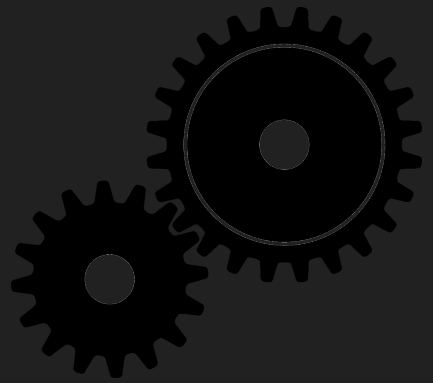
SolidWorks Workshop

By Engineering Club



What is CAD?

CAD

- CAD = Computer Aided Design
- Using any CAD program (like OnShape, SolidWorks, Fusion 360, etc.) you can create 3D objects that are parametric Very useful for engineering!
- Paramentic - models are create/defined by parameters, relationships and constraints. (ex. Angles, length, height, other models)

SolidWorks

- An industry standard CAD program used by engineers and designers for production ready documentation in product development!

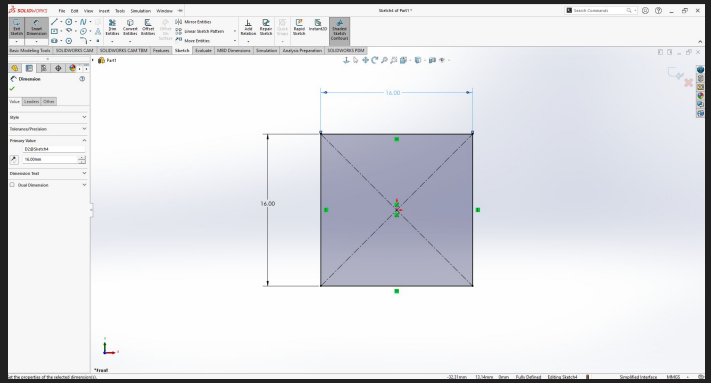
CAD Workflow

1. Make a 2D-Sketch

2. Extrude the Sketch
    a. Creates a 3D object
    b. (extrude mean to push out)

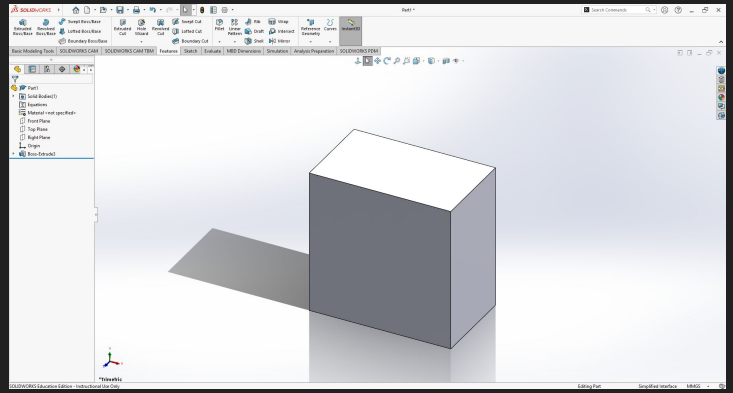
3. Modify the object With features
    a. Once again using extrude and or cut (to remove any of the extruded portions)

2D Sketch



Extrude sketch

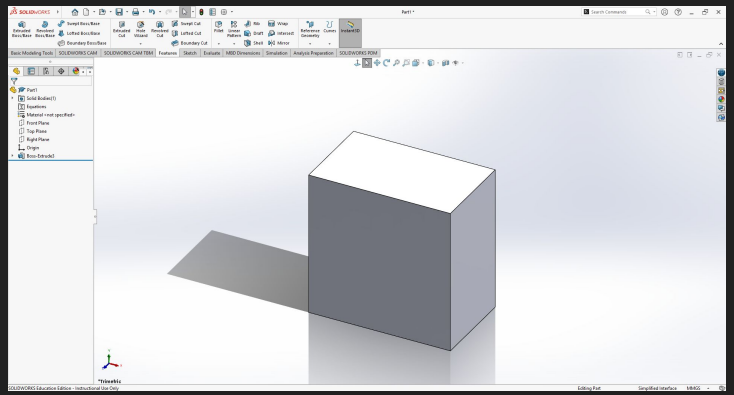
3D Object

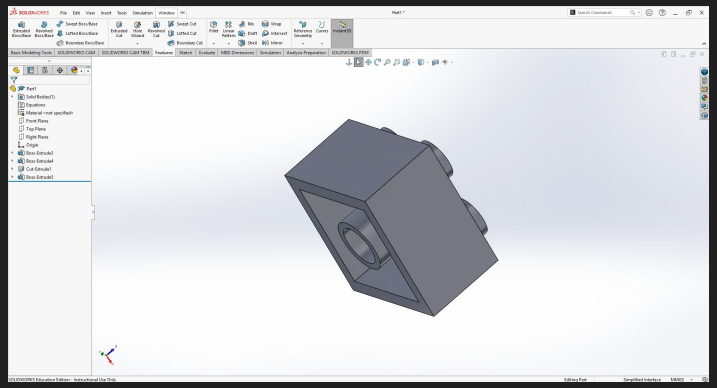


3D Object

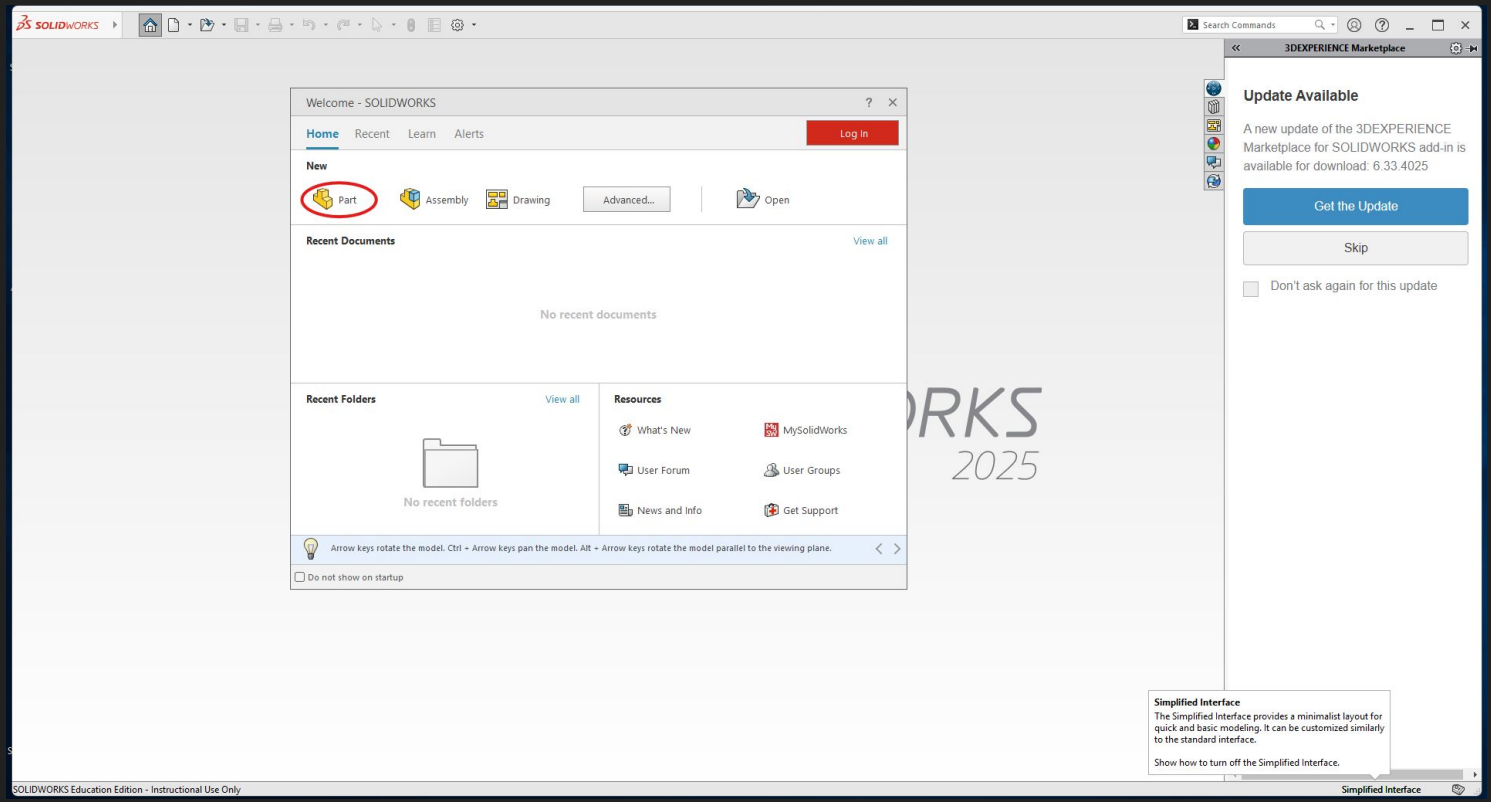
3D Object With Features

Add/ Remove Features





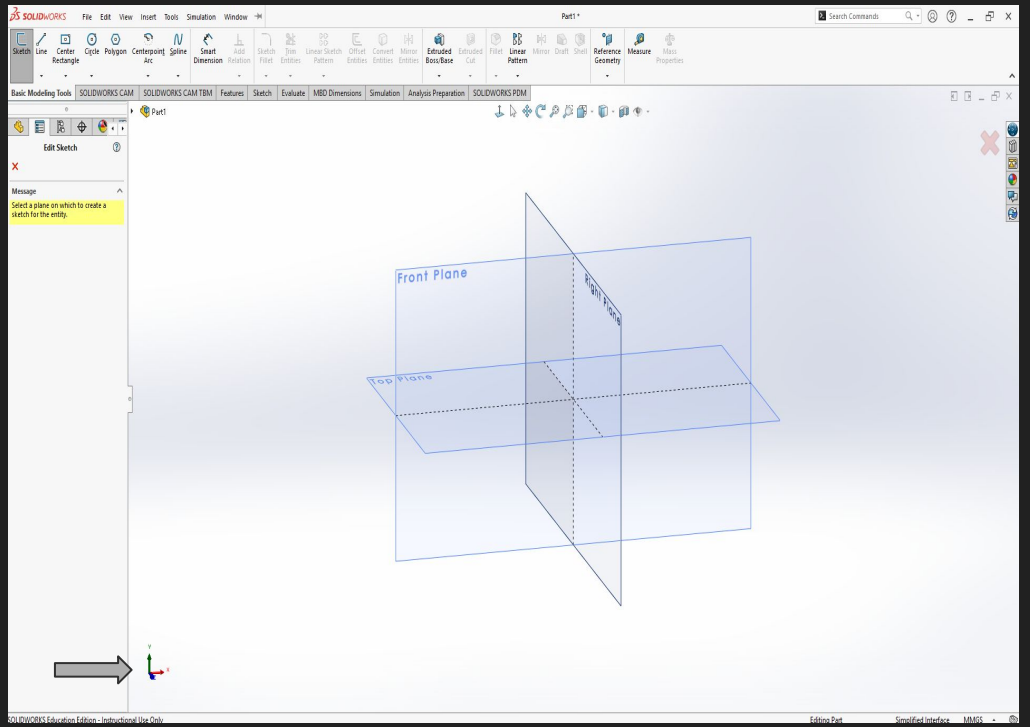
Create a document



Basic Navigation

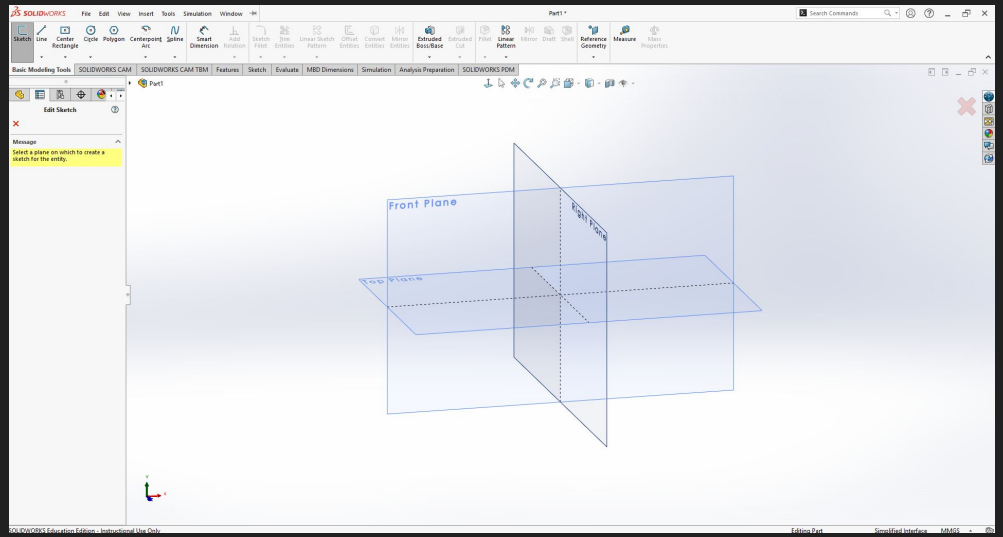
- You can change your view by using the arrows on your keyboard
- You can also change your view using the arrows on the bottom left corner!

Another handy way you can change your view is by using the center clicker of your mouse



Start your first sketch

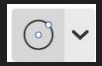
Click sketch on the top left of the page and select the plane you wish to sketch on



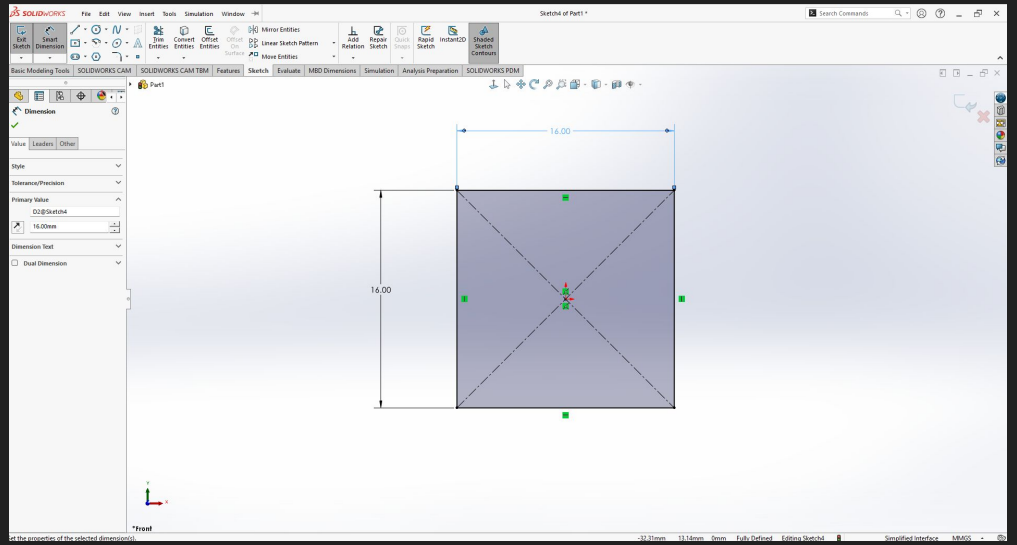
In our case select the “Top Plane”

Basic Tools in Sketch

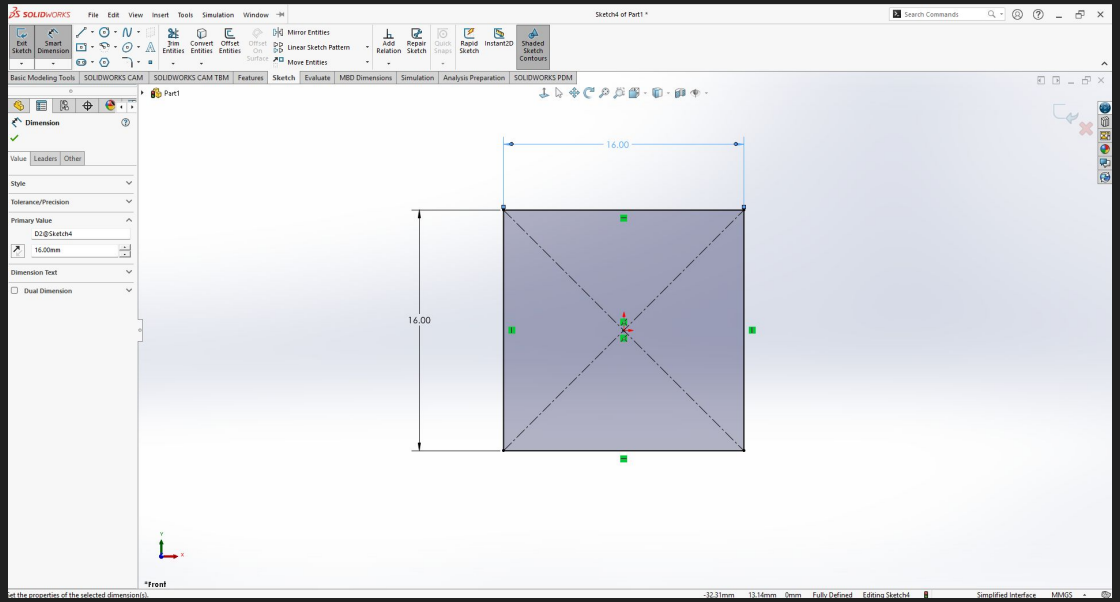
Under the sketch tab, there are:

- Line
  - 
- Rectangle
  - 
- Circle
  - 
- Dimension tool
  - 
- Constraints (coincident, Parallel, Equal, ect.)
  - 

Location:



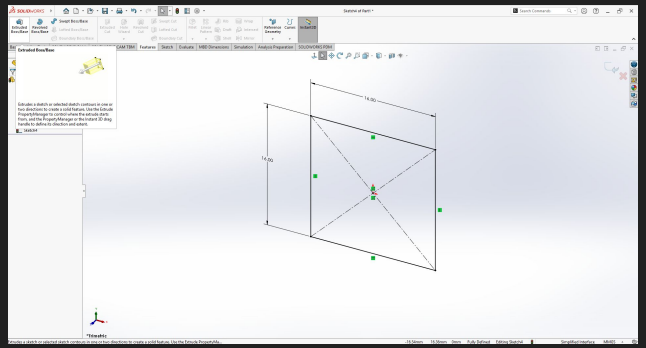
Create a square with dimensions

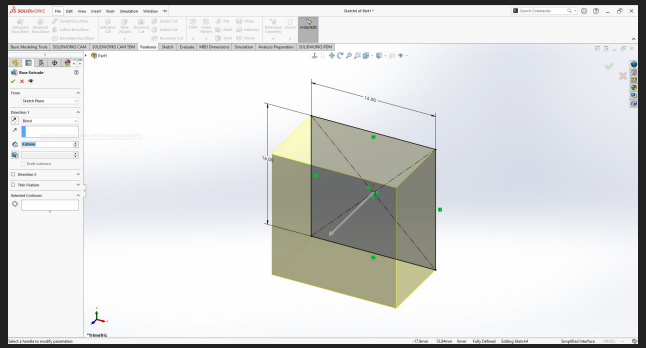


- Select the “center rectangle” option on the toolbar at the very top; we’ll be drawing from the “center point” of the drawing
- Once drawn out, select “smart dimension”
- Smart dimension a 16x16 mm square by selecting the sides of the shape

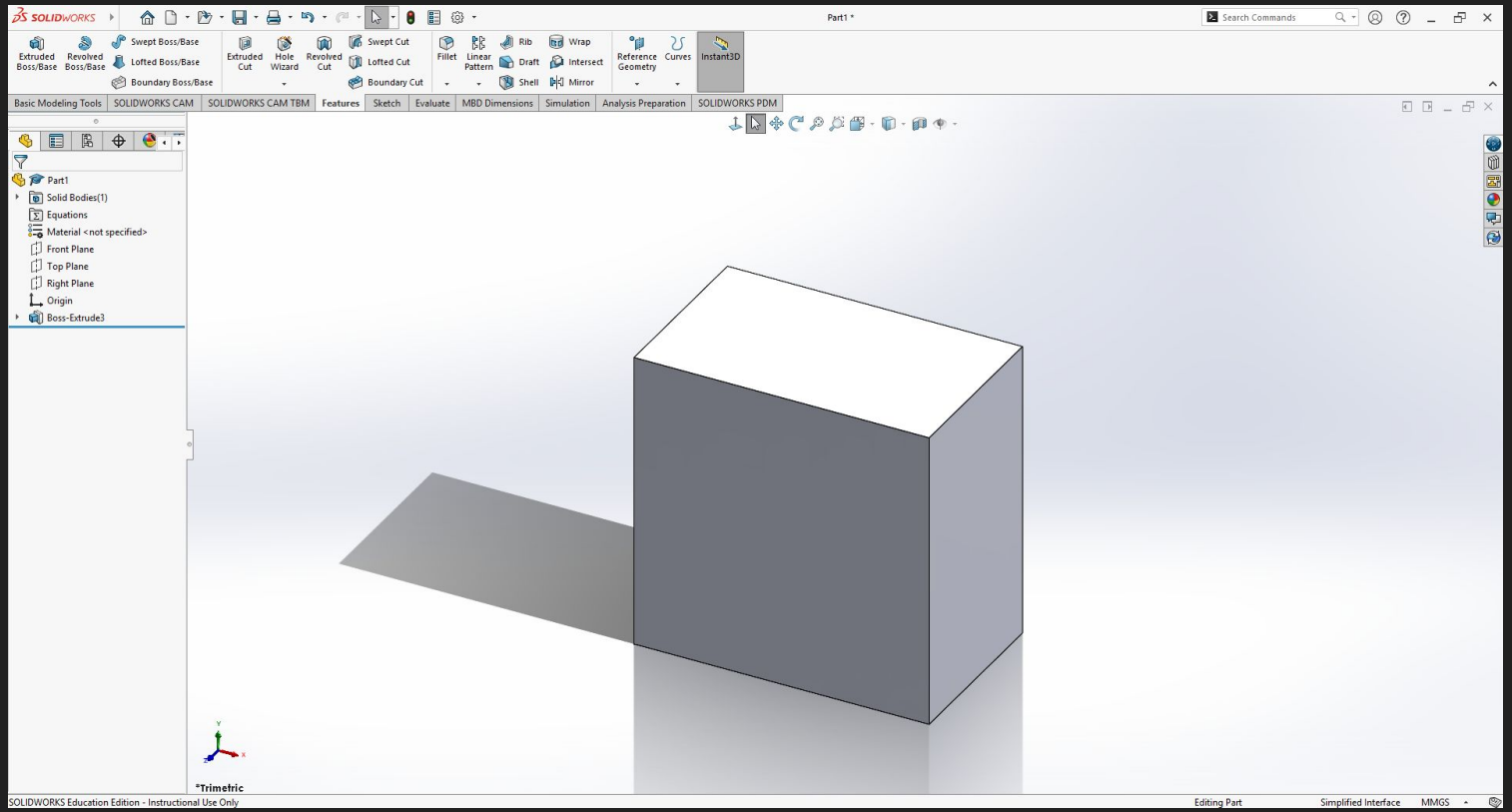
Now We Extrude

- Extrude 
  - Select the “Extrude Boss/Base” button in the features tab, then click on the sketch we created
  - Set the depth of the extrusion to 9.6 mm





Congrats! You have a Cube!

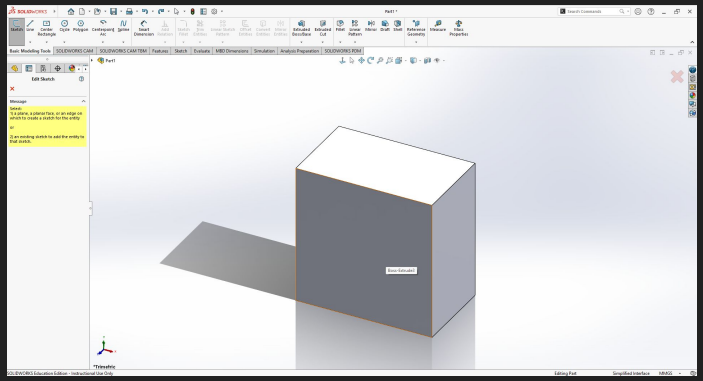


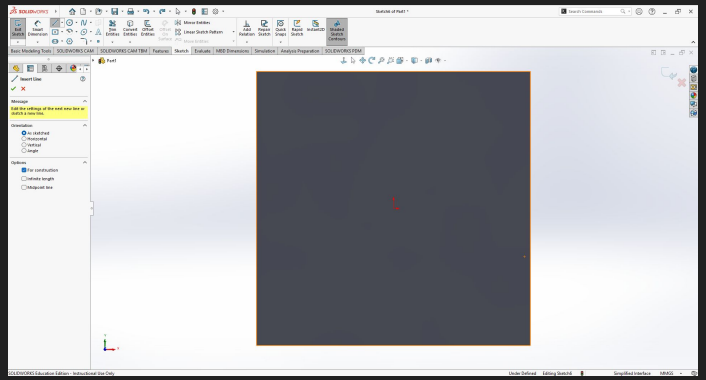
Add a feature

We want to make multiple extrusions in our cube.

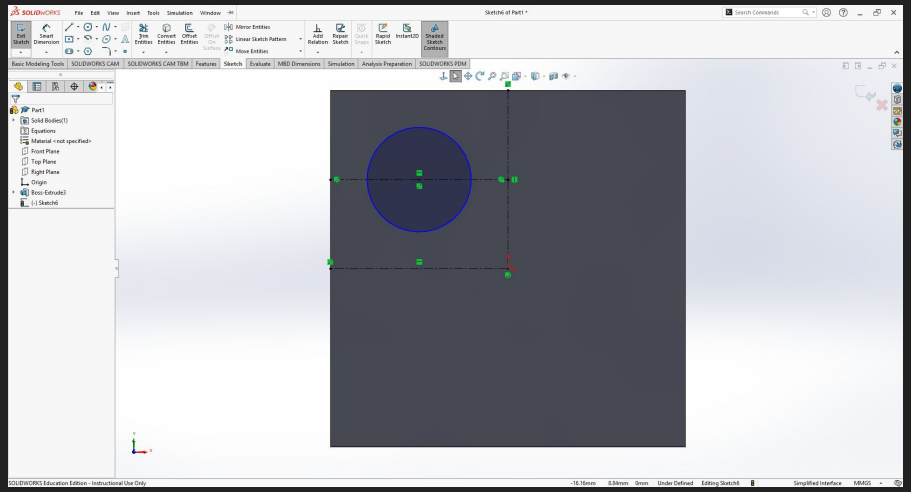
To do this we sketch on top of the face of the cube!

- Select the sketch button and select the top plane of the cube!





Add a feature cont’d



- Now select the **line** button!

  We’ll be making “**construction**” lines to show the center point of one corner of the square

- Next, select the “**center circle**” button in sketch to create a circle.
  - Click on the center point created from the construction lines
  - Dimension with a diameter of 4.8mm

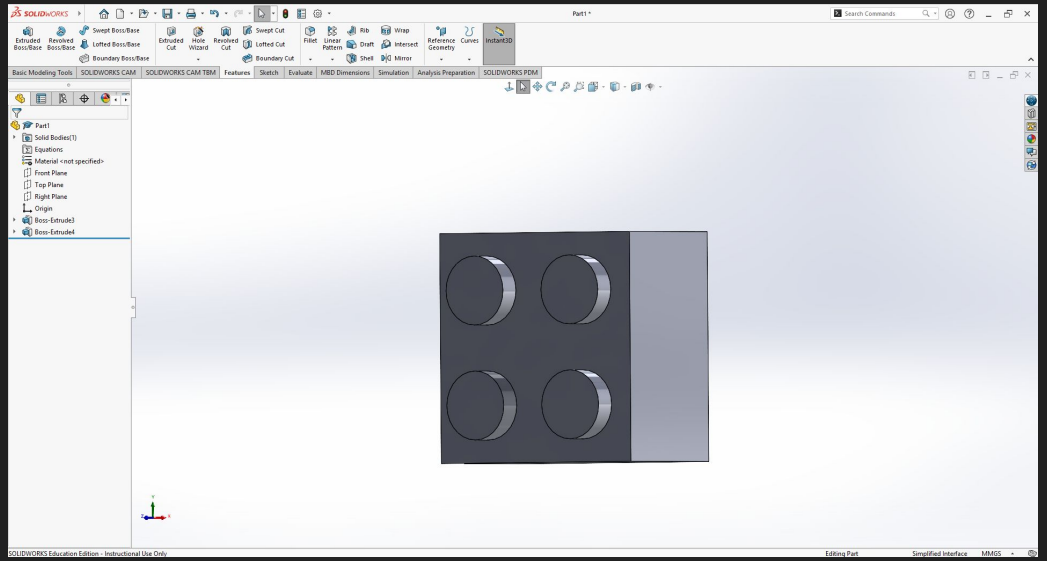
Now we’ll create a circular sketch pattern! (this is done to create copies of a shape on a plane with even spacing)

Add Material

Let’s start extruding!

- Select the “Extruded Boss/ Base” option in the features tab and select your circle
- You’ll notice that all circles will extrude, nice!
- Extrude to a height of 1.6 mm

Awesome! It’s starting to look like a Lego!

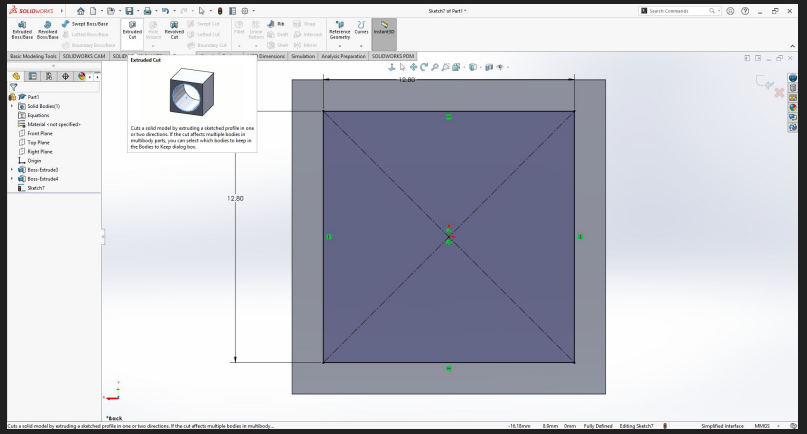


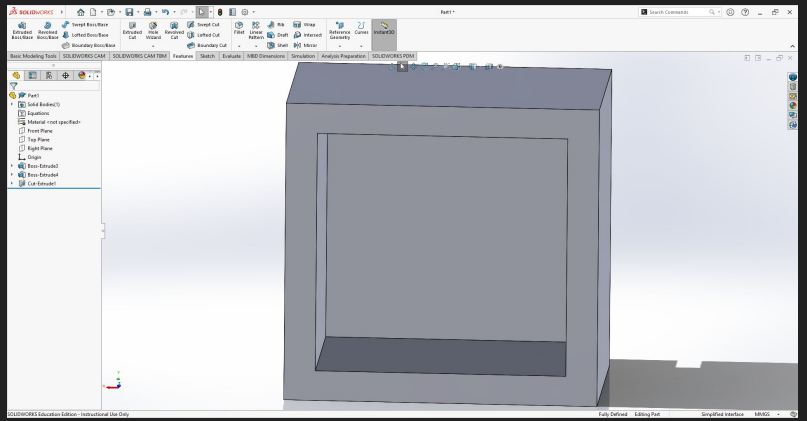
Remove Material

Now we cut the bottom portion of the block.

- Start by sketching another square, opposite of the side of the extrusions we made
- Let’s space this inner-square 1.6 mm apart from the outer-square
- This time we select “extruded cut” on the shape
- We’ll be cutting 8 mm from the smaller square

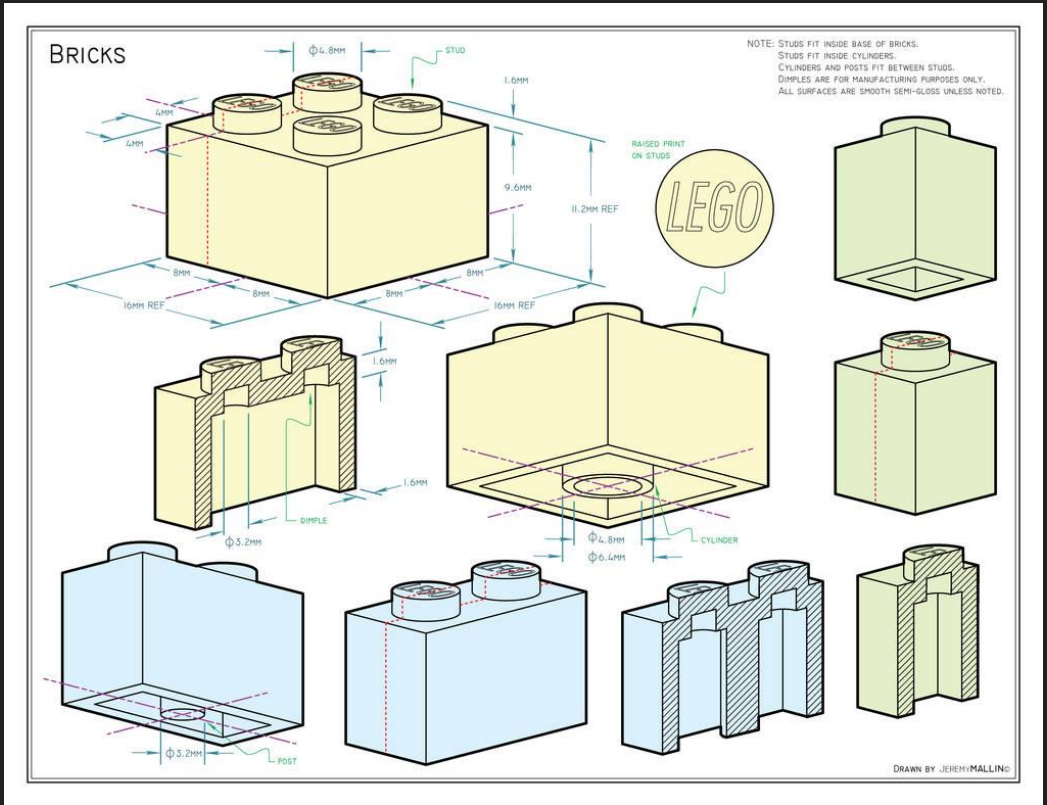
Click the check mark when done.



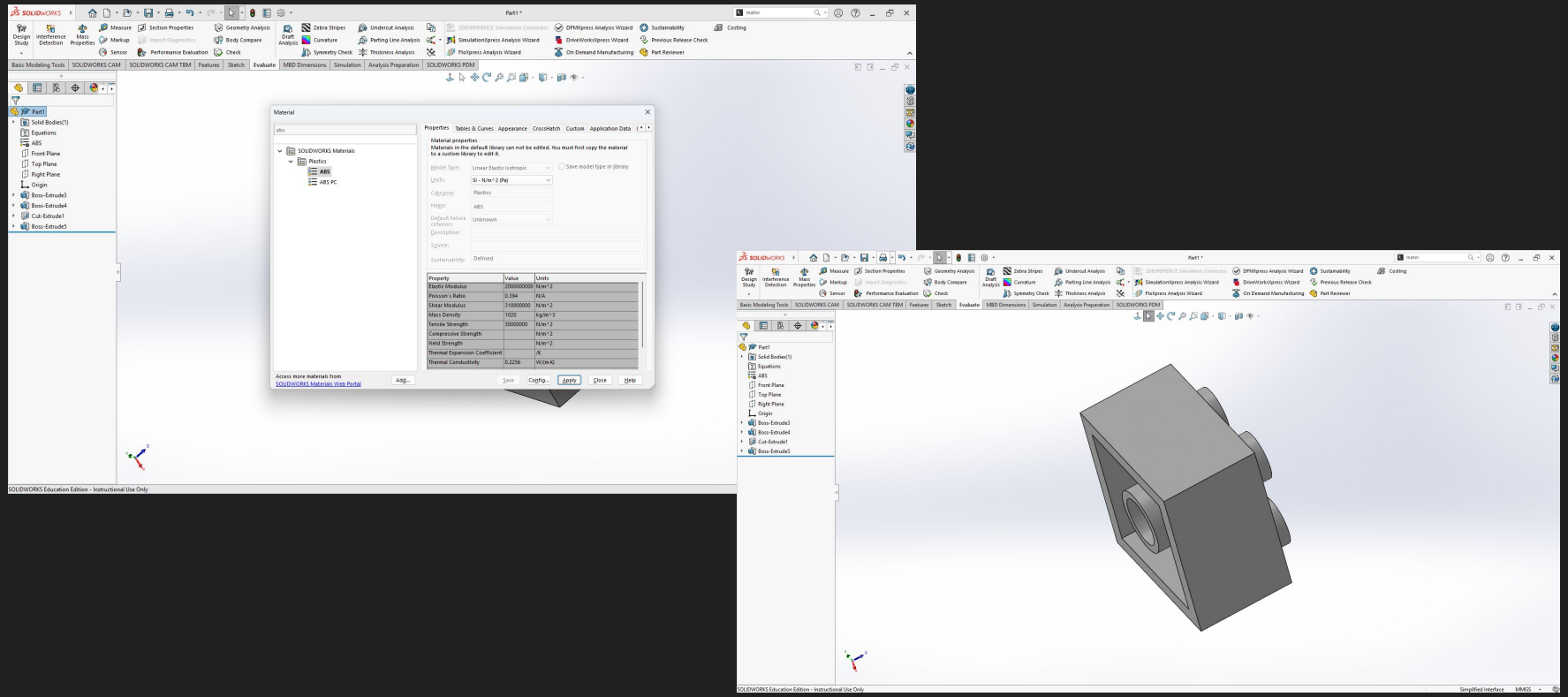


Try out the last part!

Try making the center circle on the bottom of the brick!



Material, who?



Congrats! You made a 2x2 Lego brick!