

Click this link [OnShape](https://learn.onshape.com/catalog?labels=%5B%22Learning%20Pathways%22%5D&values=%5B%22All%22%5D)

This will take you to the OnShape Student Sign up. Create a user to sign up for a free student OnShape account.

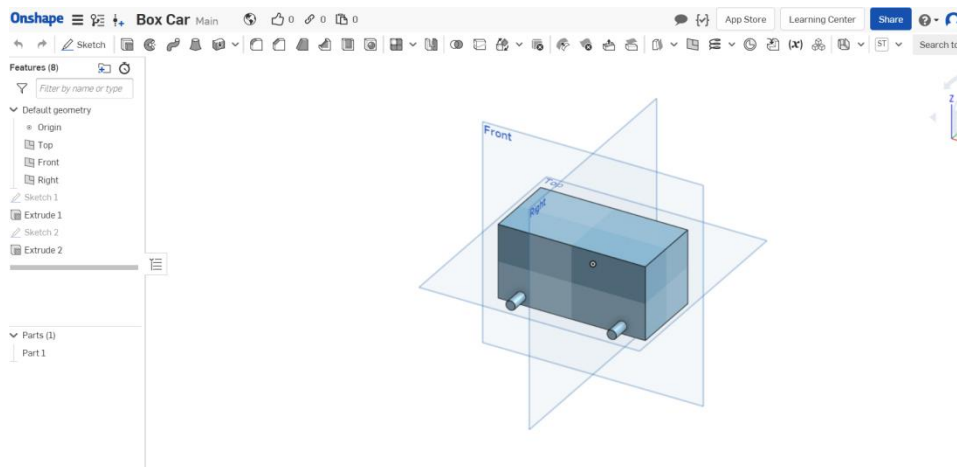
Once logged into OnShape if you would like to learn more before on your own before starting the lesson you can go to the Self-Paced Learning section for how to use OnShape link below.

<https://learn.onshape.com/catalog?labels=%5B%22Learning%20Pathways%22%5D&values=%5B%22All%22%5D>

To get started go to the link below and in the top left corner there will be Make a copy in blue writing. Click Make a copy for the Box Car file to your OnShape account to be able to edit.

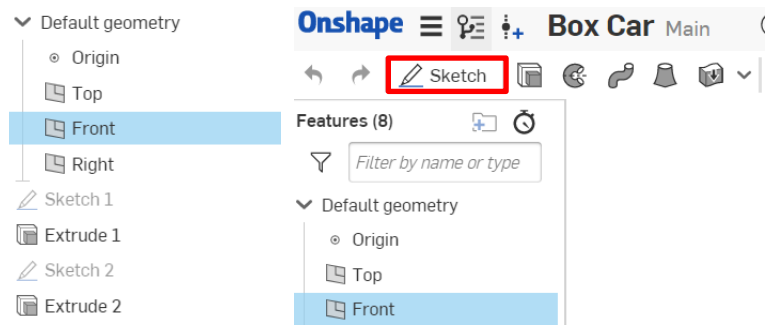
<https://cad.onshape.com/documents/44dd8243be9f5833662ff53a/w/024467085155fb04321fb49d/e/f725496efd0336052cc1f016>

It should load up and look like so.



Click on the word Front like in the picture right.

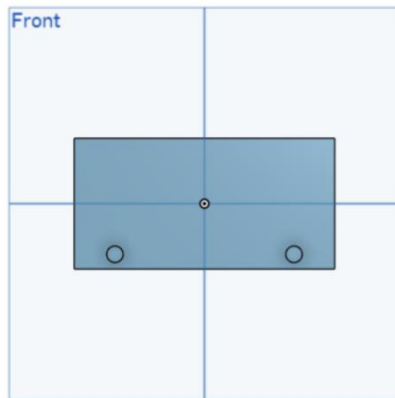
Then click on the Sketch tool like pictured.



Here is a link to a quick overview on how to move objects in OnShape.

<https://cad.onshape.com/help/Content/moving.htm>

Push the N key on the keyboard to make it face towards you like so. Push the F key to auto zoom.

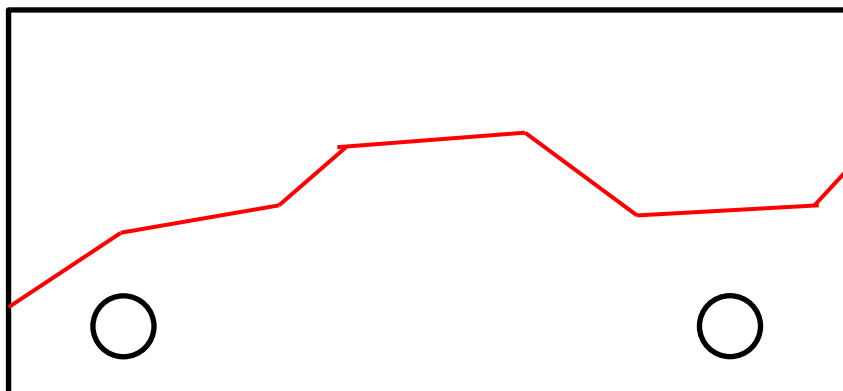


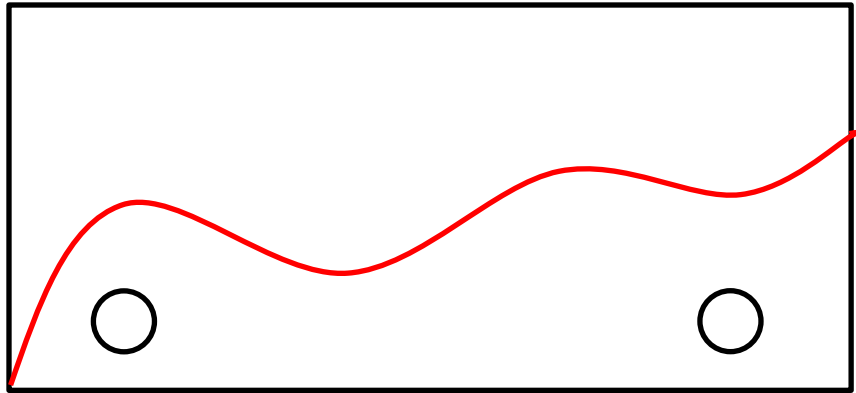
The key is we are going to cut shapes out of the block to create our own model car. Do not cut out the small cylinders. The wheels will go there once we finish designing the body of the car.

Before you do anything on the OnShape program I would like you to get a piece of paper or multiple pieces of paper and come up with some design ideas. You want a clear idea of what you want the end product to look like. Draw a rectangle shape on the paper with two circles similar to below.



Now on the paper it's time to design some cut out ideas for the car. You could start simple with just straight lines like below or do more advanced with curved lines like the following picture. It's your design make it you own!





Once you have an idea you think will work it's back to OnShape to start your Sketch.

You may need to play with the tools to get a feel for how they work. You can always hit the undo button in the top left to get rid of something you don't like or accidentally drew.



You just click the tool to start using it and click on the tool again to stop using that tool.

The line tool.

The rectangle tool.

The circle tool.

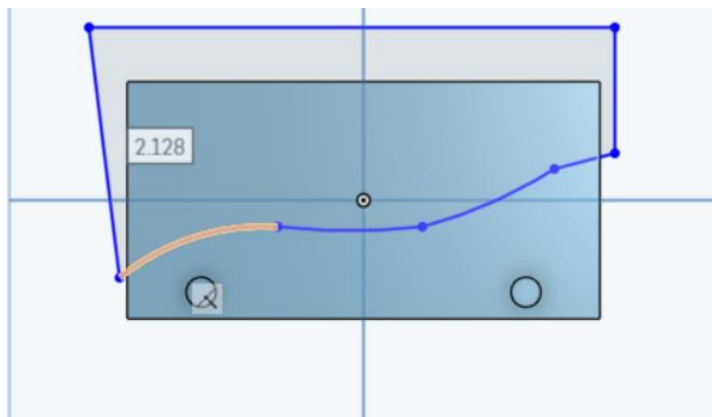
3 point arc tool.

Inscribed polygon tool.

Spline tool.



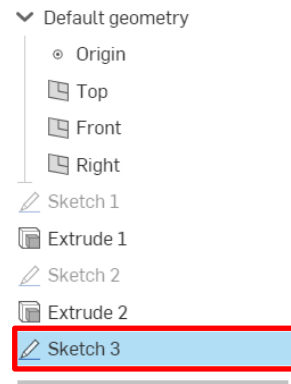
Once you finish your sketch you need to close the shape to cut the entire top of the block off like the picture below.



I just used the line tool to connect the rest of the shape in the above image. Once finished click the Green Check. **Sketch 3**



Click on Sketch 3 on the left menu like in the picture.



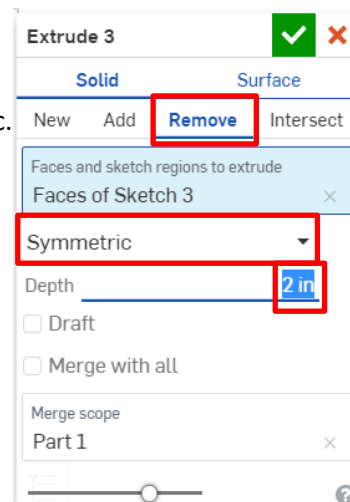
Click the Extrude Button.



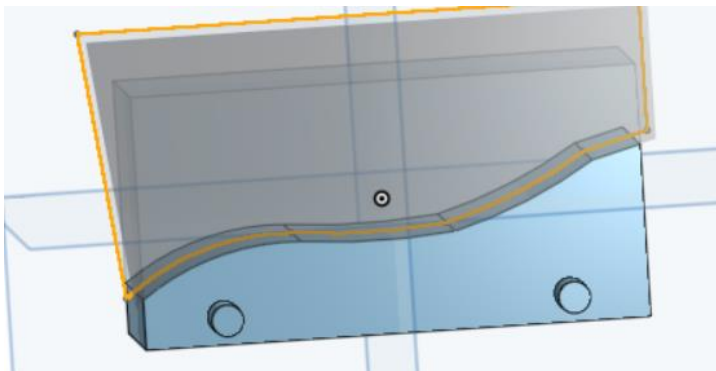
Change these options on the Extrude pop up window.

Click the Remove tab. Change the drop down to Symmetric.

And change the Depth to 2in.



Click the Green check if it cut off all material similar to below.

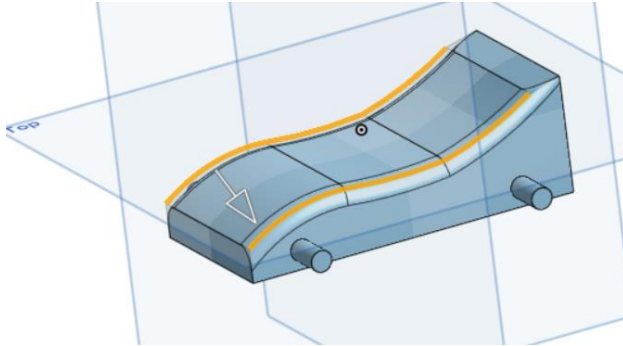


Holding down the Right mouse button and moving the mouse allows you to rotate objects.

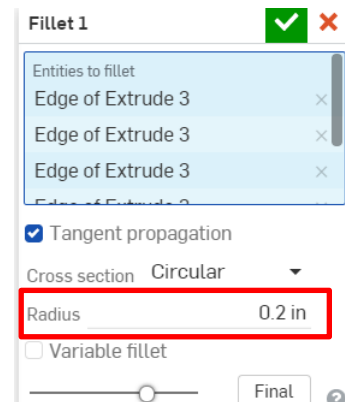
You can use the fillet tool to round sharp edges to look better.



Click on edges you want to round you can hold SHIFT to select multiple edges at once.



If an edge won't round it might be the Radius is too high for that particular edge. You can try adjusting the radius to a smaller number or larger if you want it to round more off.



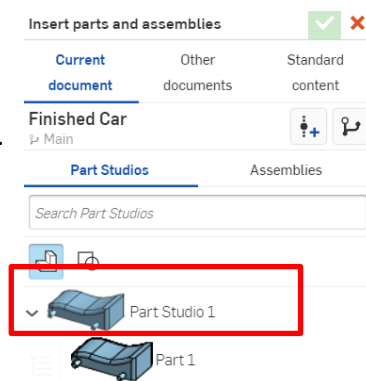
Once open down in the bottom tab click Assembly 1



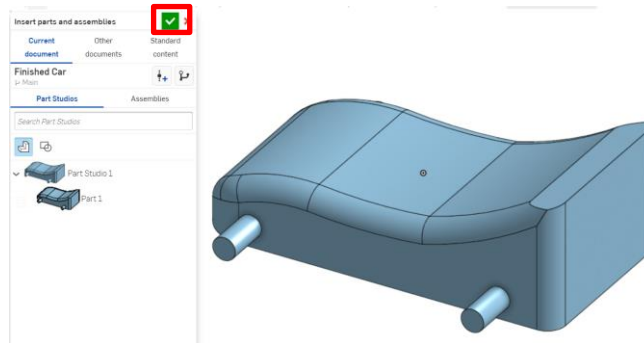
Click on the insert button towards the top left.



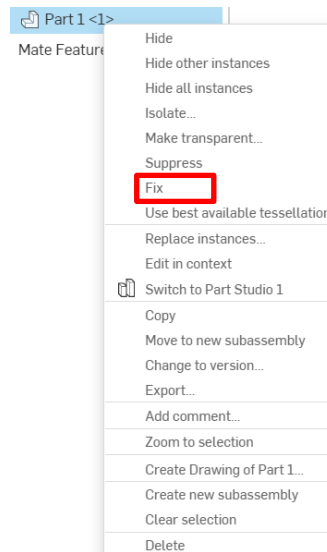
Click on the image of the car you made.



Click once on the screen to set the car down then click the green check.



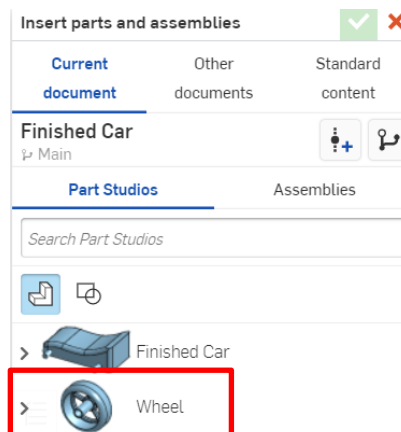
Right Click on the part 1 as shown. Then click Fix.



Click on Insert in the top left again.



Select Wheel in the pop-up window.

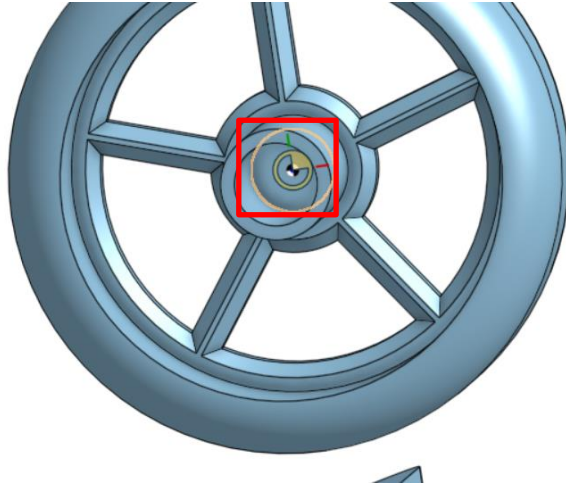


Click Once to set the wheel down.

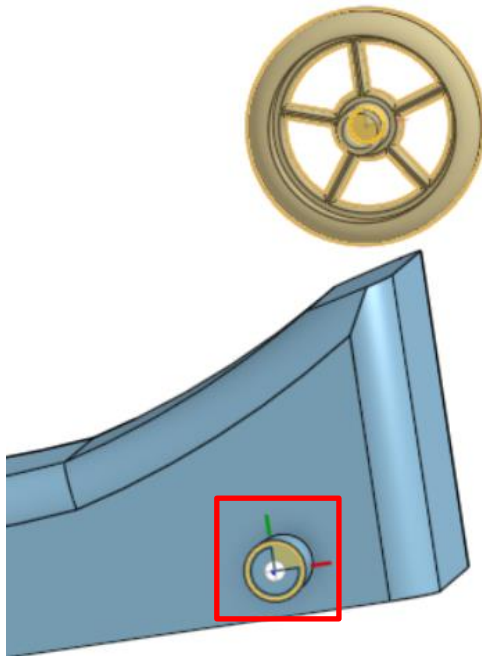
Click on the Revolute Mate button at the top toolbar.



Click on the bottom circular surface inside the cylinder of the wheel like the picture below.

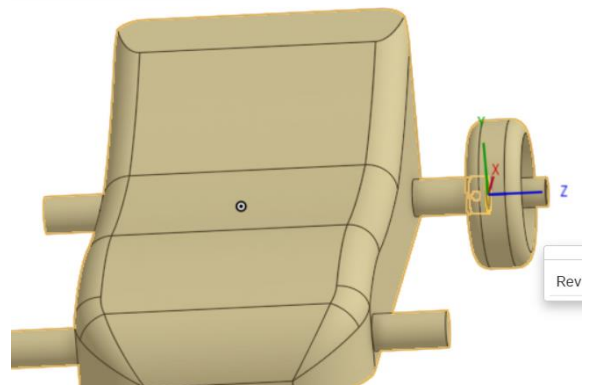
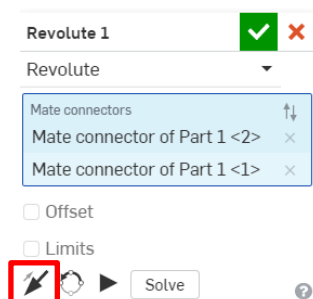


Then click on the flat surface of one of the cylinders on the car like below.

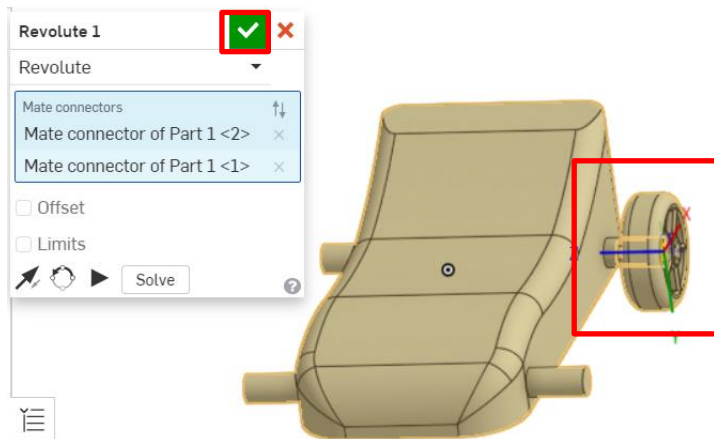


If the wheel is facing the wrong way like in the picture right.

Then you need to click the flip primary axis button.



If it looks like the picture to the right then click the green check.

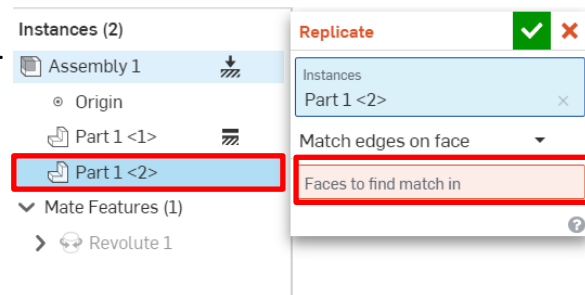


Click the Replicate button in the top toolbar.

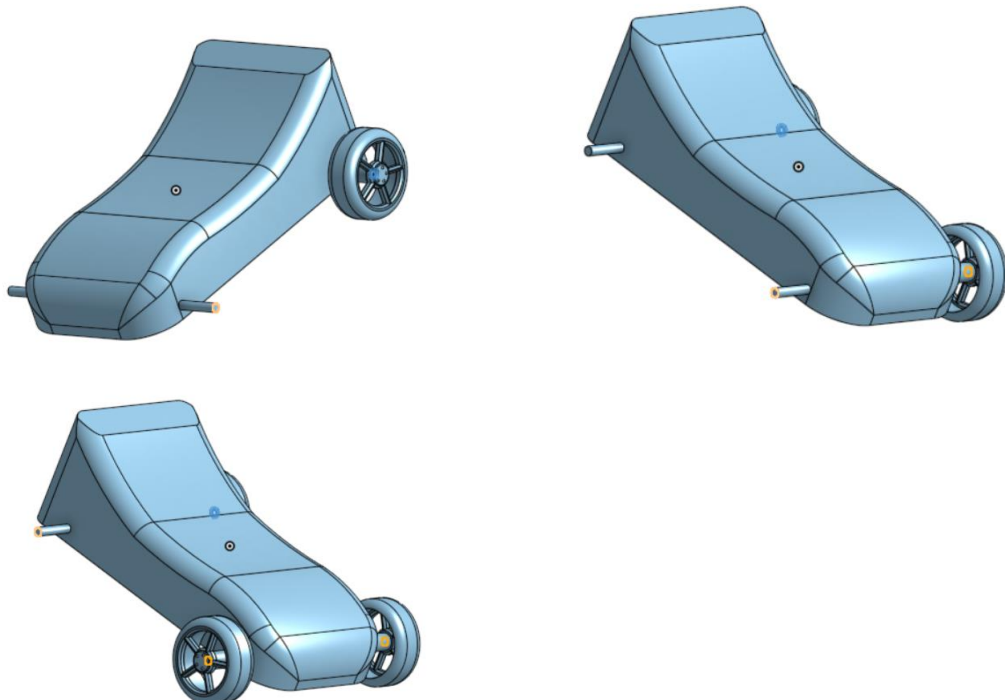


Click on the wheel part in the menu like the picture.

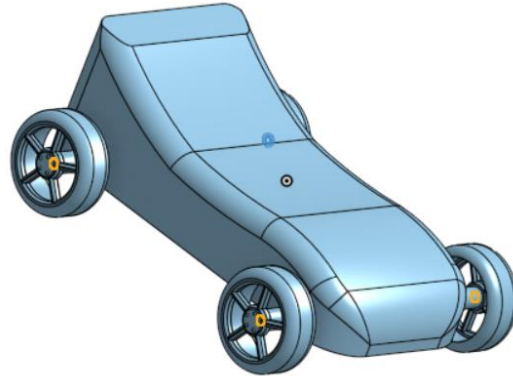
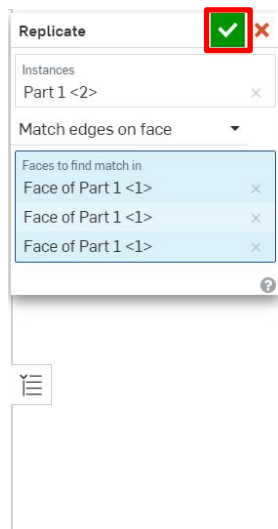
Then click where it says Faces to find match in.



You can then click on the flat surfaces of the 3 remaining cylinders to copy the wheel to those cylinders as well the below pictures.



With all 4 wheels attached click the green check on the pop-up window like below.



If you Left click and hold on each individual wheel it should spin freely as you move the mouse on the axle.

Your car is done!!! Feel free to repeat this process as many times as you'd like to see what sort of creations you can come up with. More advanced cuts and designs can be made as you use the learning pathways or figure out the program more on your own!

