Tinkercad

A fancy birdcage! A luxury doghouse! Design and 3D-print an animal home using the online modeling program, Tinkercad©

TEKS:

TA 7.3 B: The student is expected to discuss and implement a design process that includes planning and selecting digital tools to develop and refine a prototype or model through trial and error

Materials:

- Tinkercad Activity Supplement – Attached
- Computer or tablet

How To:

Part 1: Creating your design

1. Go to https://www.tinkercad.com/.
2. Log in or sign up for an account to save your projects.
3. On the top right corner, click *+New* and select *3D Design* to start building your creation.
4. Go through the challenges on the supplemental pages to practice using Tinkercad, use the Tinkercad guide pages to help you.
5. Brainstorm and draw a plan for your animal house to create on Tinkercad.
6. Use the different shapes and tools on Tinkercad to build your design.
7. Tinkercad will automatically save your design, but be sure to rename it by clicking on the given name on the top left of your design.

Part 2: Printing your design

1. Export your file by clicking on Export at the top right corner then selecting .STL. This will download your file to your computer.
2. If you have a 3D printer at home, upload your downloaded file to your slicer software and begin printing.

3. If you do not have a 3D printer, download your file to a USB drive and bring it to a 3D printer near you! Many places offer free or low-cost 3D printing, including:
    a. Local schools and colleges/universities
    b. Local libraries
    c. Local makerspaces
    d. UPS Stores

STEM Explanation:
3D printing and modeling is widely used to create scale models and prototypes in many different industries and professions. Individuals and companies from different fields are turning to 3D printing for both rapid manufacturing of consumer products and for its ease to customize creations. For example, in healthcare, 3D printing is used to help design prosthetics and organs used for patients and in training. In architecture, 3D printing is used to create models from buildings to city plans. Today, you can find 3D prints all around you ranging from every day jewelry to full size houses!

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

Resources:
https://www.makerbot.com/stories/engineering/advantages-of-3d-printing/
https://www.pcmag.com/news/3d-printing-what-you-need-to-know#:~:text=Designers%20use%203D%20printers%20to,and%20novelty%20items%2C%20and%20toys.

TINKERCAD© ANIMAL HOME

A fancy birdcage! A luxury doghouse! Design and 3D-print an animal home using the online modeling program, Tinkercad©

What type of animal will you create a home for in Tinkercad©?

_____

_____

What things will your animal home need to have?

_____

_____

Use the space below to brainstorm a design for your animal home.

Tinkercad© Challenges!

Complete the following Tinkercad© challenges, and check them off as you go. Play around with Tinkercad© to try them on your own at first, but if you get stuck on any challenge, turn to the *Tinkercad© Guide* for help.

- ❏ Challenge 1: Add a solid box shape to the workplane.
- ❏ Challenge 2: Change the color of this box to your favorite color.
- ❏ Challenge 3: Make the box smaller. Then, make the box bigger.
- ❏ Challenge 4: Add a cylinder hole (the cylinder with dashed lines) to the workplane and make the cylinder hole smaller.
- ❏ Challenge 5: Align the cylinder to the center of the solid box. Hint: drag the black cone to move the cylinder up and down.
- ❏ Challenge 6: Group the box and cylinder hole together. Hint: press shift to select multiple shapes at the same time.
- ❏ Challenge 7: Add a cone to the workplane. Rotate the cone 90 degrees horizontally and vertically, then return it back to the original cone.
- ❏ Challenge 8: Place the cone on top of the box and group the cone and cylinder together.
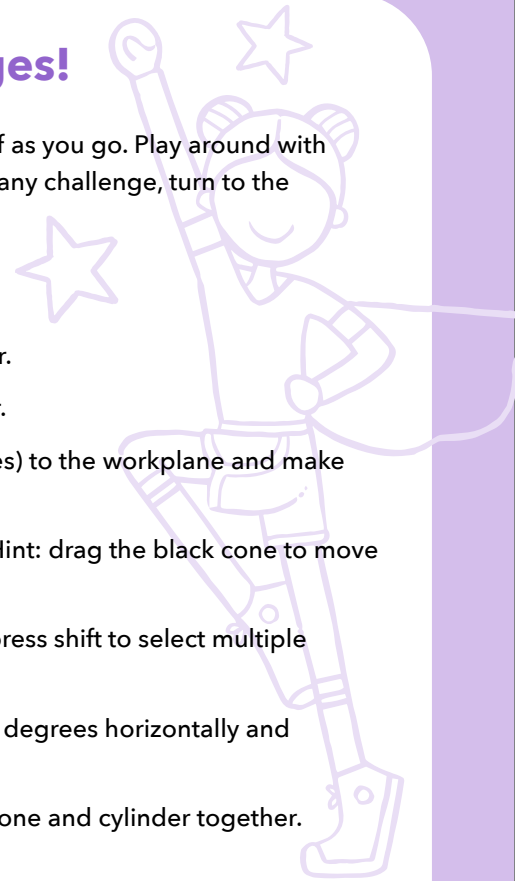
Today you were an Animation and Technology Designer!

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!

Meet Lila Martinez!

Growing up in Mexico City, Lila Martinez discovered a passion for animation while watching Disney animated movies, Looney Tunes, and Tex Avery cartoons. She attended Vancouver Film School and studied the crafts of traditional character and computer animation. In 2009, Martinez won the award for Best Animated Short at the International Student Film Festival. Lila has worked with Netflix, Fox, The Simpsons, and Original Force, and she currently works at Wild Canary Animation on a Disney Junior show called The Chicken Squad.
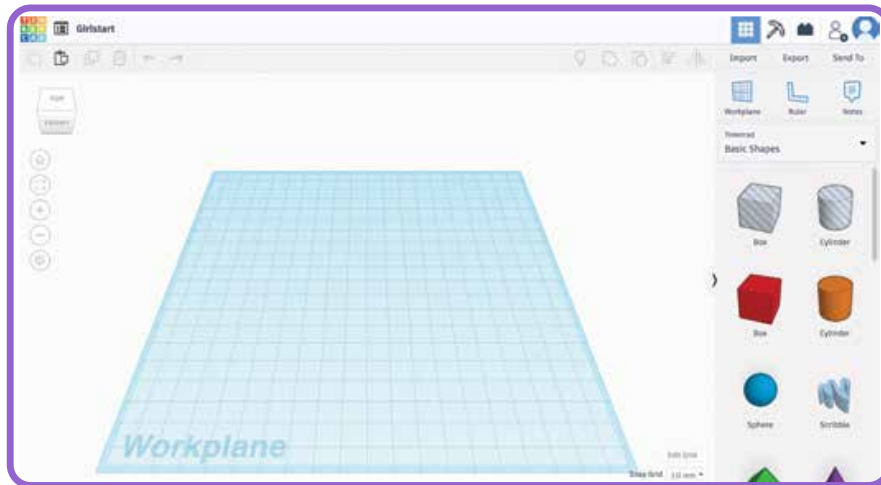
TINKERCAD© GUIDE
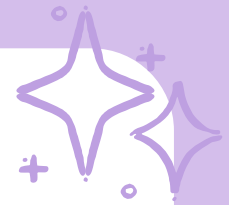
Use these pages to learn how to use many of the basic features on Tinkercad©.

Top Menu Bar

Left Sidebar

Right Sidebar

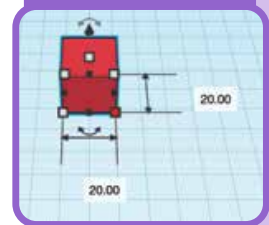## Right Sidebar: Shapes

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.
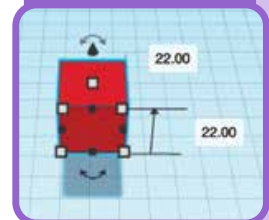
Position
- Height of shape off the ground: Drag the black cone above the shape up and down, or type in your own position by clicking on the numbers that appear next to the shape.
- Move the shape left/right/forward/backward: Click anywhere on the shape and drag it left or right.
- Tilt the shape: Look 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.

MEASUREMENTS

POSITION UP

POSITION TILT

Tinkercad© Guide Image Source: https://www.tinkercad.com/things/ld64OHFZ5P4-cool-snicket-jaiks/edit

Style
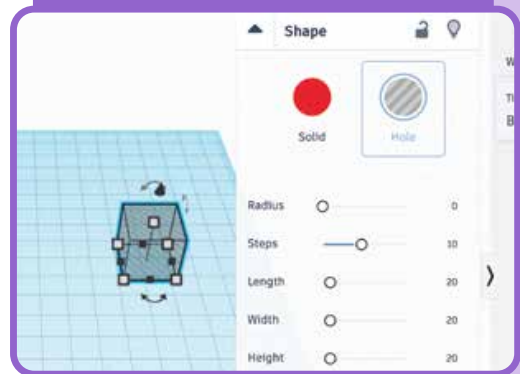
- Color: Click on the shape and select "Solid" on the menu that appears to choose a color.
- Hole: Click on the shape and select "Hole" on the menu that appears.
- Lock and Unlock: Click on the "Lock/Unlock" icon. Lock allows your shape to stay in place without any edits. This is helpful when you are 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.
- Duplicate 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.

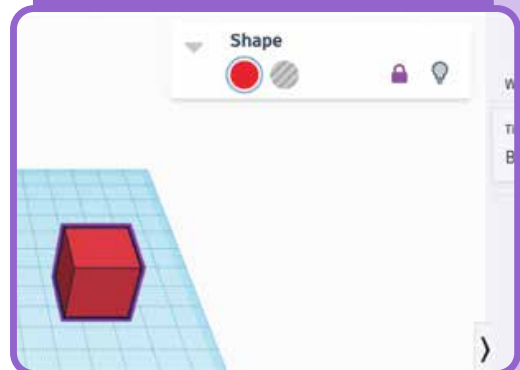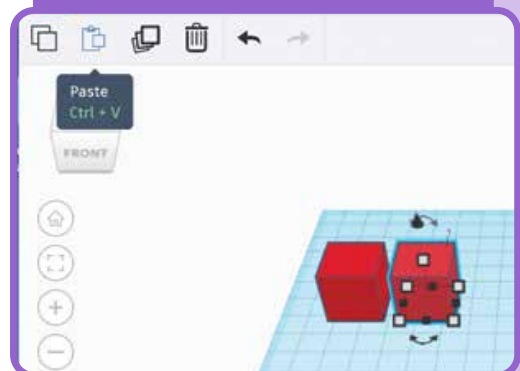# Top Menu Bar

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!**
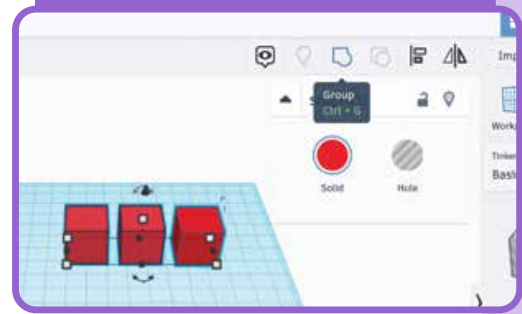
Zoom
Click on the plus and minus icons to zoom in and zoom out while working on your design. You can also scroll on your computer mouse or pinch two fingers on a touchscreen to zoom in and out.
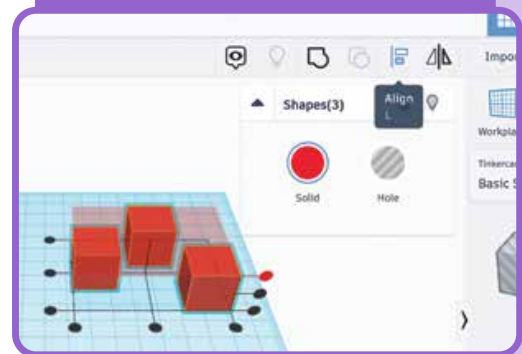
Fit
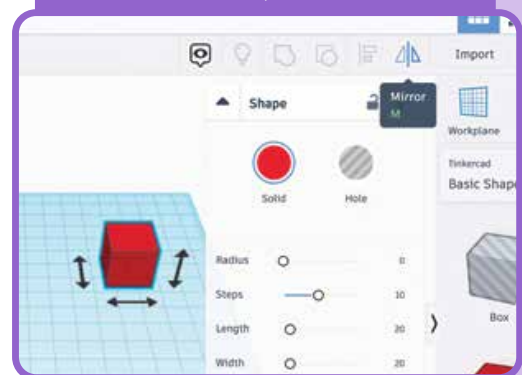Click on the shape and then select the "Fit all in view" icon to get a closer look at the shape you are working on.

GROUPING AND UNGROUPING

ALIGN

MIRROR

FIT