Using TinkerCad to Introduce Students to the Wide, Wonderful World of 3D

Start Here

1. Our notes are available through a browser:
   http://cs.oregonstate.edu/~mjb/tinkercad

2. The TinkerCad program is available through a browser too:
   http://www.tinkercad.com

3. You can create your own TinkerCad account. The advantage of this is that TinkerCad will keep your 3D creations in cloud storage so you can get at it later. If you are under 18 years old, get your parents’ permission and have them help you.

To use our account, use:
User: mjb@engr.oregonstate.edu
Password: corvallis72542

Logging In

1. Start Tinkering
   How will you use Tinkercad?
   - student?
   - teacher?
   - education?

2. No, not here either. Don’t ever create your own new account on anything without your parents’ permission!

3. Yes, go here!

TinkerCad

TinkerCad is a free web-based CAD package from AutoDesk. (Thanks, AutoDesk!) It is a solid modeler, so you always have legal 3D objects suitable for 3D Printing.

You get to it at: http://www.tinkercad.com/

Click here to start
Logging In

Welcome back
How will you sign in?

Yes, go here!

To use our account, enter:
Username: mjb@engr.oregonstate.edu
Password: corvallis72542

The First Screen You See

Who you are

Designs this account has worked on before

First Screen You See

Click here to start something new

TinkerCad's Build Screen

More things to build with

Your 3D scene

Standard 3D objects to build with
Moving the Scene around in 3D

If you have a mouse:
- Rotate – right mouse button
- Scale – scroll wheel
- Pan (translate) – middle mouse button

If you don’t have a mouse:
- Rotate – touch and move the blue plate, or touch and rotate this cube
- Scale – pinch on the plate, or touch the + and - buttons
- Pan (translate) – two-finger touch on the blue plate

Un-do and Re-do are Your Best Friends Ever!

Keyboard shortcuts:
- Un-do: Control-Z
- Re-do: Control-Y

Start by Placing an Object into the Scene

With your finger or the left-mouse button, drag a shape into the scene

The Small Symbols Let You do Things to the Object

This curved arrow allows you to rotate the object in the horizontal plane

The solid black triangle allows you to lift the object up in the air.

Touch or left-click in the object to move it left-right and in-out.

All the white and black dots allow you to change the size of the object in one or more dimensions

This curved arrow allows you to rotate the object in the horizontal plane
### Scaled, Lifted, and Tipped

![Scaled, Lifted, and Tipped](image)

### Changing the Color

With the object selected, click here and select a new color.

![Changing the Color](image)

### Combining Objects

Take 2 objects and overlap them.

- They might look like they are one object together, but they aren’t. You can tell by the overlapping edge lines and overlapping polygon colors here. **3D Printers hate overlapping 3D shapes!!**

![Combining Objects](image)

### Combining Objects

Select both objects (touch both, or left-click on one and then shift-left-click on the other) … … and then click on **Group**

![Combining Objects](image)
Sometimes it is Easiest to Select Multiple things by Dragging a Selection Box Around Them

Click here
Then drag to here

Combining Objects
You can tell they are now one object because you see no overlapping edge lines here, and they are a single color. 3D Printers love grouped 3D shapes!

Combining Objects
An even cooler trick – while the objects are overlapped, click on just one of them and then click on Hole. This makes that object a “negative object”

Combining Objects
Now select both objects again, then click on Group like you did before. This causes the Hole object to take a “3D Bite” out of the other object. You can use this to make new shapes or can even create holes through shapes.

In Computer Aided Design, this is known as Constructive Solid Geometry (CSG), or Boolean shapes. Think of it as 3D Venn Diagrams:
Changing the Name of Your Design

When you start a new design, TinkerCad gives it a funny name. This is OK, but if you want to give it a more descriptive name, click on the funny name and type in a new one:

Not Sure Where to Start? Try One of These

Geometric Primitives

These are the standard built-in objects that you can use.

3D Text!

Type your text in here.
Union the Text with a Block to 3D Print a Desk Sign

Drag the Scribble icon into the scene

The screen changes to this:

Grab the blue circle and, well, scribble with it (duh)

3D Preview

Your scribble

Click Done when done
From there on, it acts like any other 3D object. Here you are subtracting a cylinder from your 3D Scribble.

Other Cool Stuff

- Solid letters and numbers
- Solid symbols
- Solid goofy things
- Shapes where you can enter information about them (includes state outlines!)
- Shapes donated by other users (includes some good text-input objects)
- A place to store your favorite shapes

Shape Generators

A Shape Generator is a way of making different versions of a shape by interacting with a dialog box. The Fidget Spinner is in here. States and countries are in here.
The Voronoi Shape Generator is Pretty Fun Too

State and Country Shape Generators

More Fascinating Features

Smithsonian
More Fascinating Features

Select the object and click on Export, which says that you are trying to give your object away.

The most common shared file format among 3D modeling programs is an OBJ file, so then click here and tell TinkerCad where you want this file saved.
Writing Your Design to take to a 3D Printer

Select the object and click on Export, which says that you are trying to give your object away.

Most 3D Printers want an STL file, so then click here and tell TinkerCad where you want this file saved.