

Pollock Draw Bots

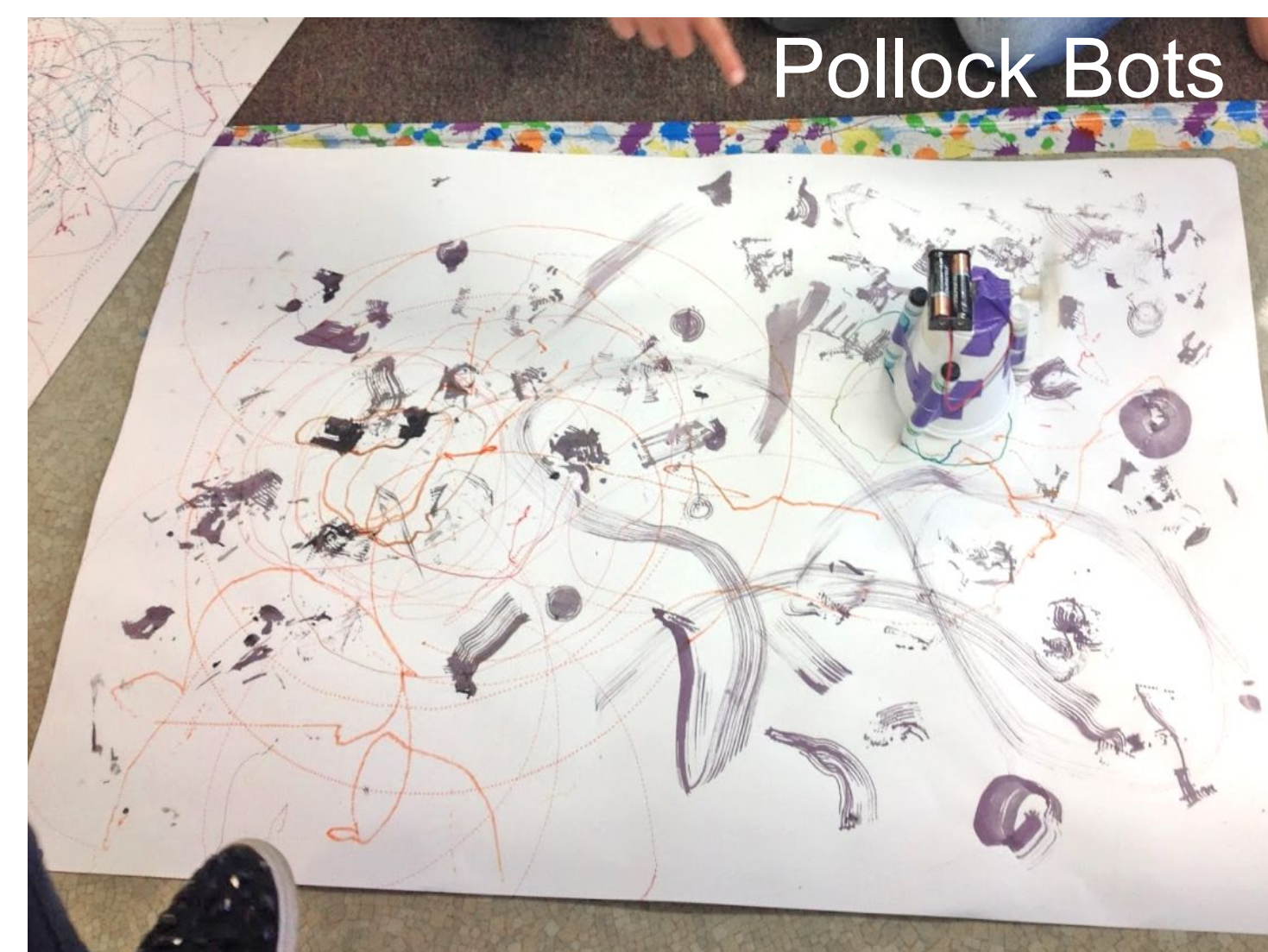
WHAT: Draw Bots are drawing robots made from a DC hobby motor, battery pack and art supplies. The robot is brought to life by completing a simple circuit between the battery and motor.

ELEMENTARY - HIGH SCHOOL CHALLENGE:

Use the materials provided to design and redesign your own Draw Bot and consider the impact of the different variables. Combine the drawing robot over the bristlebot to create a Pollock-inspired work of art.

UNDER WHAT CONDITIONS CAN YOUR BOT DRAW:

- Dotted lines?
- Straight lines?
- In circles?



<http://kloartventure.blogspot.com/>



https://c2.staticflickr.com/4/3314/3544180737_1db90b00fb_b.jpg

BristleBots

WHAT: Bristlebots are made of a vibration motor, battery, toothbrush, and foam tape. The robot is brought to life by completing a simple circuit between the battery and motor.



ELEMENTARY & HIGH SCHOOL CHALLENGE:

Use the materials provided to design your a Pollock Bot.

- Can you make a switch?
- Can you redesign your bot to move faster, slower, straight, or in circles?
- Design a bot using pipe cleaners for legs?
- Dip your bot in ink to create a Jackson Pollock inspired work?



Light It Up!

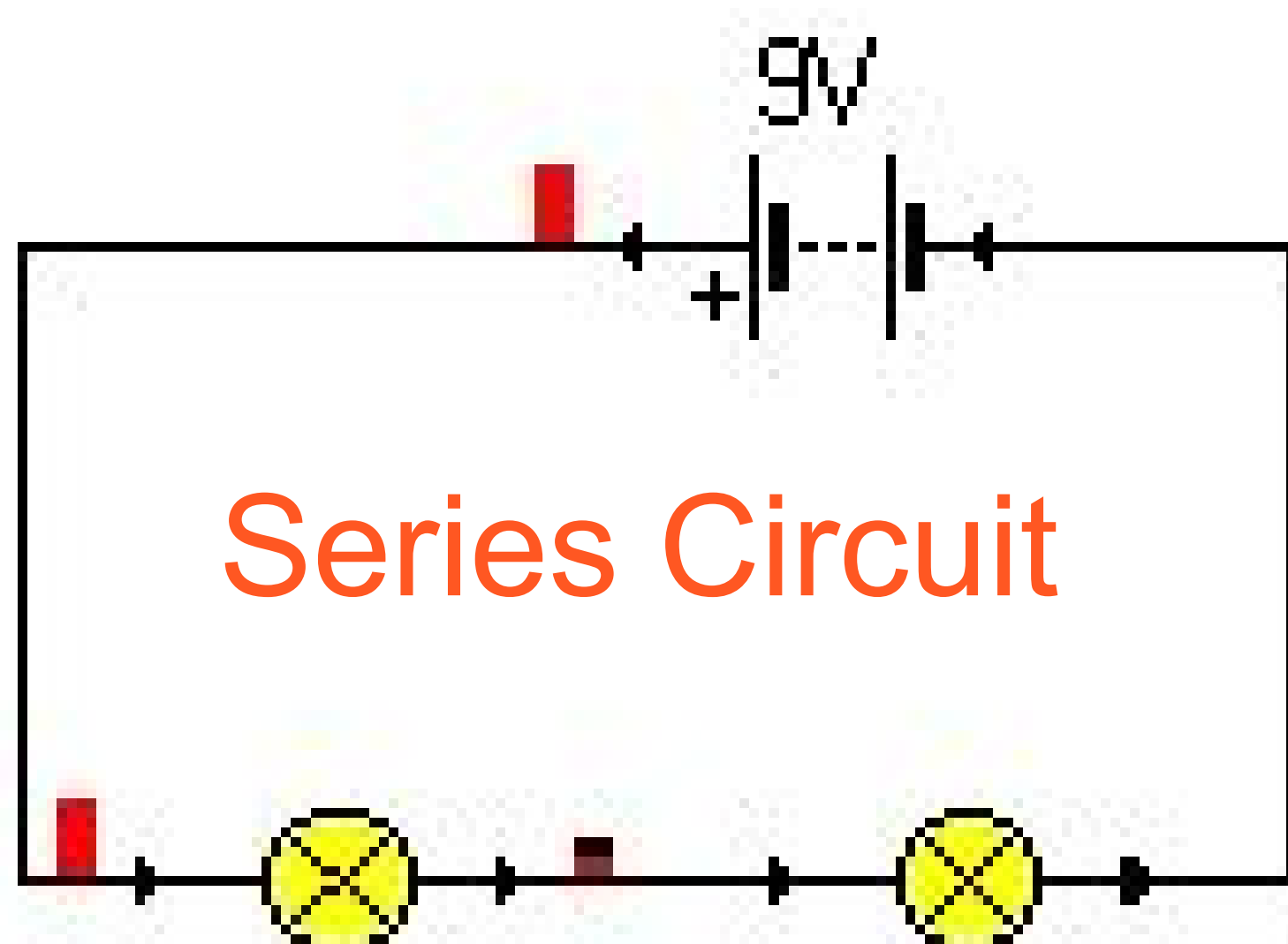
WHAT: Electronic wearables use LEDs (light emitting diodes) plus conductive tape and 3 volt batteries to create an illuminated product or design.

ELEMENTARY - HIGH SCHOOL CHALLENGE:

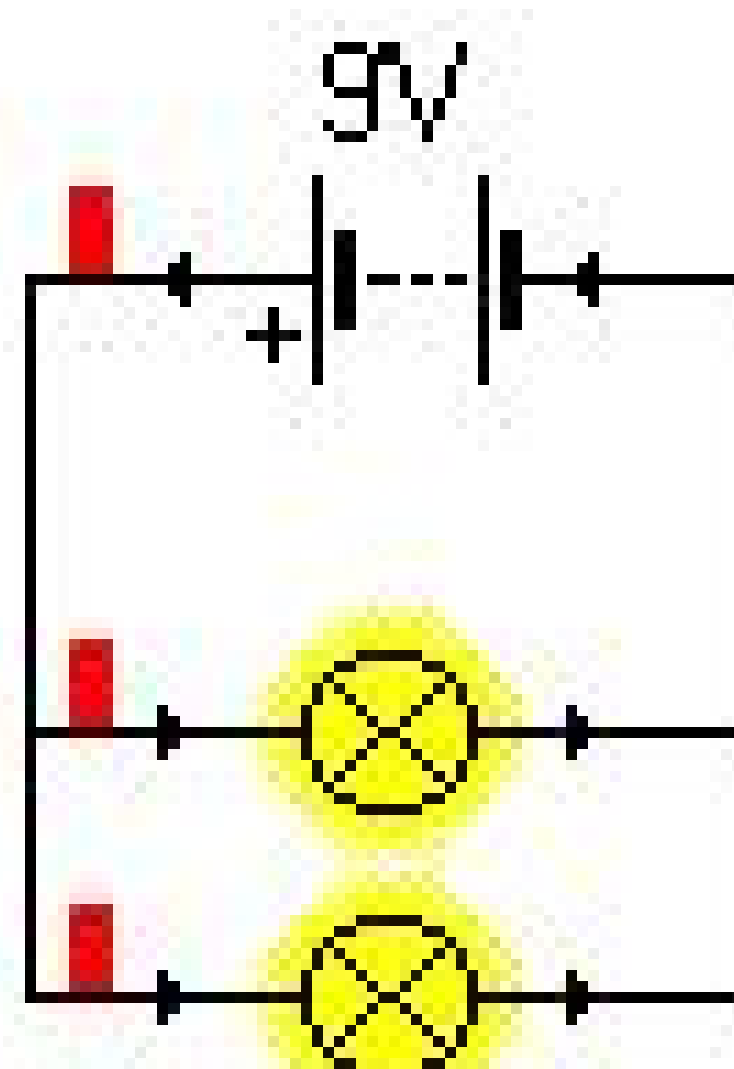
YOUR CHALLENGE: Design a new product or work of art that incorporates meaningful elements of light.

CONSIDER:

- Depending on how many LEDs are you using - would you need to design a series circuit or parallel circuit?
- Can you integrate a “switch” that helps easily turn your design on/off to save battery power?
- How might your design present a fashion concept or solve a real world problem?



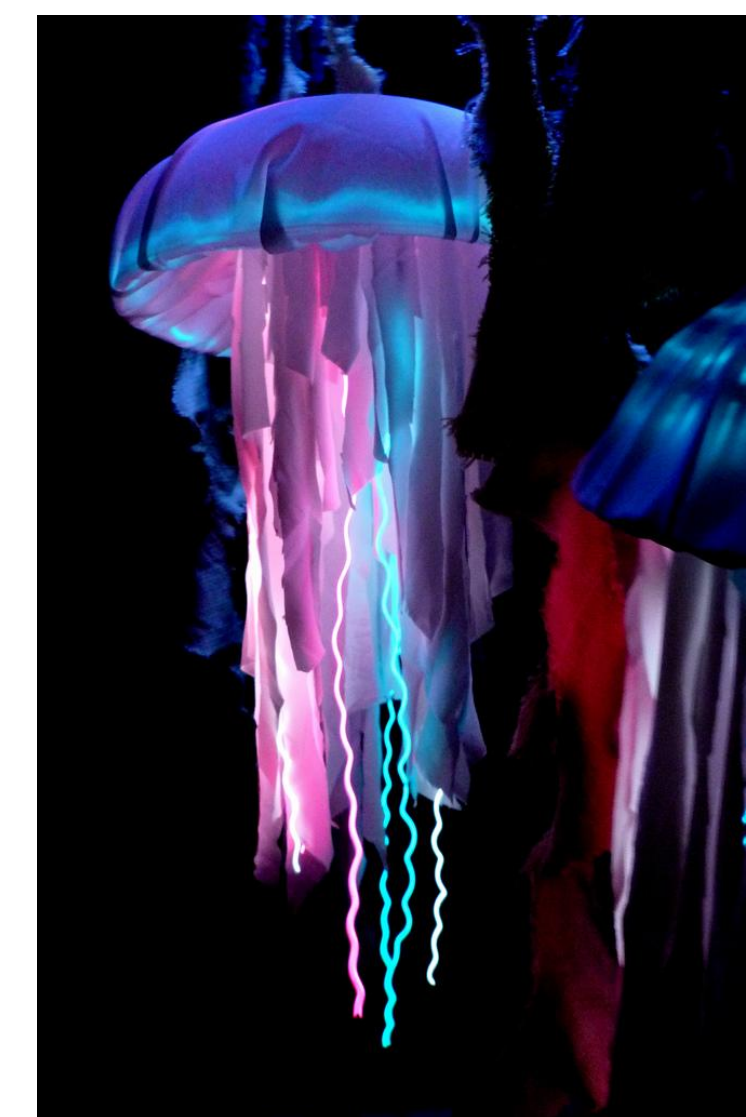
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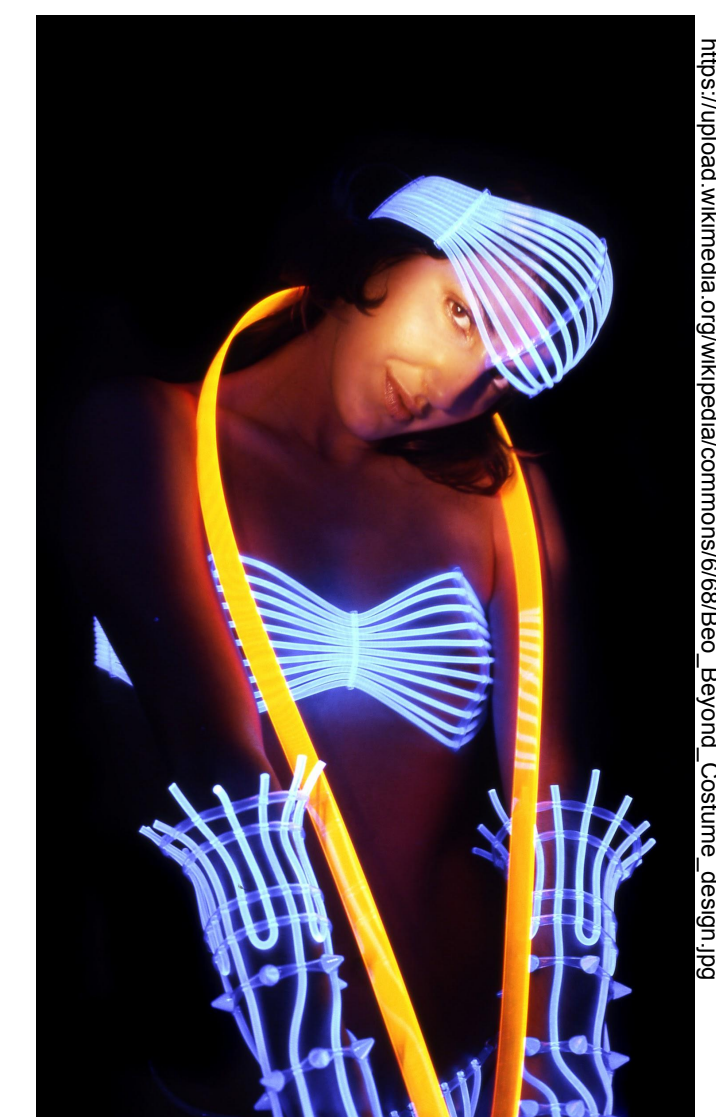
Parallel Circuit



<http://www.instructables.com/id/BraceLED/>



https://cz.sciaticlicki.com/4/3306/33336/0396_1/6a4051b0_b.jpg



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<https://upload.wikimedia.org/wikipedia/commons/thumb/8/8b/Simple-wearable-bracelet.jpg/1280px-Simple-wearable-bracelet.jpg>



These findings are consistent with the literature on the effects of social support on health outcomes. For example, a meta-analysis by Cohen and Wills (1985) found that social support buffers the negative effects of stress on health. Similarly, a study by Cohen et al. (1983) found that social support was associated with better health outcomes in a sample of elderly adults. The current study adds to this literature by showing that social support is also associated with better health outcomes in a sample of young adults.



https://www.google.com/search?q=DIY+LED+wearable&biw=1164&bih=597&source=inms&tbm=isch&sa=X&ved=0ahUKewjRjMn6qZQAhVF1hOKHKTnRioQAUICSoC&tbm=isch&n=DIY+led+dog+collar&imgsrc=ilAP3Z_5lzhIRm9%3A

MaKey MaKey

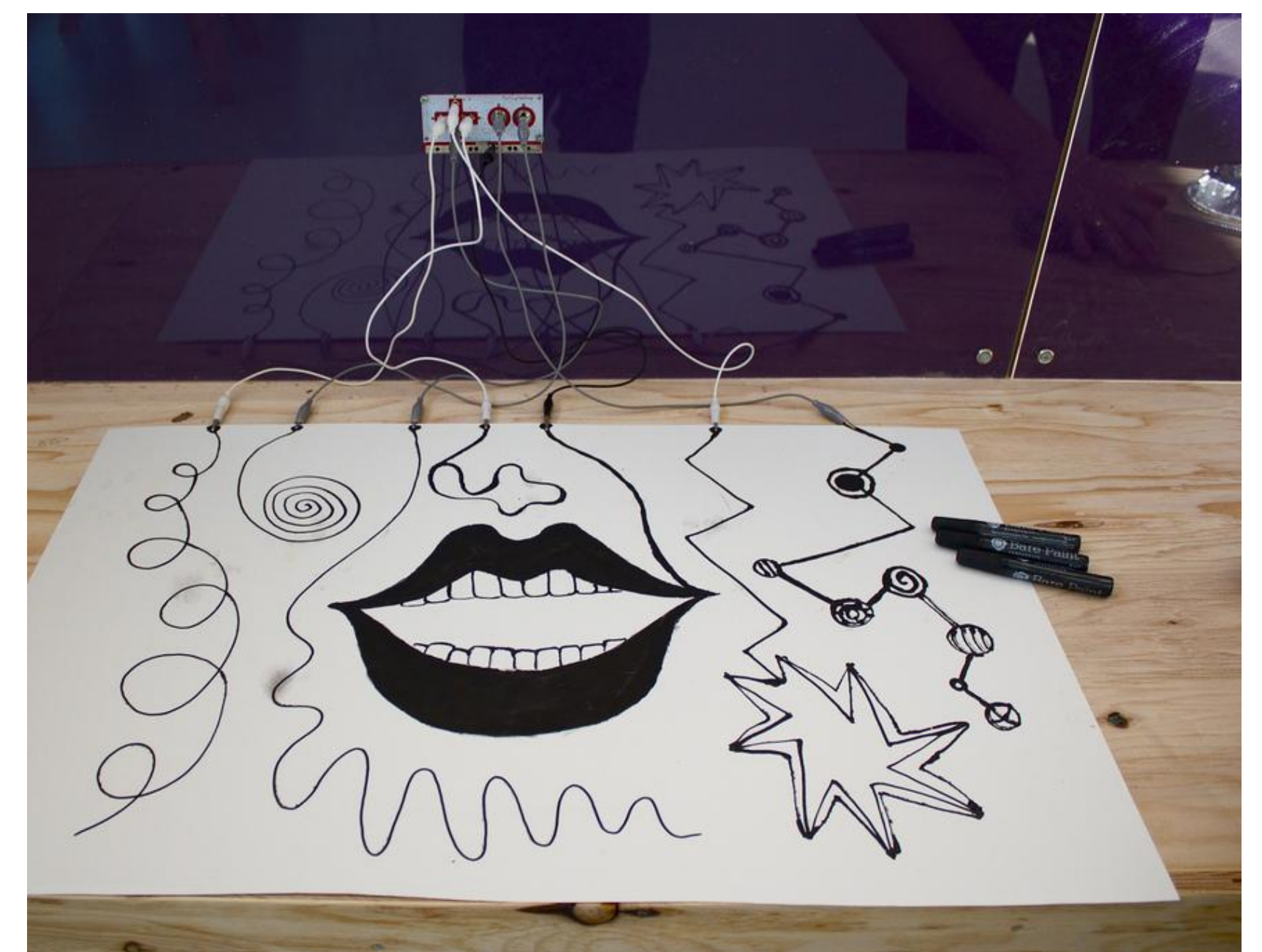
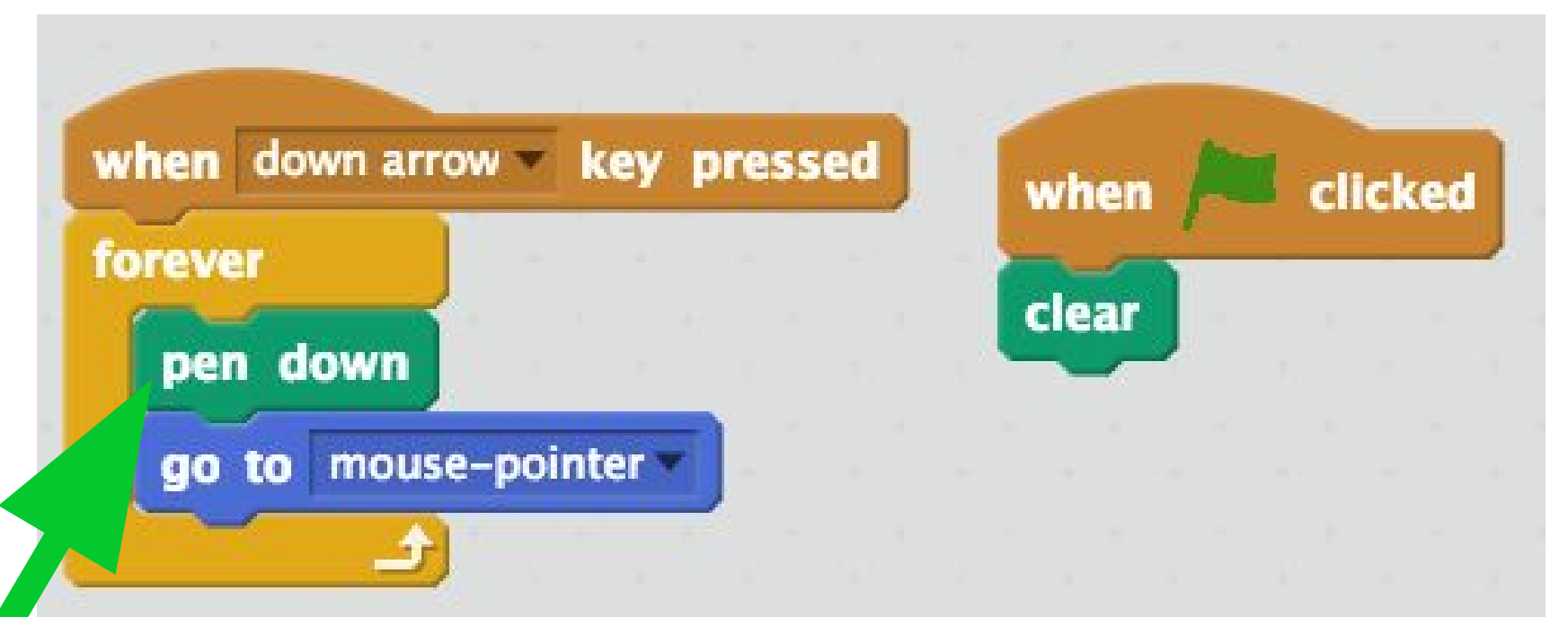
WHAT: MaKey MaKey works by creating simple circuits connected to an input (space key, up arrow key). Control the computer by turning conductive objects like fruit, tin foil, and water into a touch pad, mouse or keyboard.

ELEMENTARY CHALLENGE:

Use conductive materials to design your own interactive art.

CAN YOU:

- Create a simple drawing out of graphite to make different “keys.”
- Add a sprite and play with the pen tool to make a moving line?
- Change the pen tool color and size with different keys?



https://c1.staticflickr.com/9/8516/8534560375_e05d68f420_b.jpg

MIDDLE/HIGH SCHOOL CHALLENGE:

Use Scratch and conductive materials to bring a still life painting to life?

CAN YOU:

- Use the pen tool to draw lines/shapes triggered by a fruit keyboard?
- Record your own sound and include history or ideas about the painting?
- Use a repeat block?



https://upload.wikimedia.org/wikipedia/commons/d/d9/Still_Life_-_Abraham_van_Beyeren.png



Public domain.

Stop Motion Animation

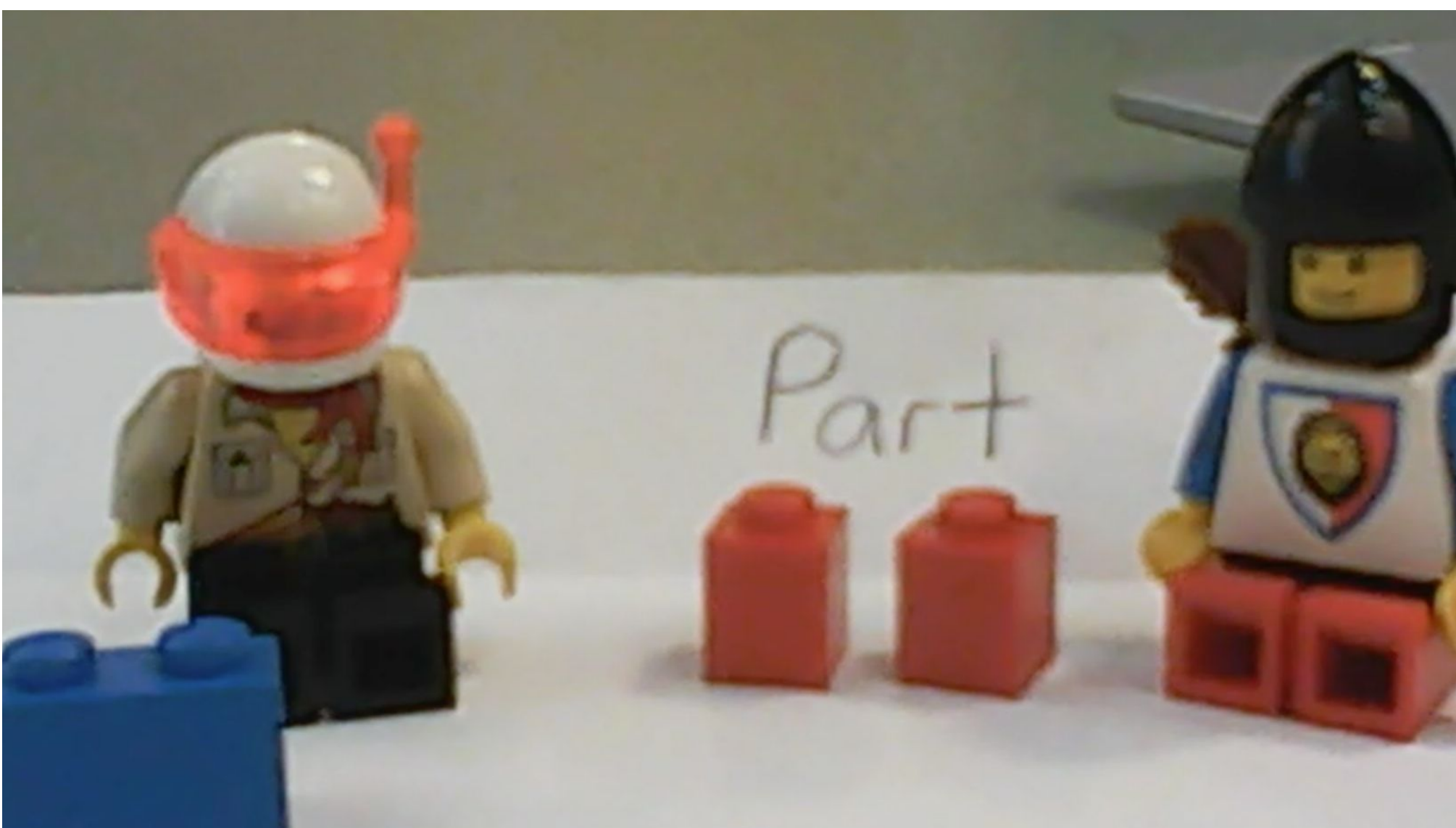
WHAT: MyCreate is a stop motion app that allows you to join together many pictures into a movie. The onion skin feature helps you line up your shots to create a smooth animation. The voice recording feature even lets you narrate the story once you're done filming.

ELEMENTARY - HIGH SCHOOL CHALLENGE:

YOUR CHALLENGE: Use stop motion to make an idea visible. Examples: show the life cycle of a plant, explain equivalent fractions, tell a story, design your own hybrid animals, or explain a biology or physics concept.

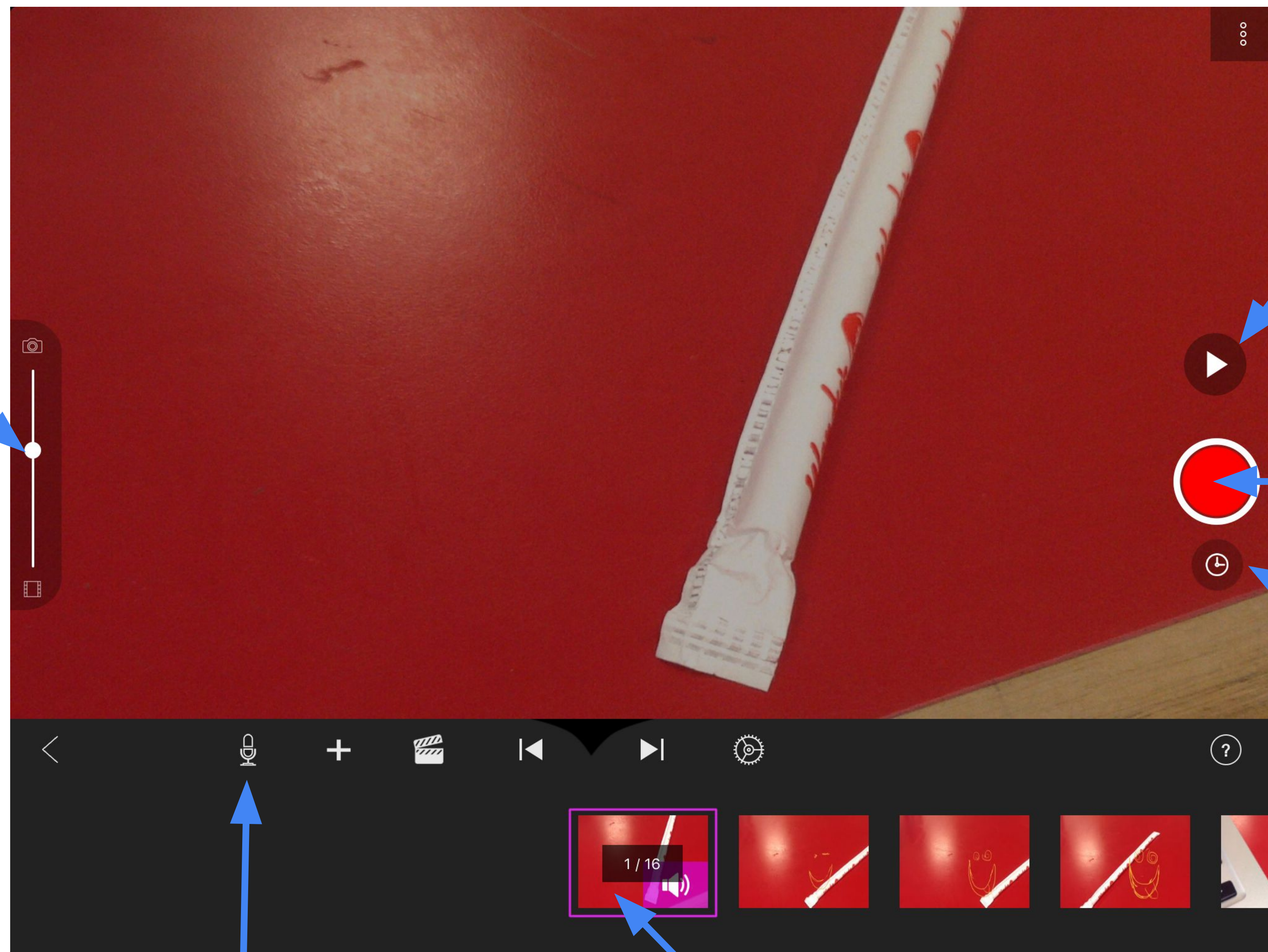
CAN YOU:

- Create an engaging storyline and visuals?
- Take at least 50 photos to help make the animation flow organically.
- Add a voice narration or sound effects?



Stop Motion Studio Tips

Onion skin: make sure to slide this down a bit...This feature allows you to view a “hint” of previous frame.



Playback

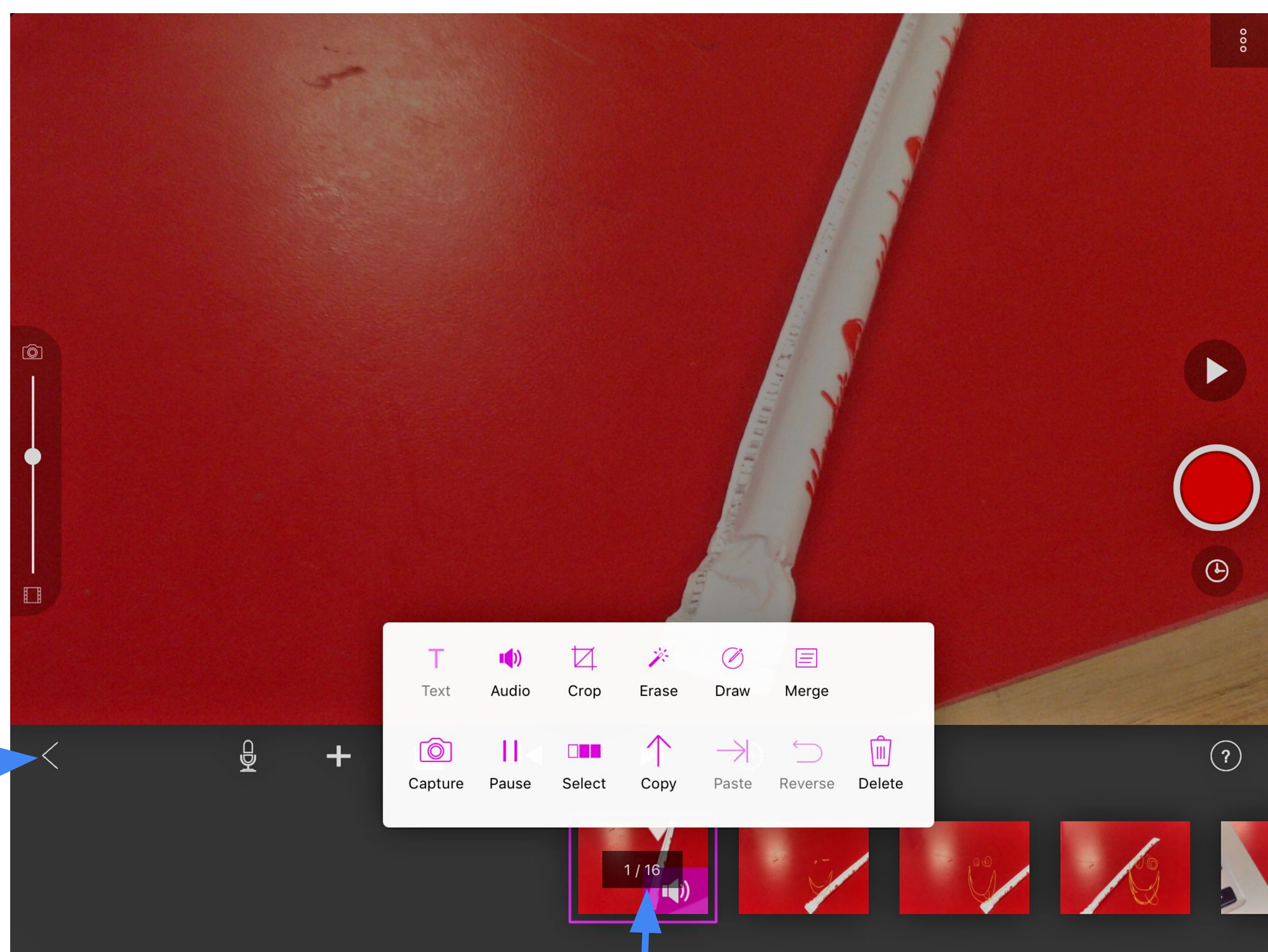
Camera button

Frames per second

Record audio

Timeline

Go back to projects start page to export your video



Holding your finger down on each frame reveals a variety of tools.

Tinkercad

WHAT: Tinkercad is a free online tool that can be used for 3D modeling. Tinkercad allows you to bring your designs to life by creating them in a 3D environment. The 3D models you create in Tinkercad can be displayed on the web or exported to use with a 3D printer.

ELEMENTARY CHALLENGE:

Dream Houses: design a house or building inspired by an architect of your choice.

CONSIDER:

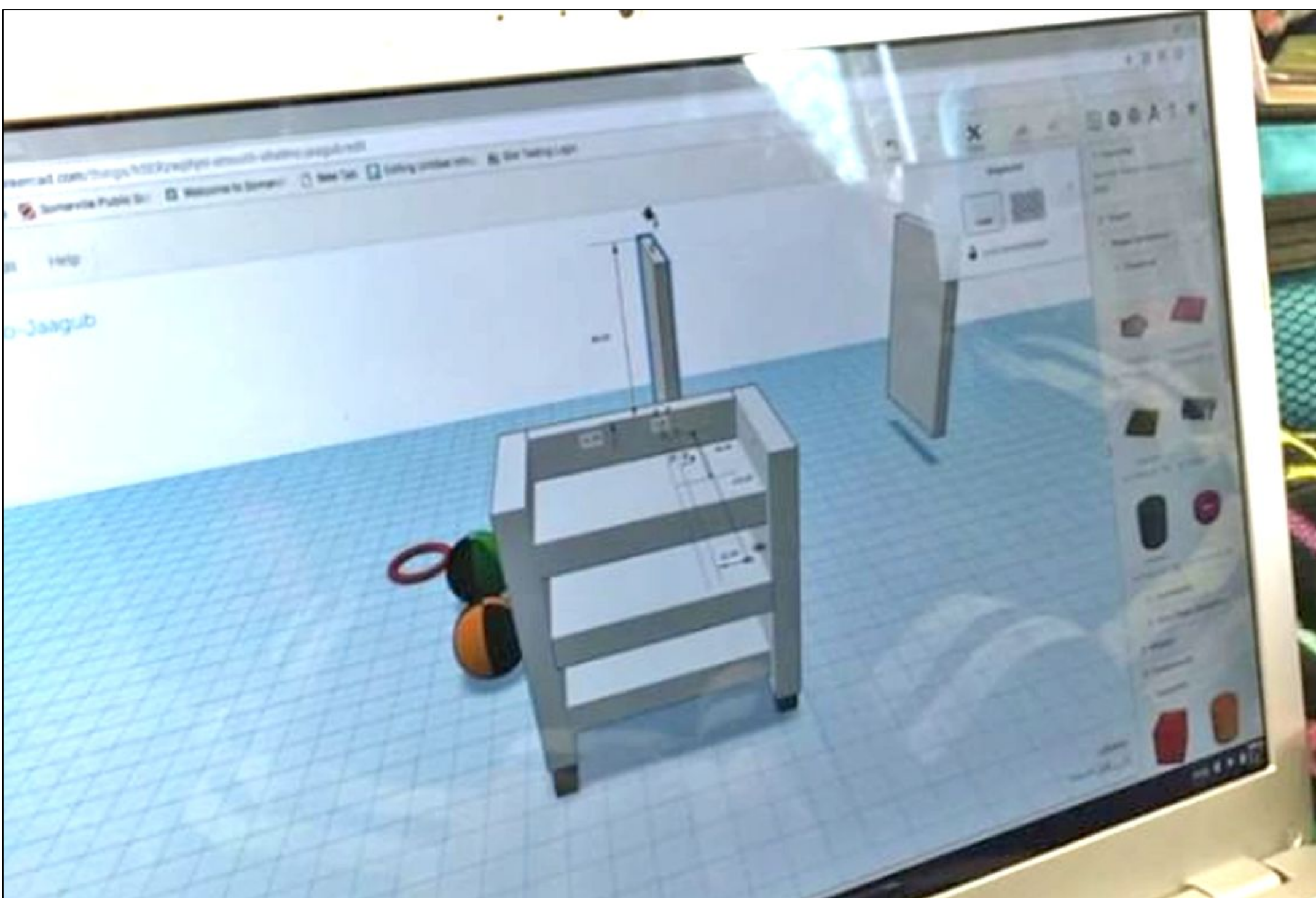
- What shapes might you use in your design?
- How many levels would it have?
- Include a person standing outside the structure to give your building some sense of scale.

MIDDLE/HIGH SCHOOL CHALLENGE:

Brainstorm a new product that solves some kind of everyday problem.

CONSIDER:

- User experience in your product's functionality? Does it meet the needs of diverse users? How?
- How different components of your product might fit together.
- What materials you might use?

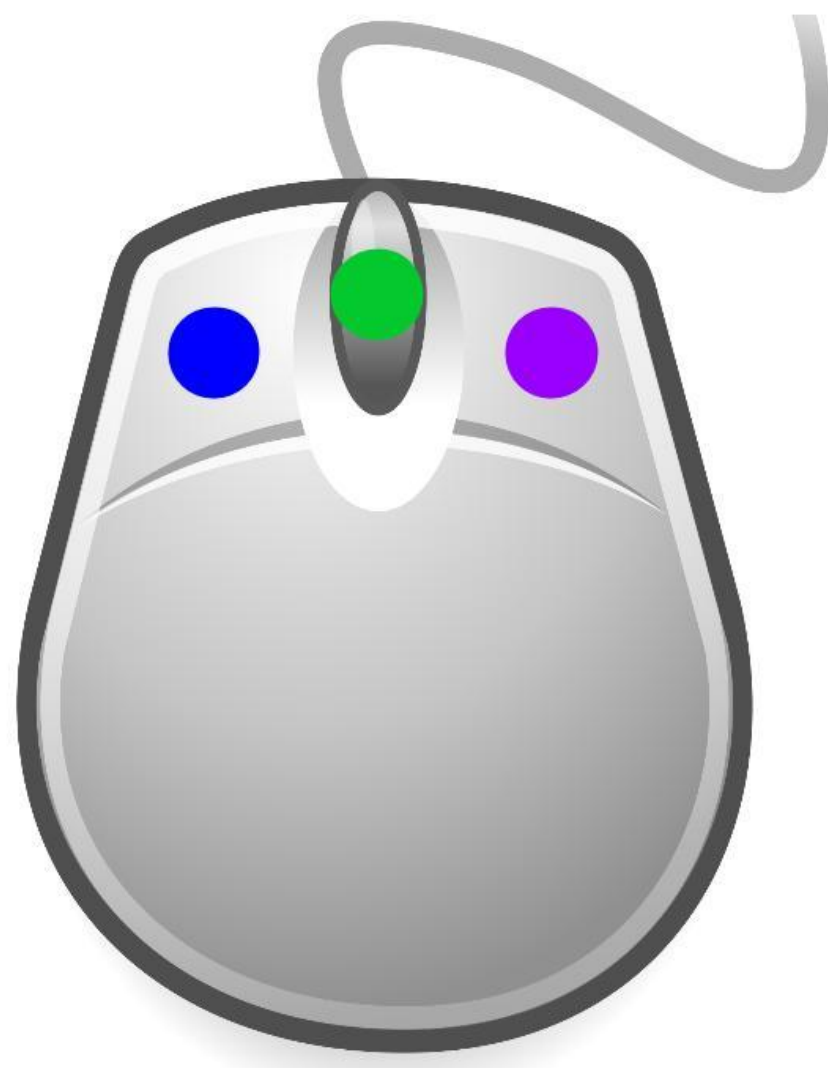


This challenge was introduced in a 6th grade math class. Students created business plans that included profit/loss projections. Kennedy students have also used Tinkercad used to design a water filtration system as well as for visually redesigning their school playground.

Tinkercad Tips

Tinkercad is a free online tool that can be used for 3D modeling. The 3D models can be exported to the .stl format which can be used with the 3D printer. You will need to create a free account before you can begin using tinkercad.

Mouse Controls



- ☐ **Left Mouse Button**

Select and drag objects

- ☐ **Middle Mouse Button (Scroll Wheel)**

Ctrl + Shift + Left Mouse Button also works if you do not have a scroll wheel

Move camera perspective

- ☐ **Right Mouse Button**

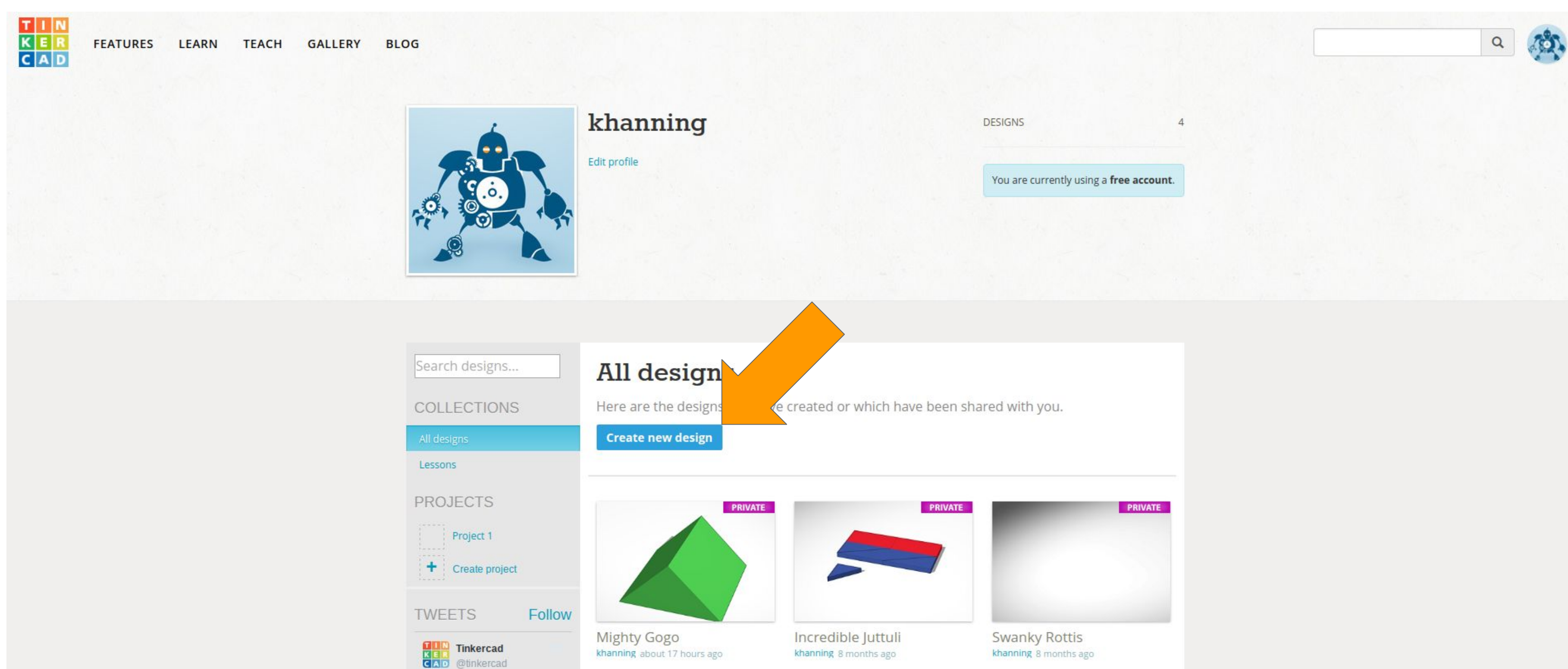
Ctrl + Left Mouse Button also works if you do not have a right mouse button

Rotate camera perspective

Getting Started

Begin by logging into your Tinkercad account and clicking

Create new design

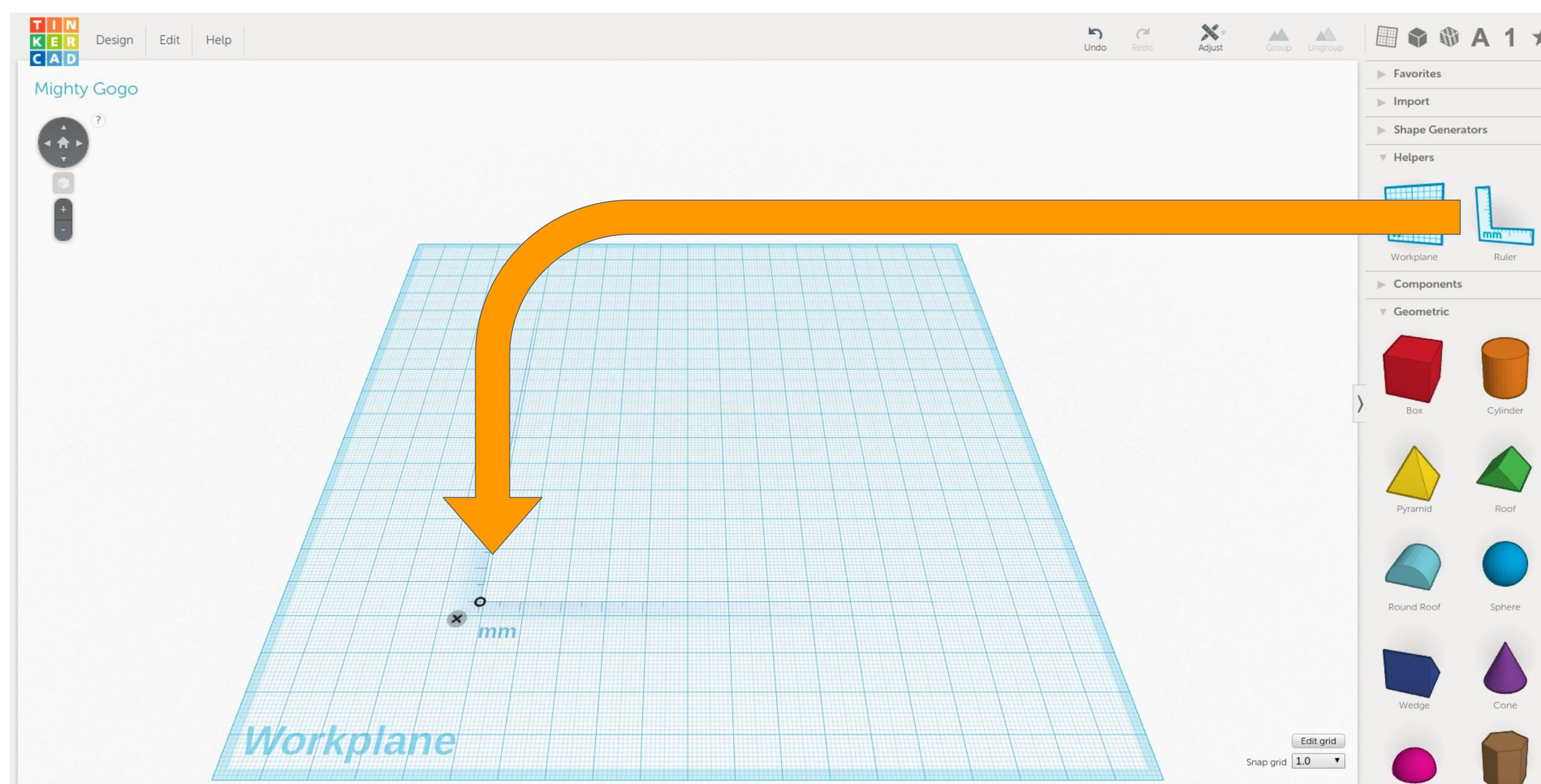


Tinkercad Tips

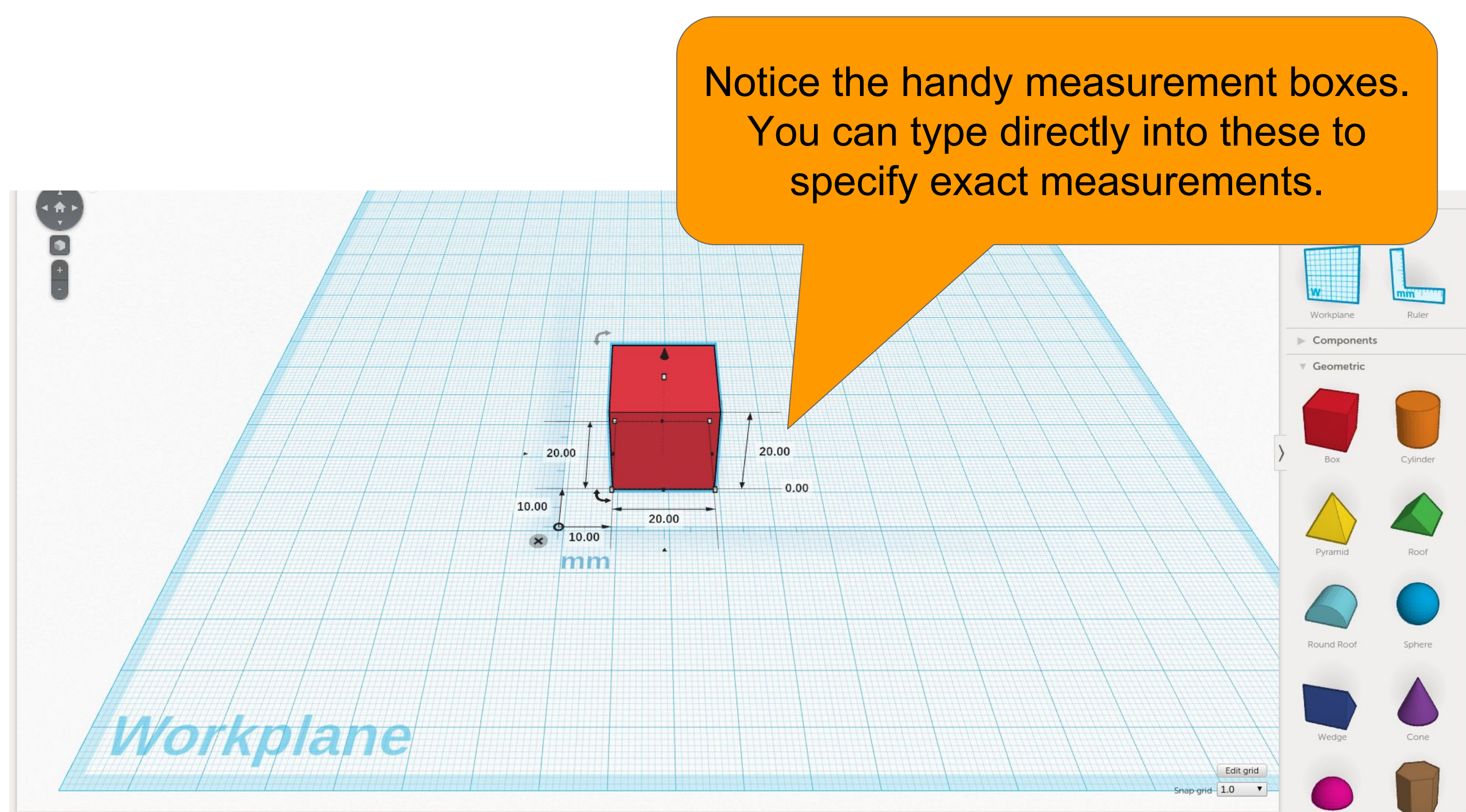
Ruler Helper

Always begin by dragging the **Ruler** tool onto the Workplane.

The **Ruler** can be found under the **Helpers** category. It doesn't matter where you drop the ruler, only that you bring out the ruler before any other shape.



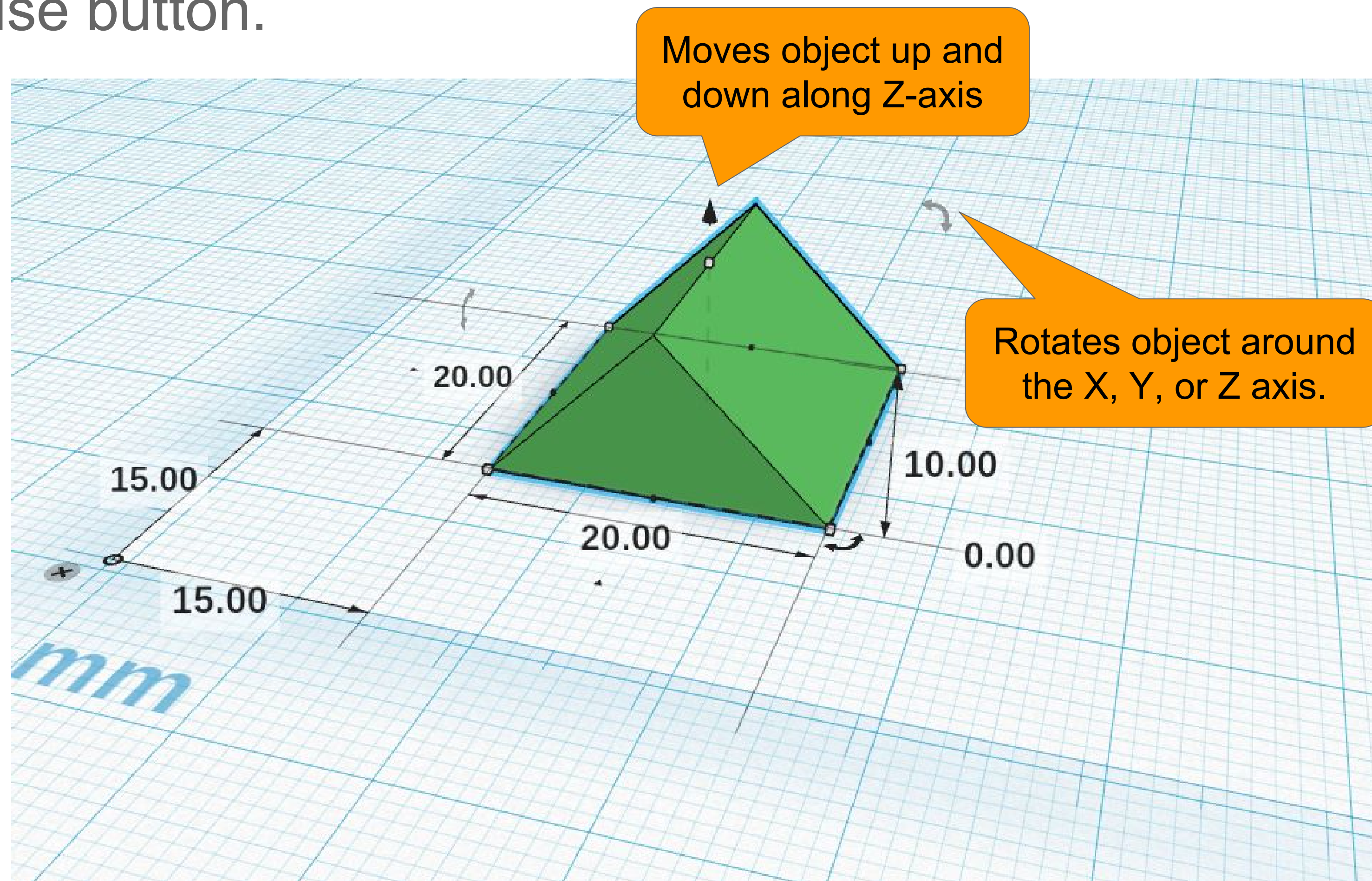
The ruler will make it much easier to align objects or specify exact measurements.



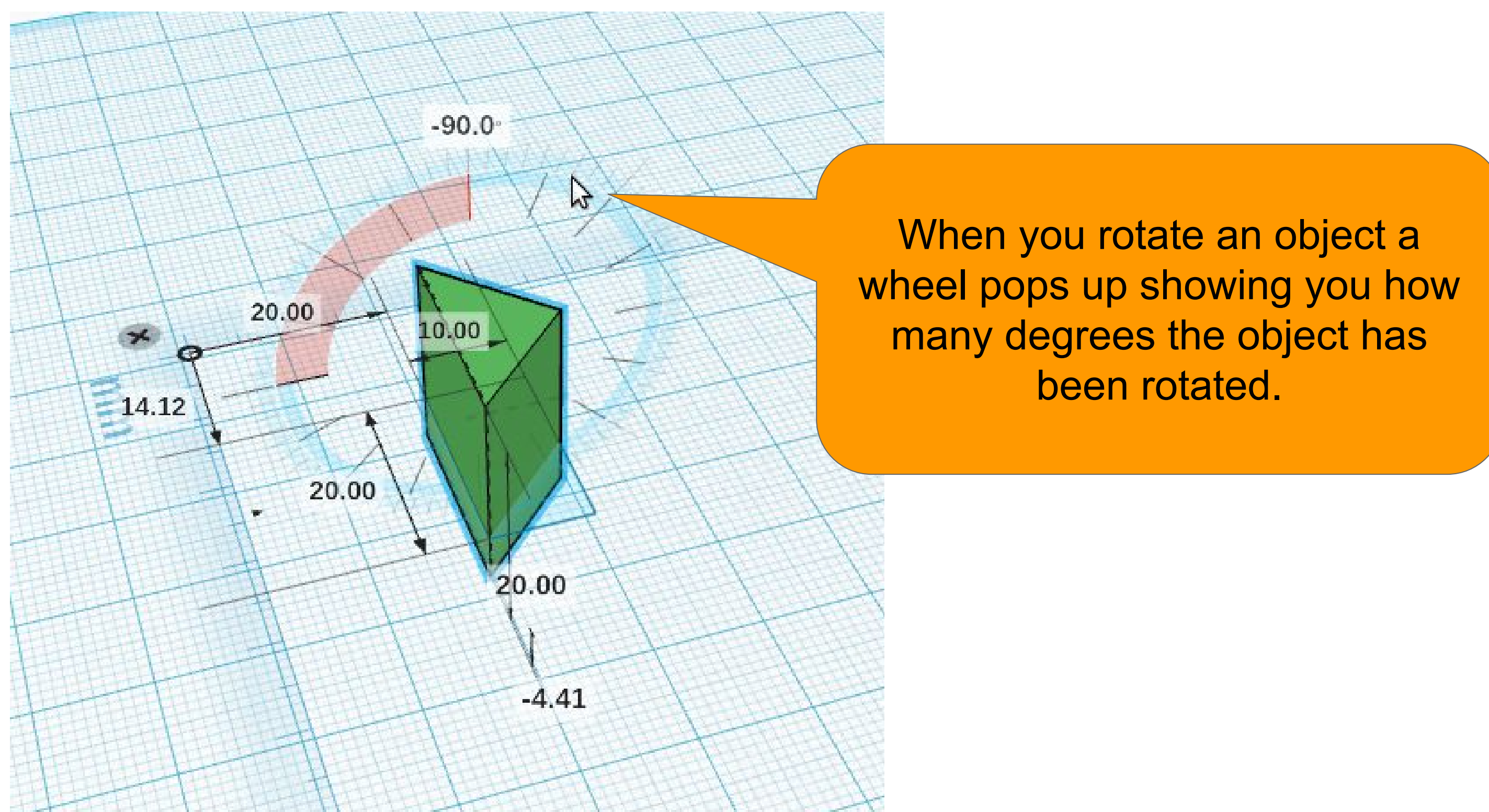
Tinkercad Tips

Rotating Objects

Sometimes you will have to rotate objects. To do this grab and drag the rotation handle across the correct axis. You may have to rotate the view using the right mouse button.



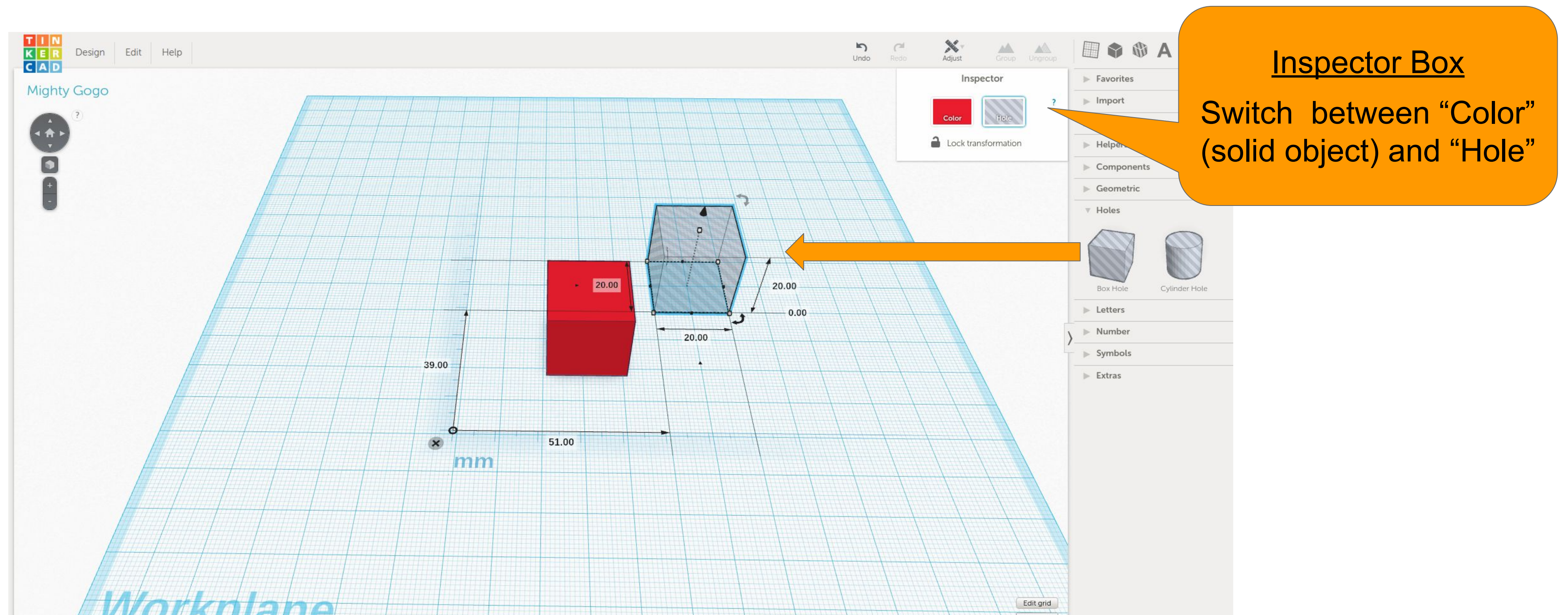
Sometimes you might need to rotate the camera perspective to see all of the rotation handles (↻). Click and drag with the right mouse button (or hold Ctrl + left mouse button) to rotate the camera perspective.



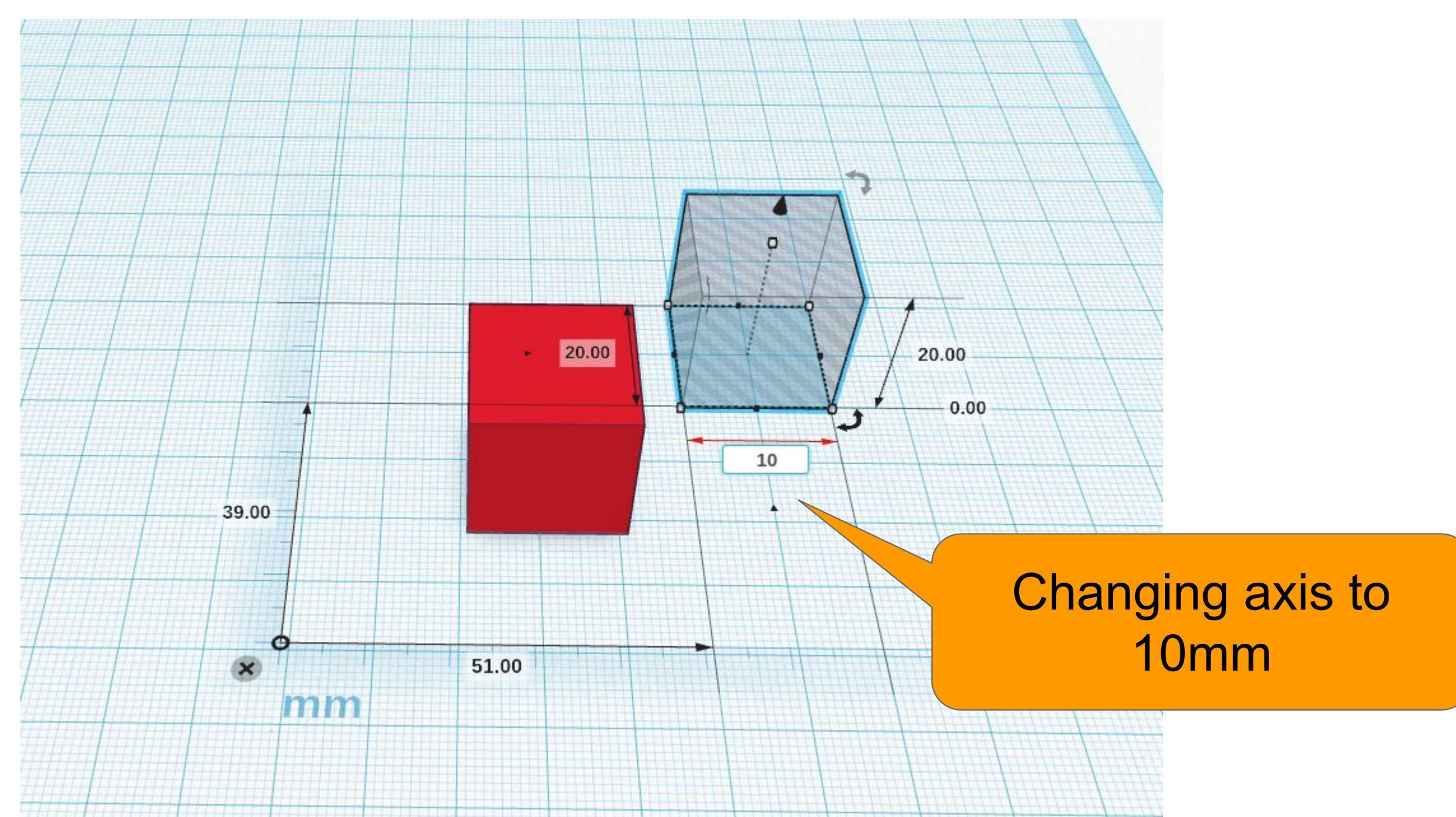
Tinkercad Tips

Making A Hole

To make a hole you can use the **Box Hole** and **Cylinder Hole** tools or you can use any shape by changing from “Color” to “Hole” in the inspector box.



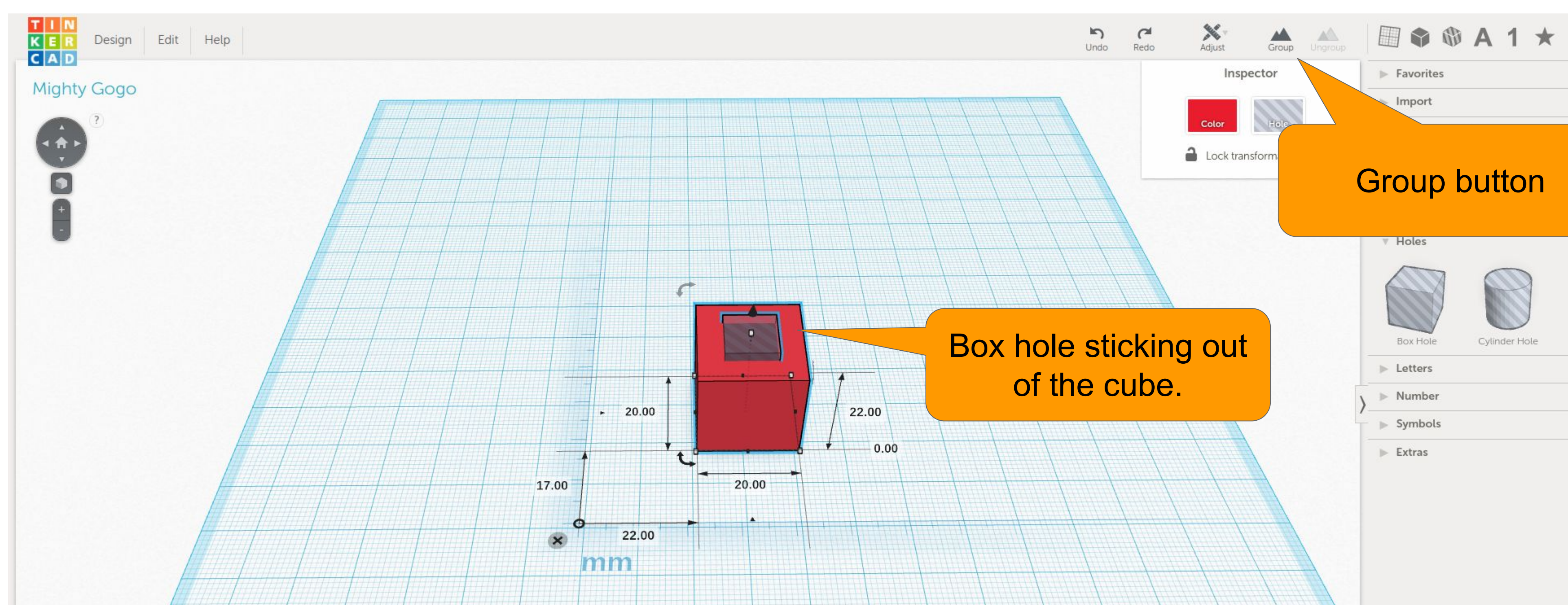
Let’s say we want to cut a 10mm hole out of this 20mm box. First I will bring a **Box Hole** onto the workplane and resize it to 10x10x10 by typing in the measurement boxes (You may have to rotate the camera to see all the boxes).



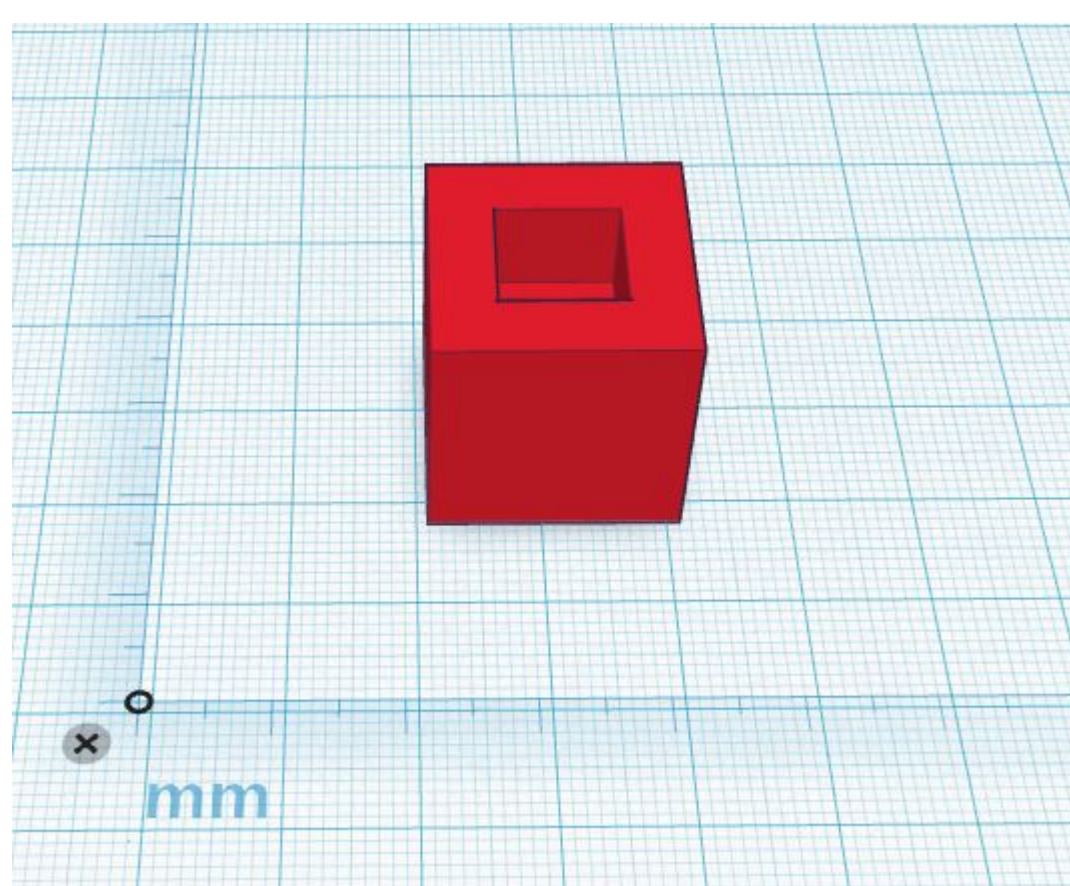
Tinkercad Tips

Making A Hole (cont.)

Now place the **Box Hole** where you want make a hole in the cube. Once the hole is in place, hold the Shift key and click both objects so they are both selected. With the cube and the hole objects selected click the Group button. It may take a minute for the grouping to process, once it is ready the hole object will disappear.



Click off of the object to deselect it, you will see the newly created hole!

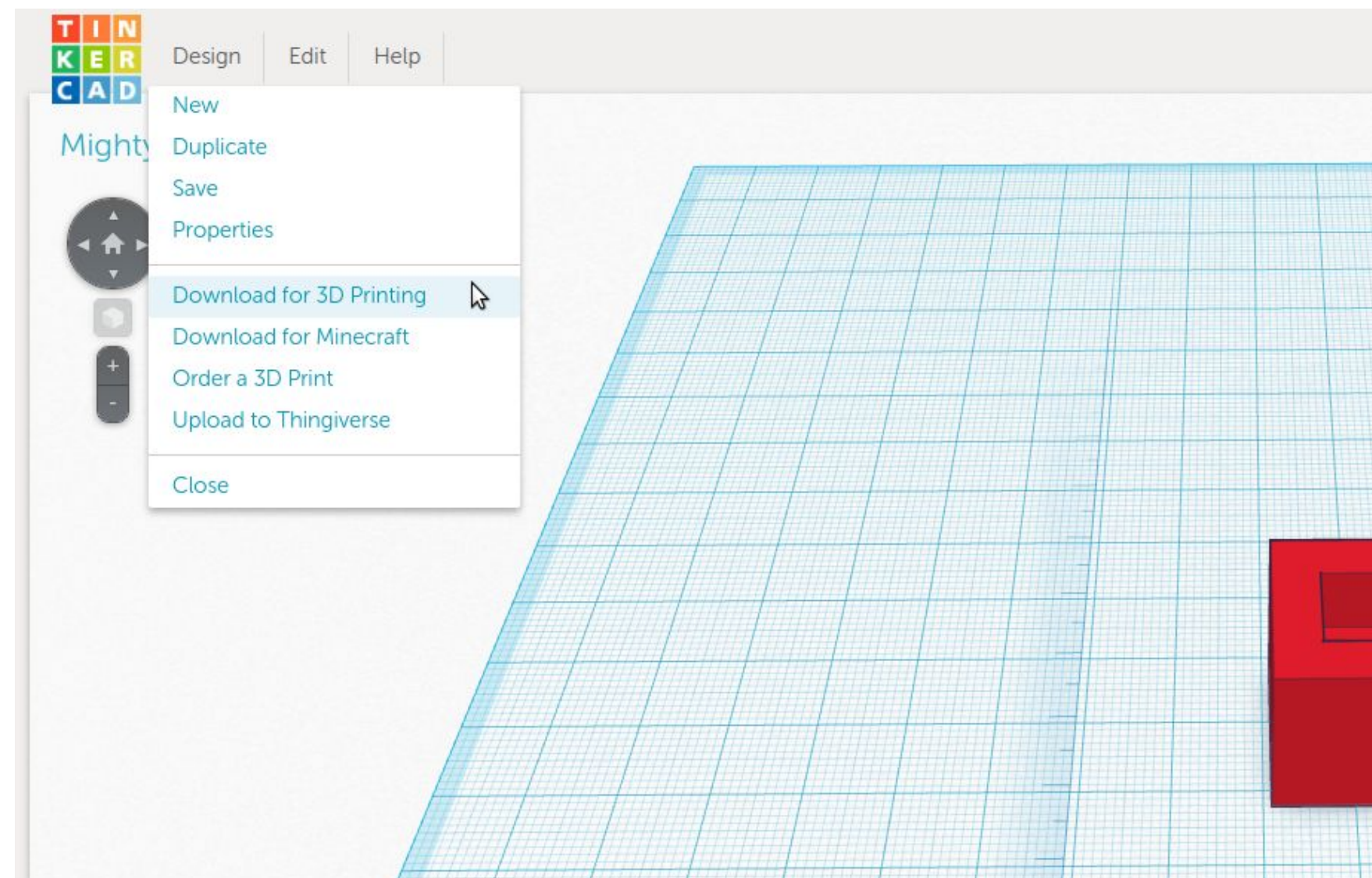


You can always modify the hole by clicking back selecting the object and clicking the Ungroup button

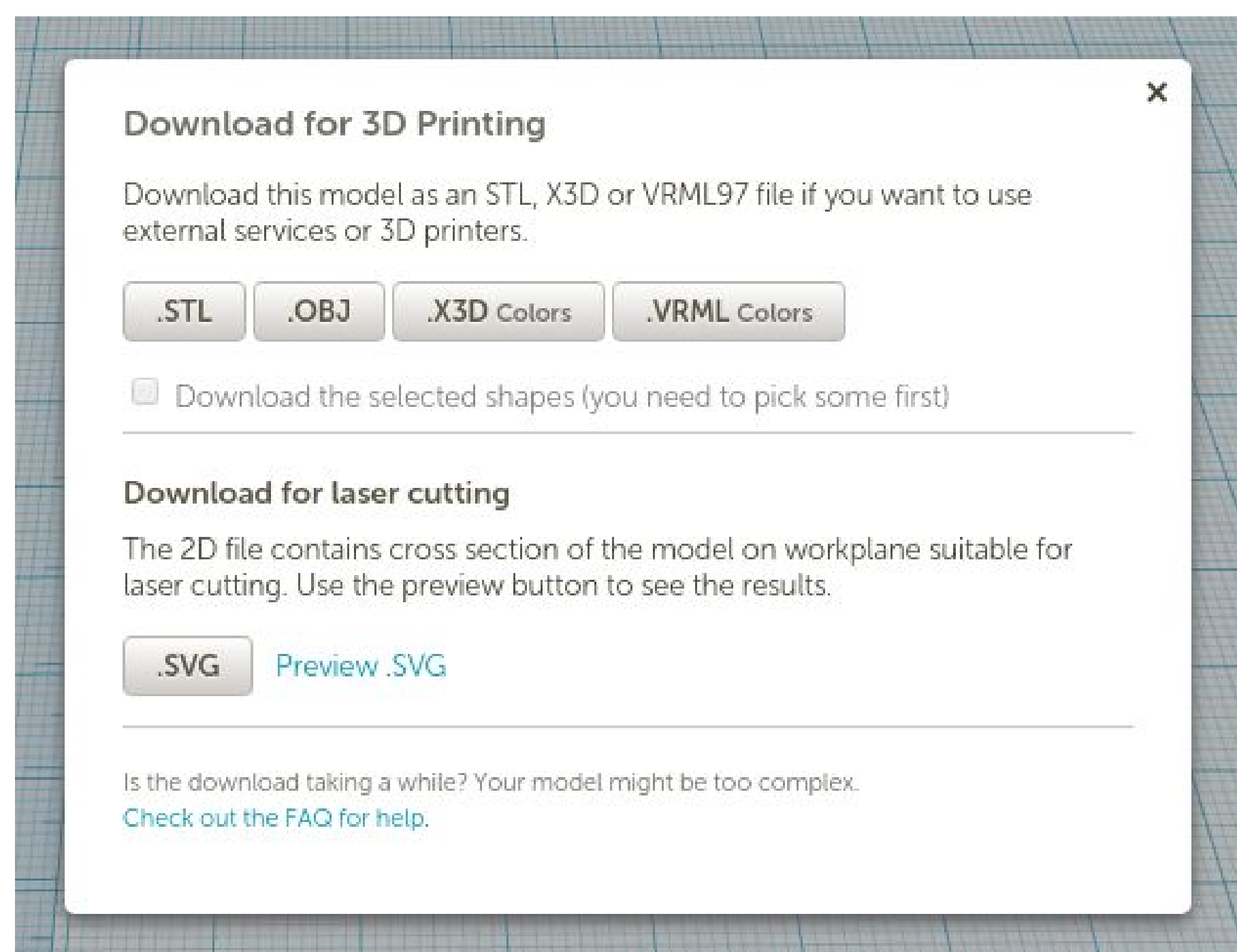
Tinkercad Tips

Download for Printing

Once you are happy with the design we need to download it so we can prepare it for the 3D printer. Click on Design then “Download for 3D Printing”.



We want an .stl (stereolithography) file, which is common 3D model format used with many 3D printers.



That's it! Now we have a 3D model that is ready to be prepped for 3D printing. Unfortunately, 3D printers can't read .stl files directly. What we need to do next is a process called “slicing”. Slicing is the process of converting a 3D model to instructions for the 3D printer which is known as GCODE.