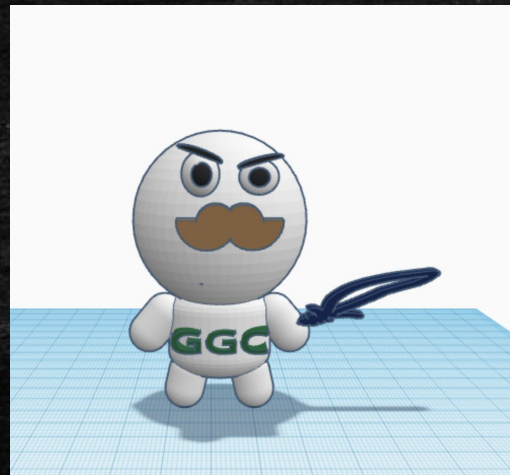
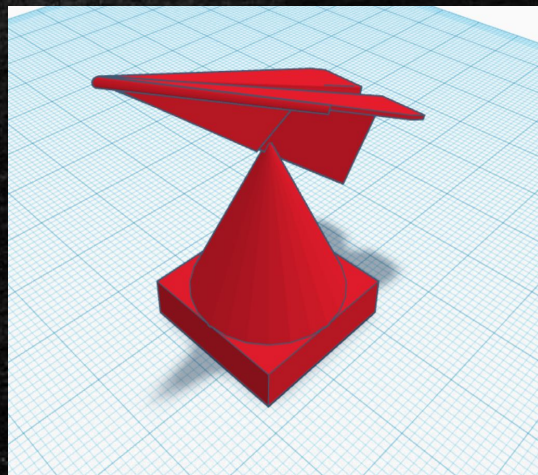
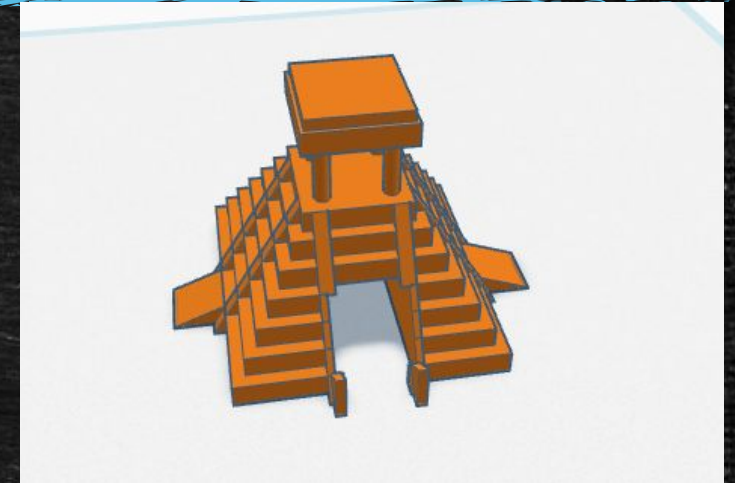
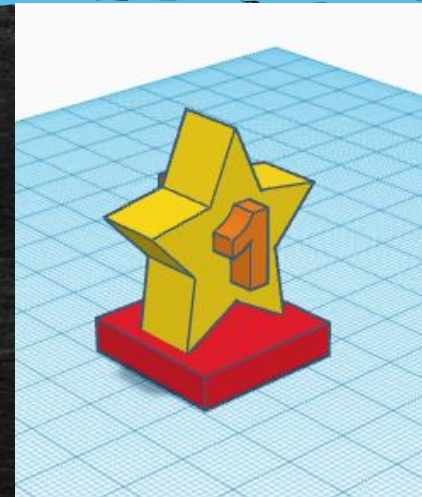
Goal Of Our Project

- We want to foster a basic level of 3D modeling literacy in all ages through an engaging project that has students actively doing what they're being taught.
- This project is intended for all ages, we believe that anyone can do it
- We want every attendee to walk out of our workshop having drawn a 3D object

Workshop 1

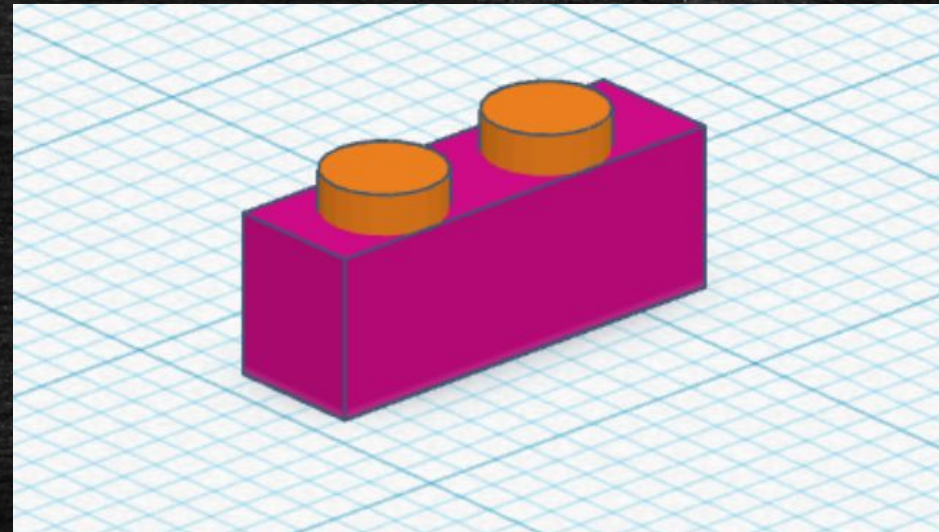
Main Workshop

3D Design Showcase



TinkerCAD

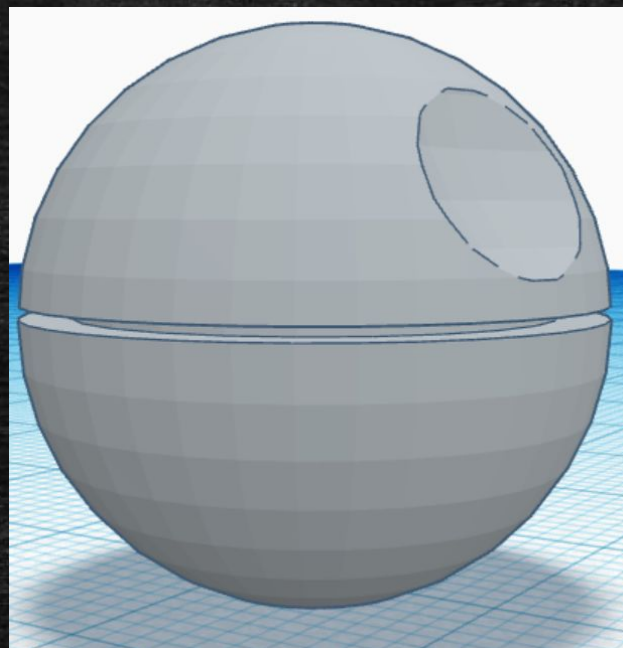
- Simplified, browser-based CAD software
- Much shallower learning curve than AutoCAD, Onshape, or Blender



The Workshop Itself

- Presenting our 3D model in TinkerCAD
- Demonstrate TinkerCADs controls
- Demonstrate how we made the model

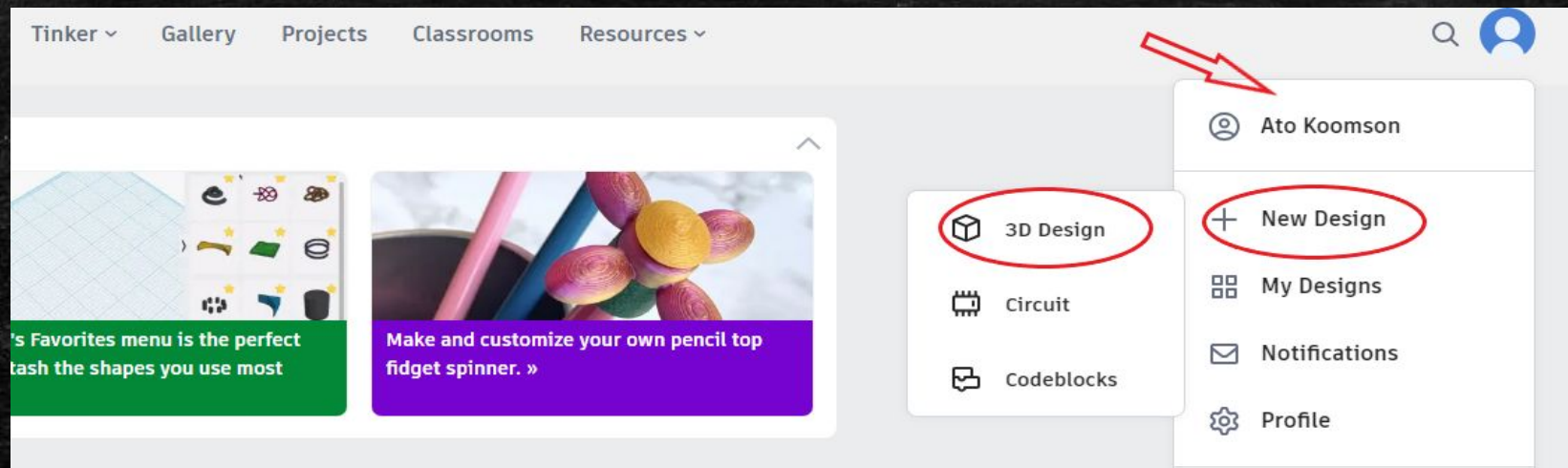
Our Model



Step 1: Creating Your Tinkercad Account

Go to <https://tinkercad.com> and create a free account

Press the Create button to start creating a new 3D design



How 3D Printing Works

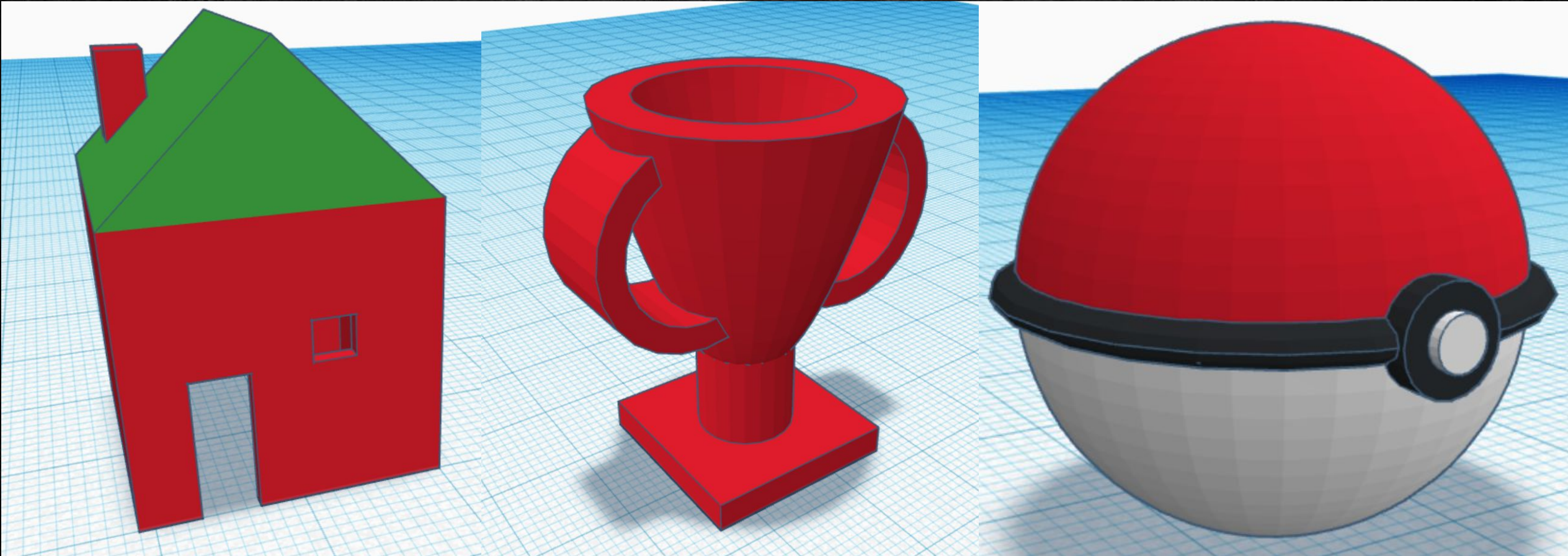
- To understand 3D modeling, we should see how printing works
- 3D printers deposit a special kind of plastic called PLA in tiny layers
- For a visual demonstration, you can watch a timelapse video of a 3D printer in action here.
- <https://www.youtube.com/watch?v=FqQAjkZOBeY>

Timelapse of a 3D printer in action

Workshop 2

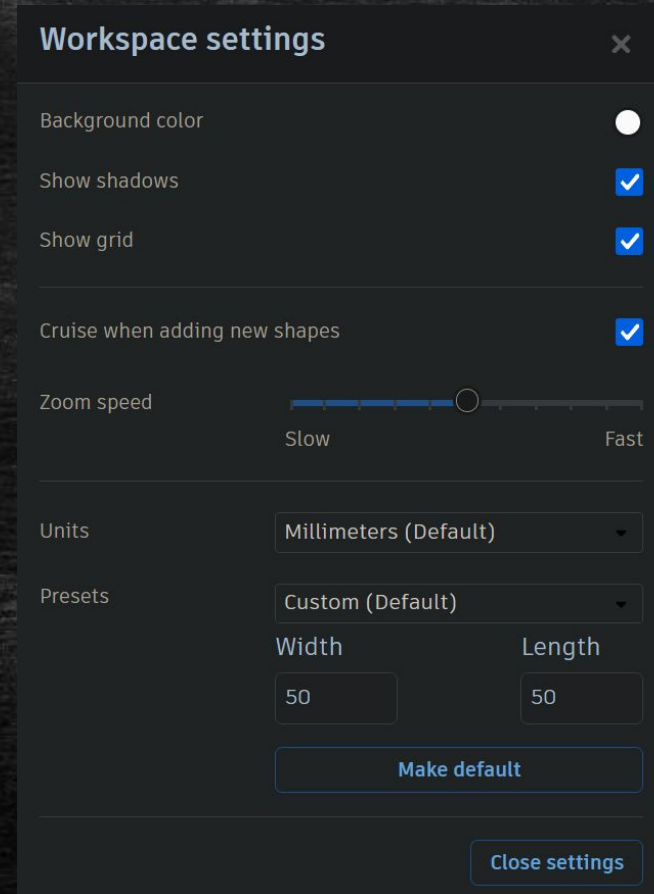
If Time Allows

Vote On the Next Design



Grid Resizing

- Click Setting at the bottom right corner of the screen and set the length and width of the grid to 50mm and click “Make Default”.
- You can close the settings panel, you are ready to create



Workspace settings ✕

Background color ☐

Show shadows ☒

Show grid ☒

Cruise when adding new shapes ☒

Zoom speed Slow Fast

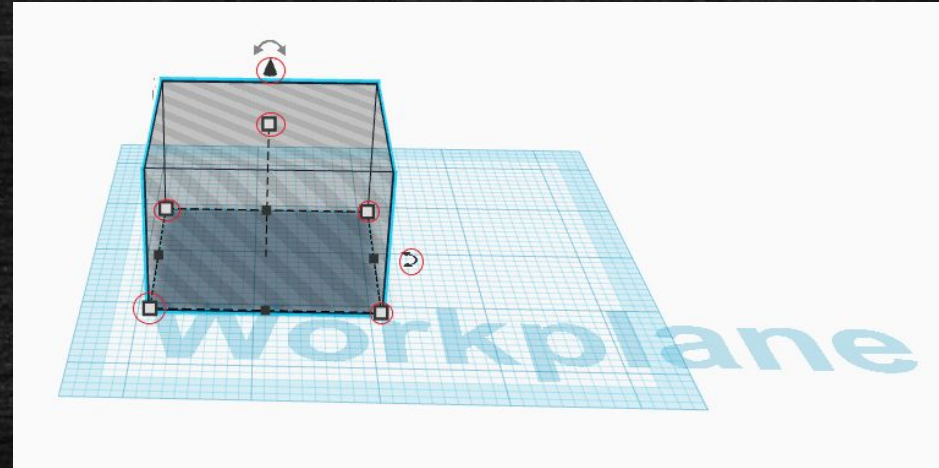
Units

Presets

Width Length

Step 3: Scaling and Shaping Objects

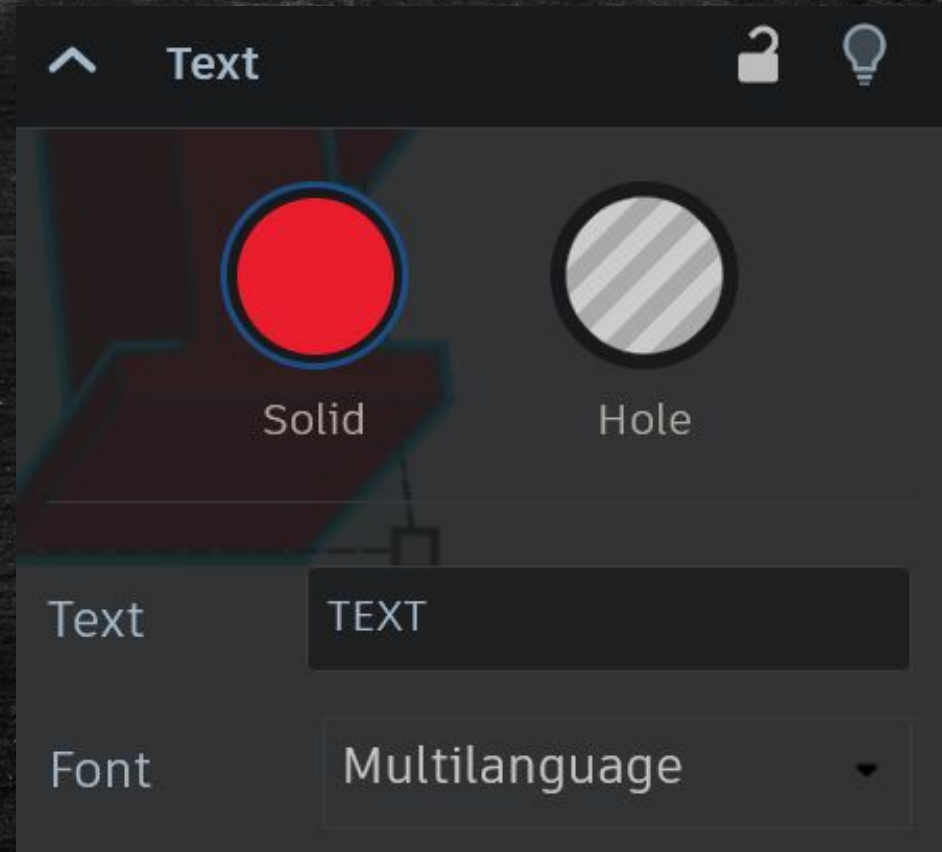
- Select any shape with a flat base and drag it to where you want it on the grid. Use the handles on the corners and edges to scale it to size. The cube in the top left corner of your screen allows you to change viewing angles.
- You can adjust elevation with the cone floating above your shape and tilt with the curved arrows, but the flat base should stay flat and flush against the grid.
- You can use the scroll wheel on your mouse to zoom in and out, and the F key on your keyboard to center the object on your screen.



Notice the flat base flush with the workspace

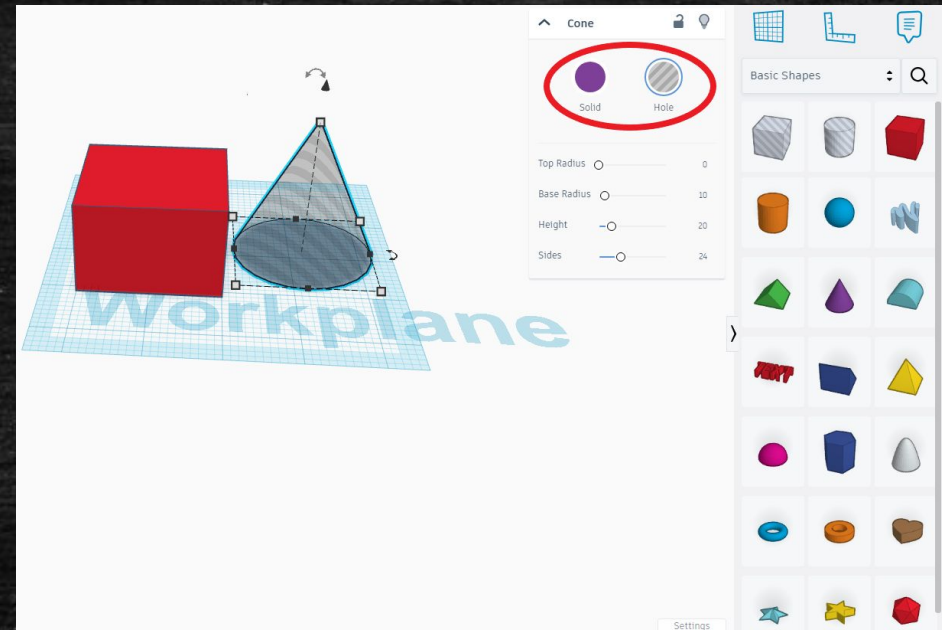
Text

- Text can be found under basic shapes
- When you place it, you will have the opportunity to edit the message
- After that, you can treat it like a normal shape



Step 4: Adding and Adjusting Objects

- To add objects to your 3D design, you can use the basic shapes available in TinkerCAD's shape library. You can access the shape library on the right side of the screen. Click on the shape you want to add, and it will appear on your workspace.
- To position and modify these objects, click and drag them to your desired location. You can also utilize the handles to resize and rotate the objects, tailoring them to fit your design precisely.
- These shapes can be both additive and subtractive. When an object is selected, you can select "Solid" or "Hole". This allows you to add or remove material in the shape of the selected object.



Combining Objects

- To combine objects, hold shift and click on each shape you want to combine
- When you've selected all the shapes you want to combine, click the fused square and circle button next to the light bulb at the top right of your screen.
- To undo the grouping, there is an "Ungroup" button to the right of the "Group" button

