STEM at HOME

SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

PRESENTED BY: girlstart

Tinkercad Pyramids

Before architects build structures, they first must plan a design. Learn how to use Tinkercad©, a 3D modeling software, to create a digital 3D model of an Egyptian Pyramid!

**We recommend that you do this activity after Paper Cup Pyramids.*

TEKS:

MATH K.6 B: The student is expected to identify three-dimensional solids, including cylinders, cones, spheres, and cubes, in the real world.

MATH 2.8 B: The student is expected to classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes as special rectangular prisms), and triangular prisms, based on attributes using formal geometric language.

TECH 5.4 B: The student is expected to collect, analyze, and represent data to solve problems using tools such as word processing, databases, spreadsheets, graphic organizers, charts, multimedia, simulations, models, and programming languages.

Materials:

- Computer, laptop, or tablet with internet access

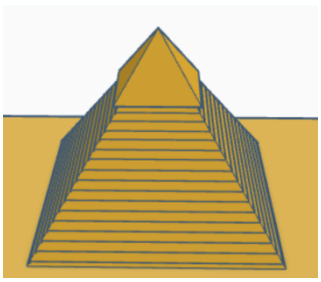
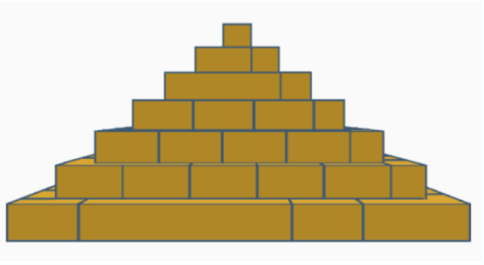
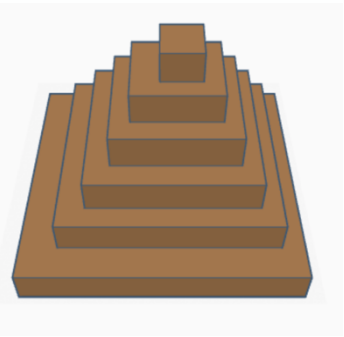
STEM Explanation:

When architects decide to build something, they usually draw sketches and build models of their project before they build a full-size version! Building a model of something means creating a miniature, three-dimensional representation of that object. What makes something three dimensional, or 3D? 3D objects have three dimensions: a length, width, and height. 2D objects only have two of these dimensions. For example, drawings of shapes on a piece of paper only have a length and a height, and they are flat. However, objects all around you also have a width, which makes them 3D instead of flat.

When architects are able to turn their 2D sketches into 3D models, they can better picture what their final construction project will look like! Architects use 3D modeling software to create diagrams and blueprints for different projects. A popular 3D modeling software is called Tinkercad©, and it lets you use different shapes and objects to create 3D designs in a workplane. Now that you've built a pyramid out of paper cups, follow the steps below to design a 3D model on Tinkercad©!

How To:

1. Log in to Tinkercad©.
    a. Go to tinkercad.com on your computer, laptop, or tablet.
    b. Click on the blue "Start Tinkering" button.
    c. Create a Tinkercad© account, then press sign in.
2. Click the blue "Create New Design" button.
3. In the top left corner, you'll see a silly, made-up design name. Click on this name to rename the design.
4. What you see on your screen now is called a workplane. This is the grid that you will use to build your design.
5. Play around with the different aspects of Tinkercad© to see what you can learn! Then, use your new 3D modeling skills (and the Tinkercad© Guide below) to construct a 3D pyramid shape.

Career Connection:

Animation and technology designers apply their knowledge of technology to design art in a virtual space. They use a variety of different technologies and software to draw 2D and 3D images that can be brought to life through animation, 3D modeling, and graphic design. Their designs can be found in movies, video games, engineering models, and much more!

Resources:

https://www.tinkercad.com/things
https://www.tinkercad.com/things/4Hmeq6rdnik-egyptian-pyramid
https://www.tinkercad.com/things/awYNIpra5Q5-the-great-pyramid-of-giza
https://www.tinkercad.com/things/il1hk6g59jK-ancient-egyptian-pyramid-20

Tinkercad© Guide:

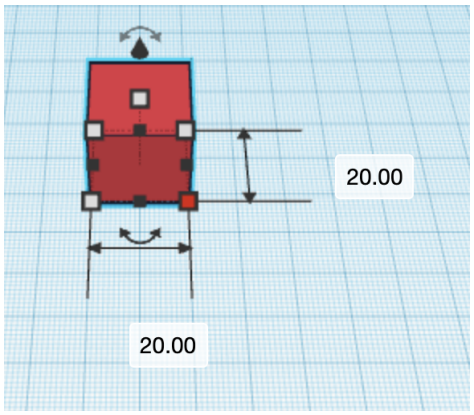
Use this guide to learn how to use many of the basic features on Tinkercad©.

Right Sidebar: Shapes

First, drag a shape to the workplane.

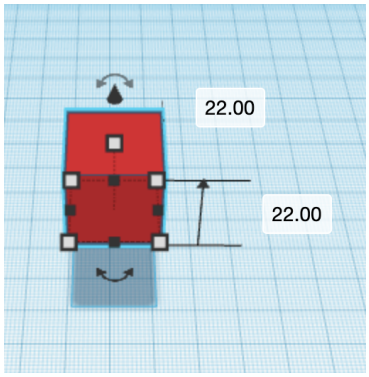
Measurements

Click on the shape, then drag the white boxes around the shape to change the size of the shape automatically, or type in your own measurements by clicking on the numbers that appear next to the shape.

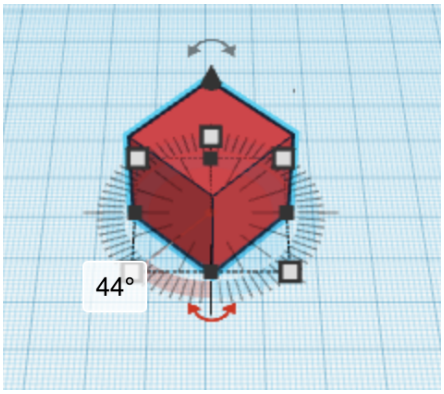


Position

- Height of shape off the ground: Drag the black cone above the shape up and down, or type in your own position by clicking on the numbers that appear next to the shape.

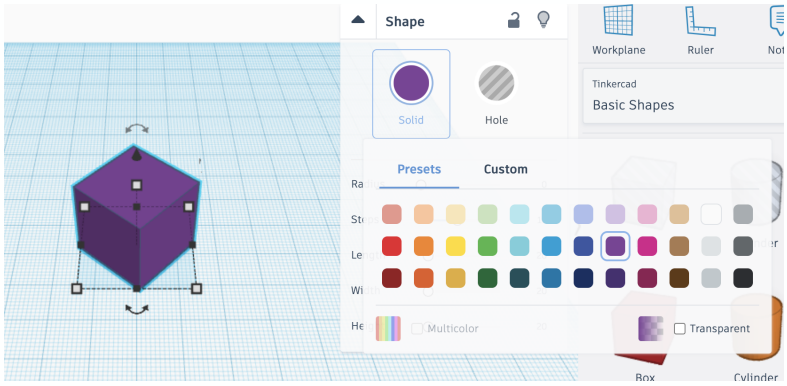


- Move the shape left/right/forward/backward: Click anywhere on the shape and drag it left or right.
- Tilt the shape: Look for the curved arrows around the shape (top, side, and front). Drag the arrows up/down or left/right to tilt the image, or type in a specific angle by clicking on the angle number that appears next to the shape.

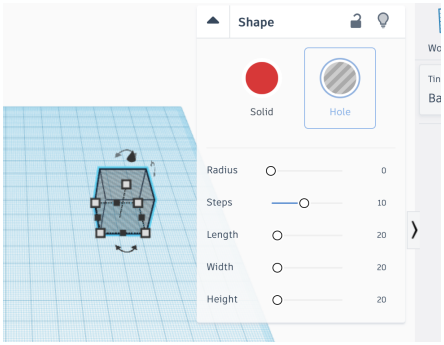


Style

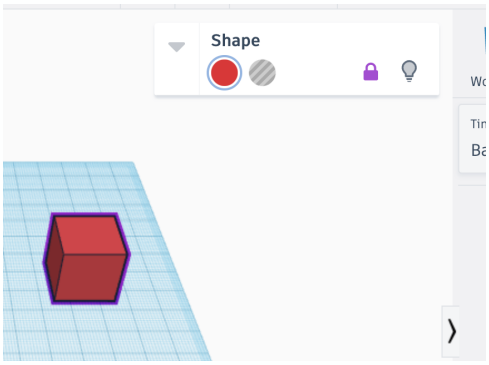
- Color: Click on the shape and select "Solid" on the menu that appears to choose a color.



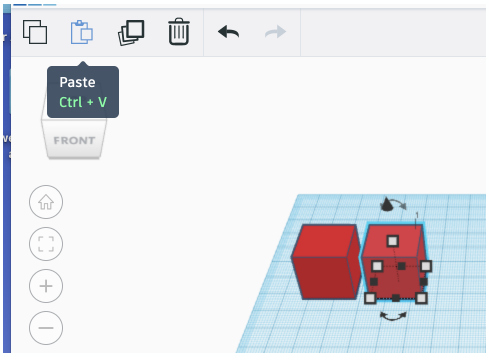
- Hole: Click on the shape and select "Hole" on the menu that appears.



- Lock and Unlock: Click on the "Lock/Unlock" icon. Lock allows your shape to stay in place without any edits. This is helpful when you are done editing a certain part and you don't want to accidentally make adjustments to it.



- Delete: Click on the shape and select the "Trash" icon in the top left corner, or press the backspace/delete button on your keyboard.
- Duplicate: Click on the shape and select the "Copy" icon (the two squares in the top left corner). Then, select the "Paste" icon (clipboard and square next to the copy icon). This creates an exact copy of your shape.
    - Shortcut: Click on the "Duplicate and repeat" icon (three squares in the top left corner) for Tinkercad© to automatically copy and paste your shape!

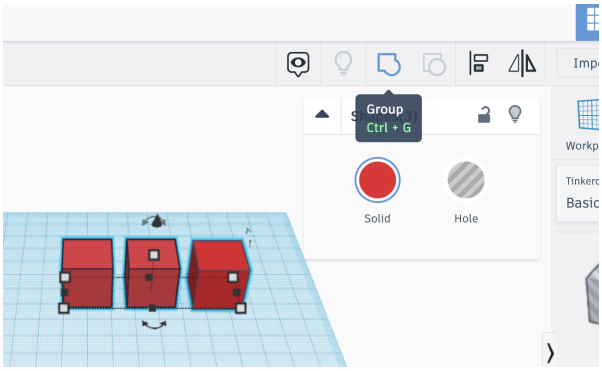


- Scribble: This is a shape found in "Basic Shapes" that allows you to draw your own shape.

Top Menu Bar

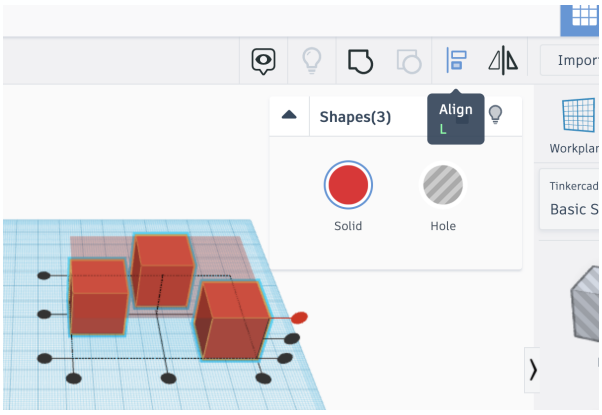
Grouping and Ungrouping

Hold shift and select all the shapes you want to be grouped. Then, select the "Group" icon in the top right corner. This allows you to combine shapes and move them together. Ungroup the shapes by pressing the "Ungroup" icon (to the right of the group icon). Note: this will make the colors of your shapes all one color.



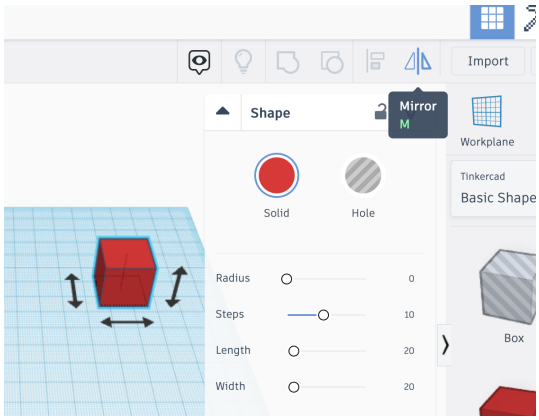
Align

Hold shift and select all the shapes you want to be grouped. Then, select the "Align" icon in the top right corner. Black dots will appear around the shapes. Choose a dot to decide how to align the shapes.



Mirror

Click on the shape and select the "Mirror" icon in the top right corner. Choose between the set of arrows to decide how to flip your shape.



Left Sidebar: View

Perspective

Hold the right button of the mouse (or, use your finger on a touchscreen) and drag the workplane to view your design from different angles. You can also drag or click on the perspective cube to look at your design from different perspectives.

- This helps you see your design from all angles or perspectives. This is also helpful to make sure your shapes are actually where you want them to be.
- IMPORTANT: Click on the "Home view" icon to bring you back to the original view!

Zoom

Click on the plus and minus icons to zoom in and zoom out while working on your design. You can also scroll on your computer mouse or pinch two fingers on a touchscreen to zoom in and out.

Fit

Click on the shape and then select the "Fit all in view" icon to get a closer look at the shape you are working on.