Tinkercad 3D Design & EV Concept Car Workshop

Part 1: Introduction to Tinkercad & Car Chassis Design

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Session 1: Introduction to Tinkercad
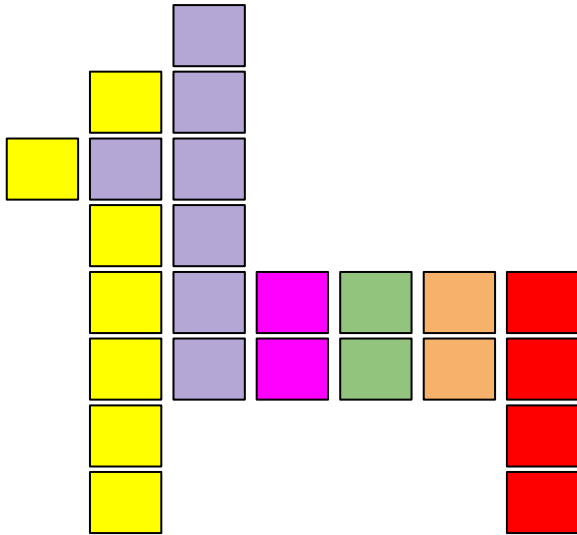
Guess what? Even NASA uses CAD!
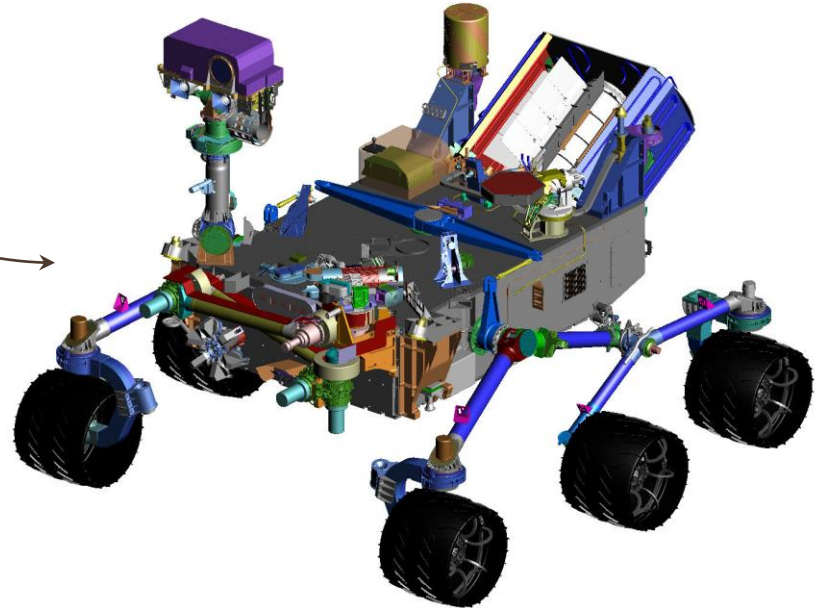
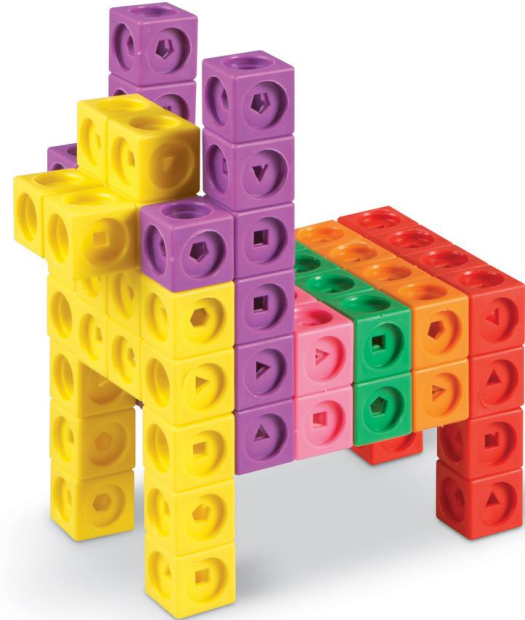- CAD stands for **computer-aided design** software.

- Engineers, architects, artists, and others use CAD to create precise **2D drawings and 3D models**.
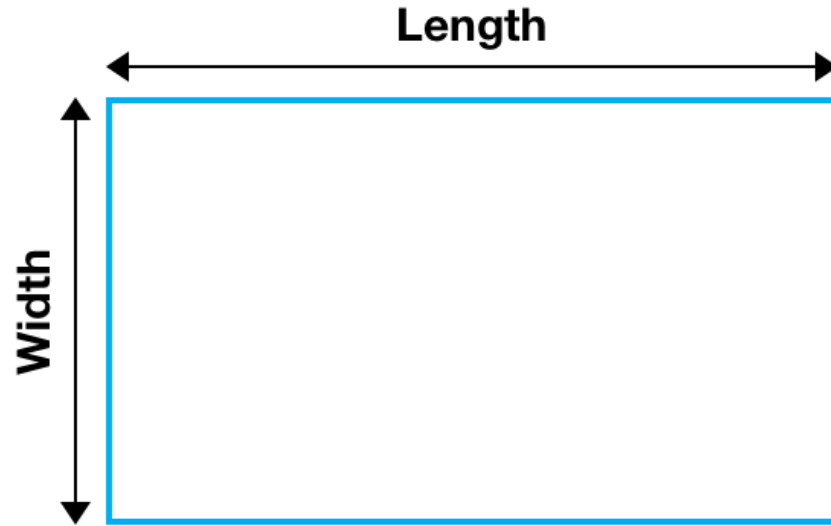
2-dimensional
isometric view

3-dimensional
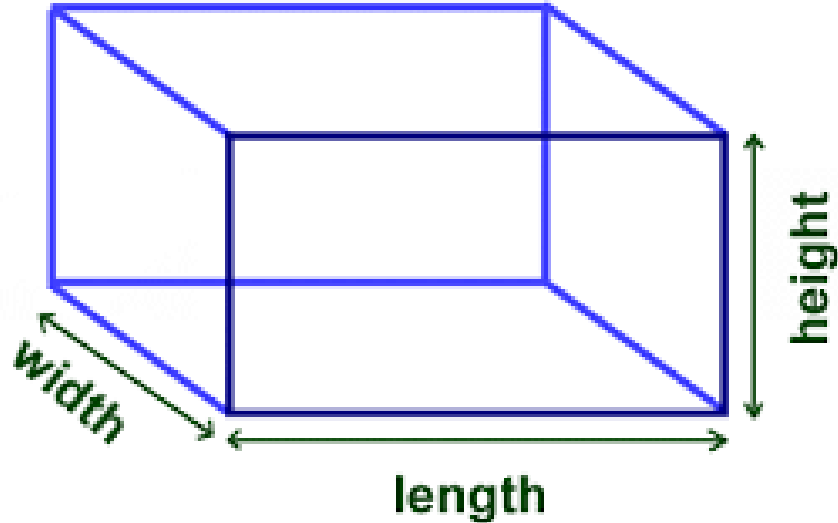# orthographic view

Measuring in 2D

2D objects have a length and width

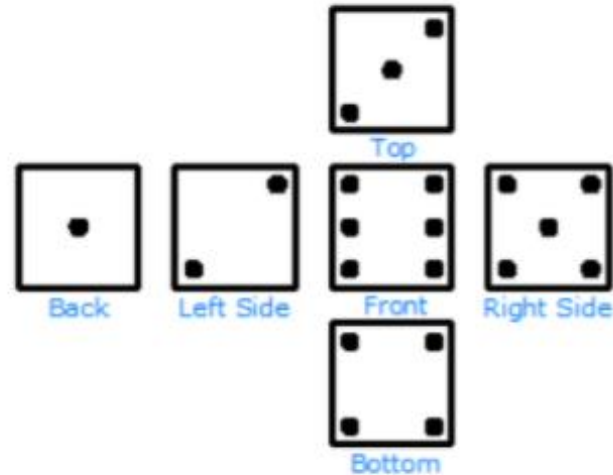# Measuring in 3D

3D objects have a length, width, and height

Spatial Visualization: Looking at objects ALL ways!

Isometric (3D) view
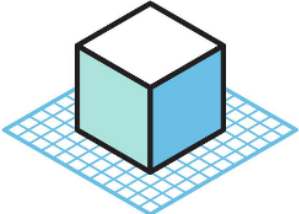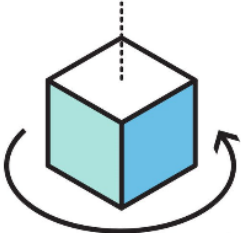
and

Orthographic (2D) view

Isometric view of a Die

Orthographic views of a Die

Top

Back

Left Side

Front

Right Side

Bottom

Tinkercad 3D Design

AUTODESK®
TINKERCAD®

Place

Place a shape to add or remove material.

Adjust

Move, rotate, and adjust shapes freely in space.

Combine

Group together a set of shapes to create models as detailed as you want.
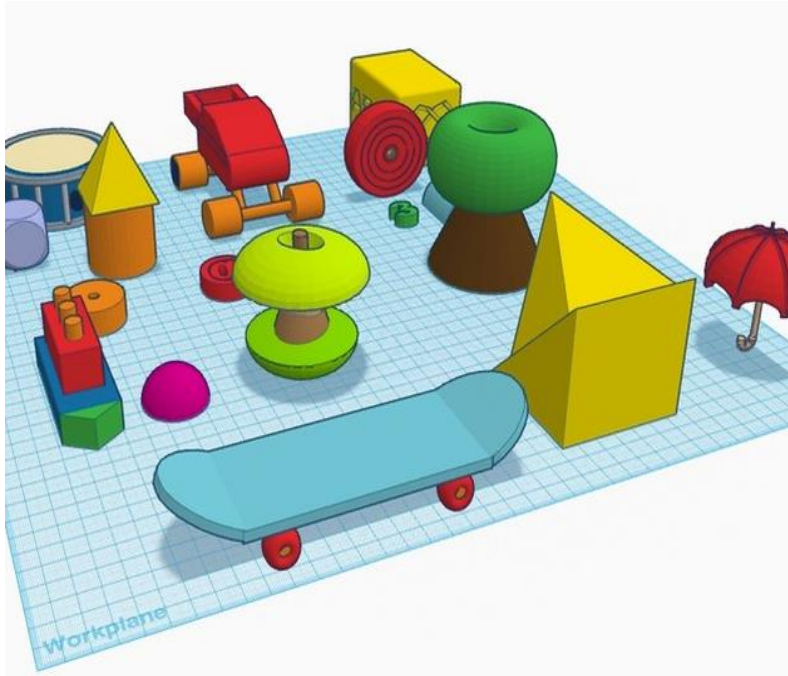
Tinkercad Tips

- Use a USB mouse

- Measure in millimeters (mm)

- Click on the upper left waffle box icon to return to your project homepage.
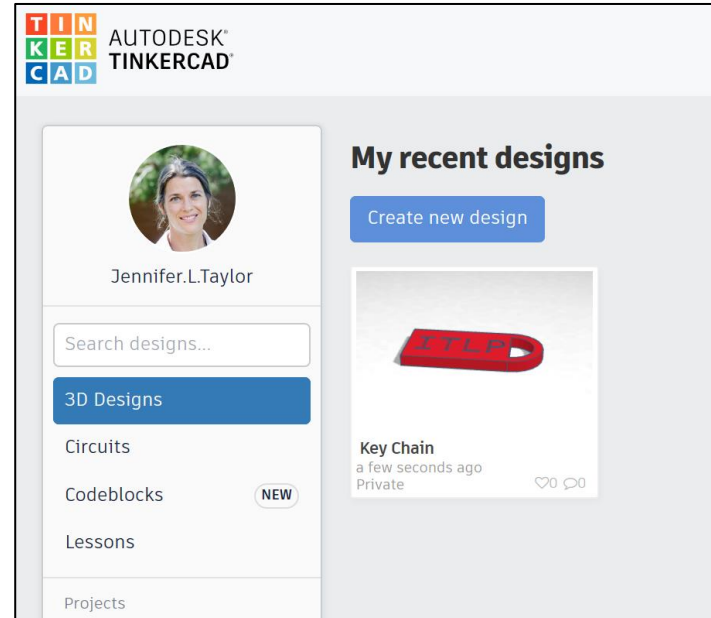
Example of Tinkercad project page

Tinkercad Tips

- Combine shapes to create new designs

- Make sure shapes are touching

- Project is flat on the workplane

Create Tinkercad.com account

Tinkercad Tutorials

Tinkercad Project Page

Click the "waffle box" icon to return to project home page.

Tinkercad Project Page

Tinkercad resources

Tinkercad Project Page

Tinkercad applications:
- 3D Design
- Circuits
- Codeblocks
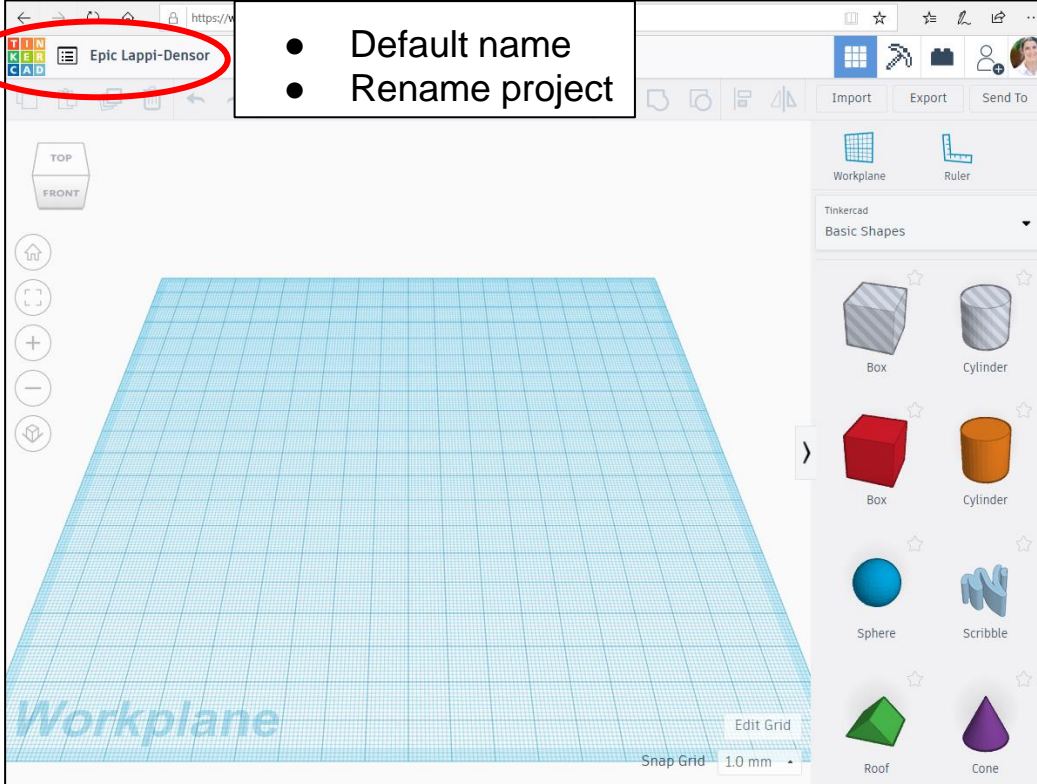
Tinkercad Project Page

Tinkercad Workplane

- Default name
- Rename project
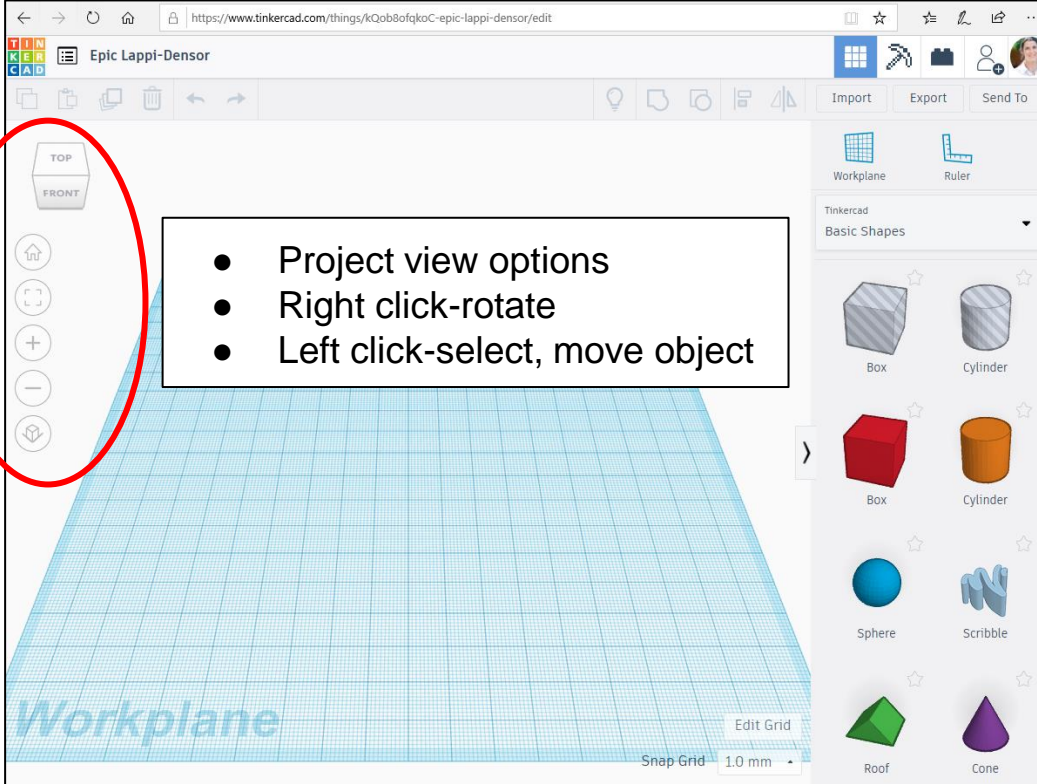
Tinkercad Workplane

Change 3D design to
- Minecraft block design
- Lego block design

Tinkercad Workplane

- Project view options
- Right click-rotate
- Left click-select, move object

Tinkercad Workplane

- Copy, paste, duplicate, delete objects
- Back arrow or ctrl Z to undo
- Forward arrow or ctrl Y to redo

Tinkercad Workplane

- Show all
- Group
- Ungroup
- Align
- Mirror
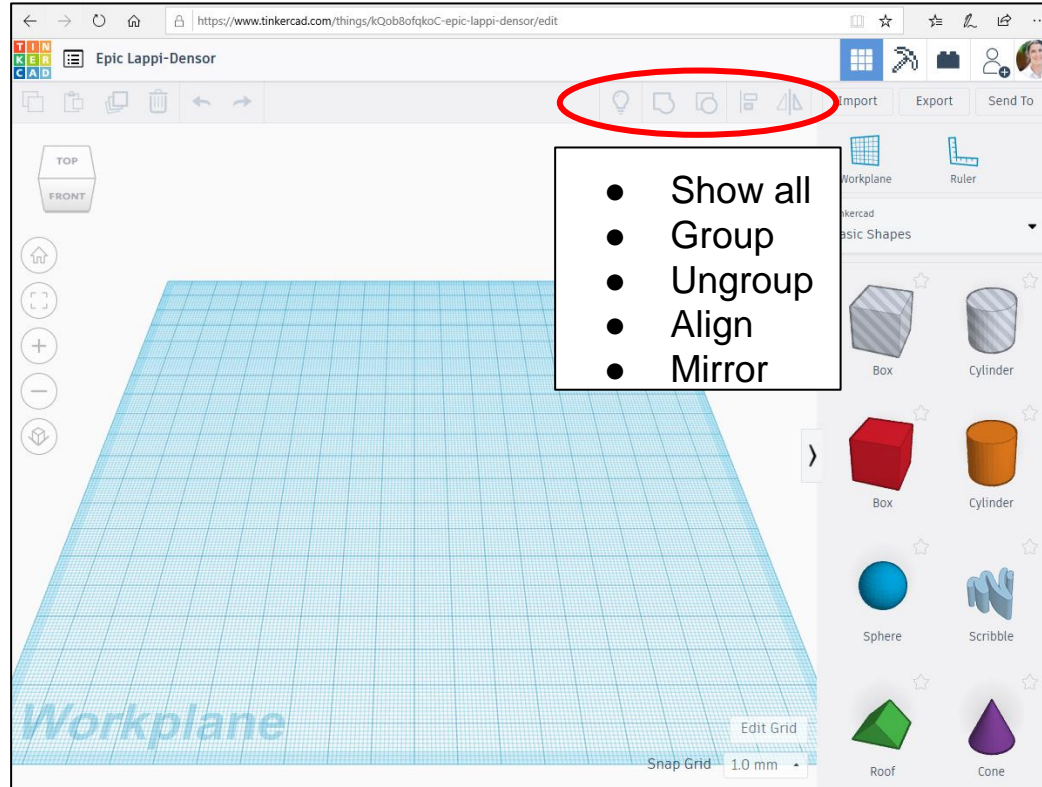
Tinkercad Workplane

Tinkercad Workplane
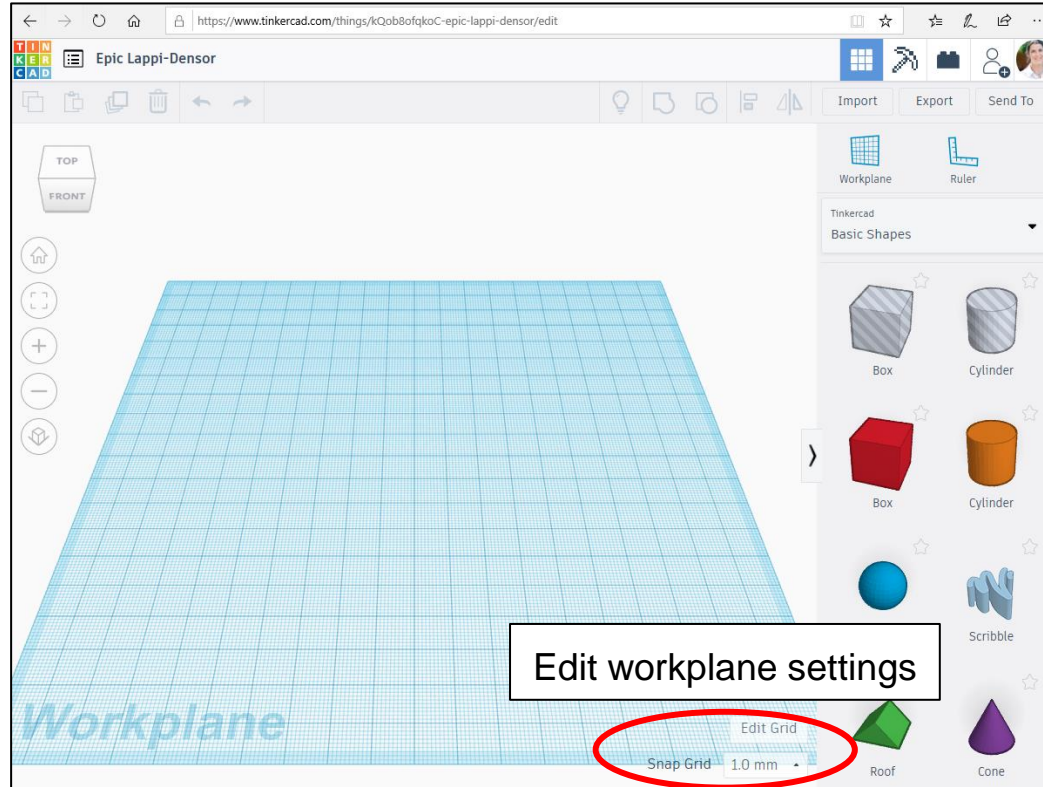
Add workplane and ruler options

Tinkercad Workplane

Edit workplane settings

Tinkercad Shape Interface

3D Design options:
- Shapes
- Text & numbers
- Characters
- Connectors

Tinkercad Shape Interface

Click white "handles" to change object dimensions.
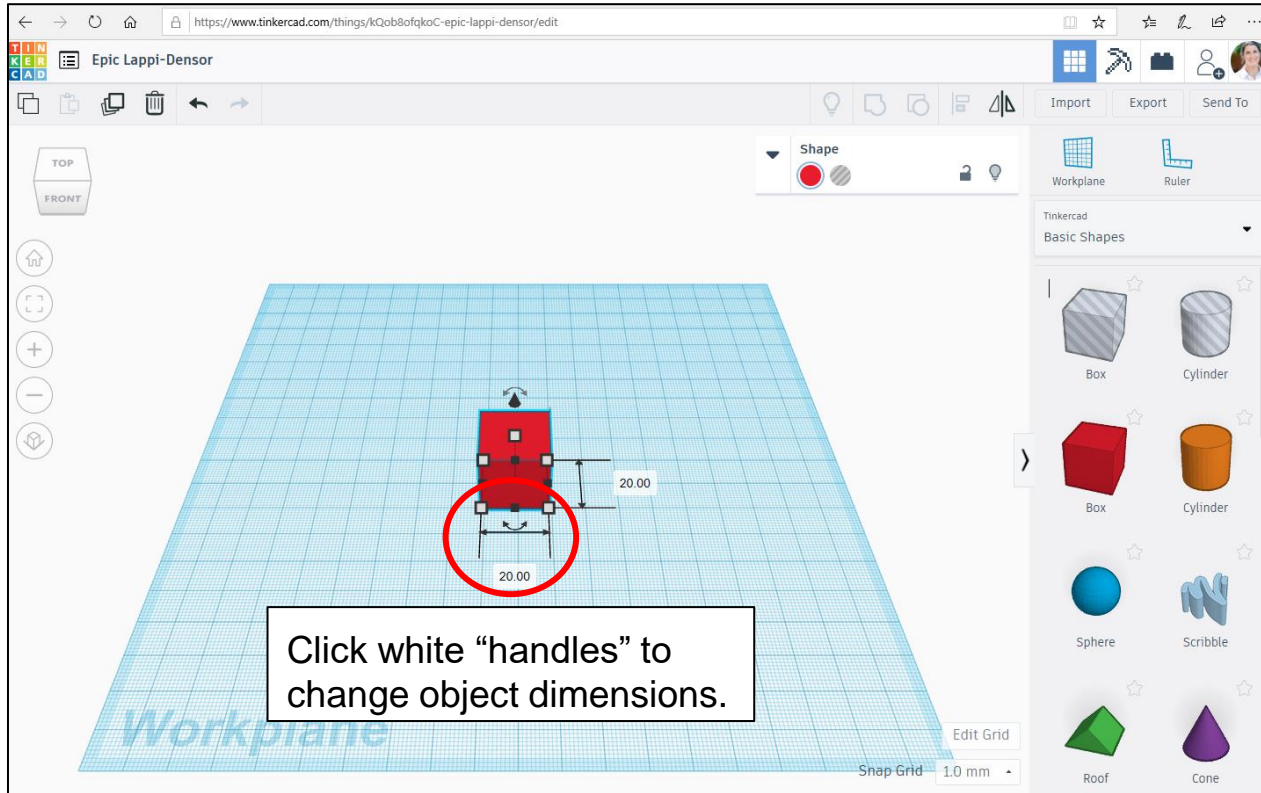
Tinkercad Shape Interface

Tinkercad Shape Interface

Left click and drag the top black cone to raise and lower an object.

Tinkercad Shape Interface

Left click and drag the lower arrows to rotate an object.

Tinkercad Shape Interface

Left click and drag the upper arrows to tilt an object.
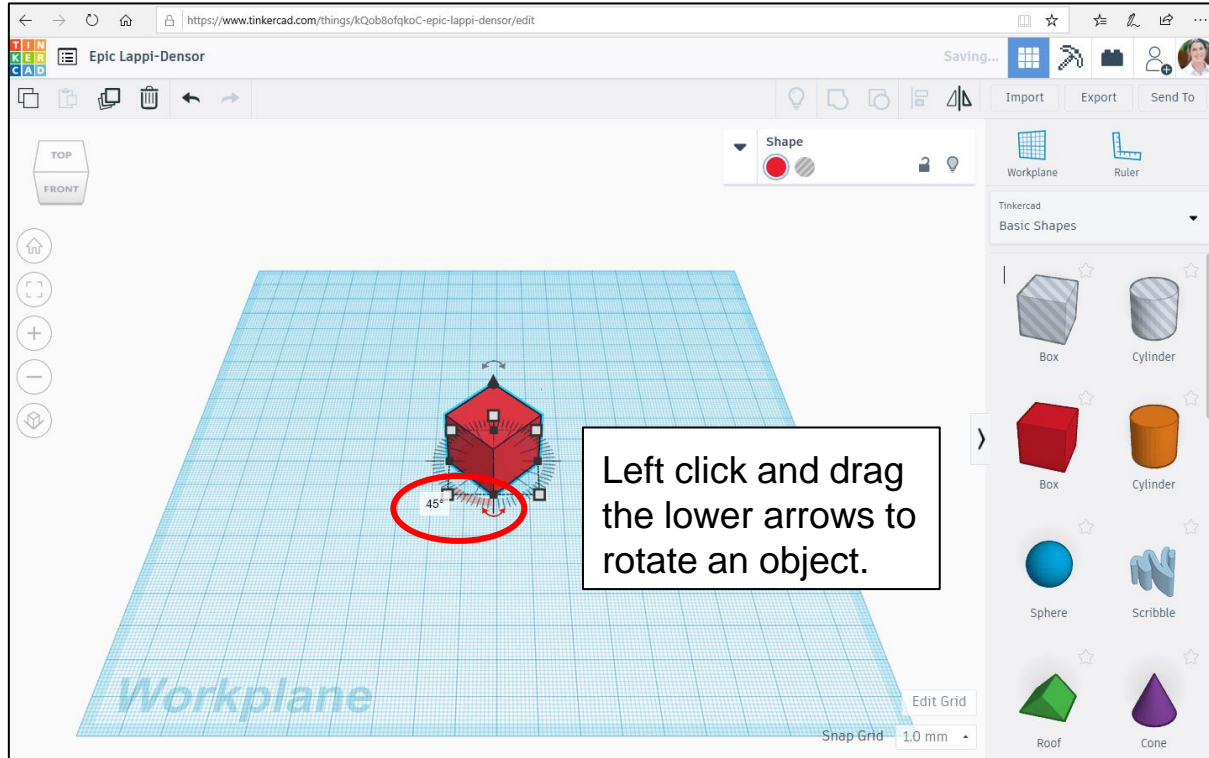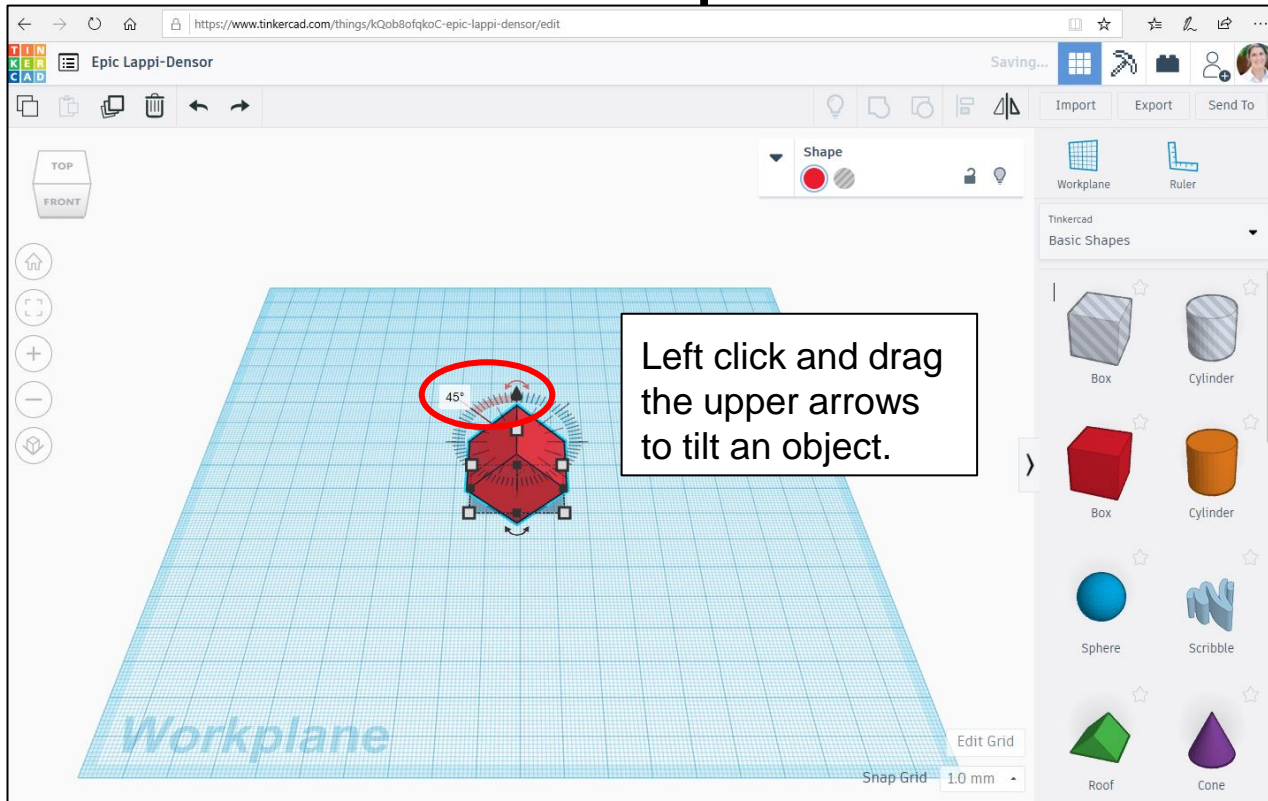
It's YOUR turn to get creative with 3D design!

Instructions:
1. Go to the **"3D"** tab in Tinkercad
2. Click **"Create New Design"**
3. File name: "EV Concept Car"

Reminders:
- Project is flat on the workspace
- Objects are touching
- Back arrow or "Control Z" to undo
- Click on the Tinkercad "waffle box". icon to get back to your project page
- Don't get frustrated, have fun!

Session 2: Car Chassis Design

Drag a cube onto your workplane, and change the dimensions.

Length: 60 cm

Width: 30 cm

Height: 5 cm

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More shapes!

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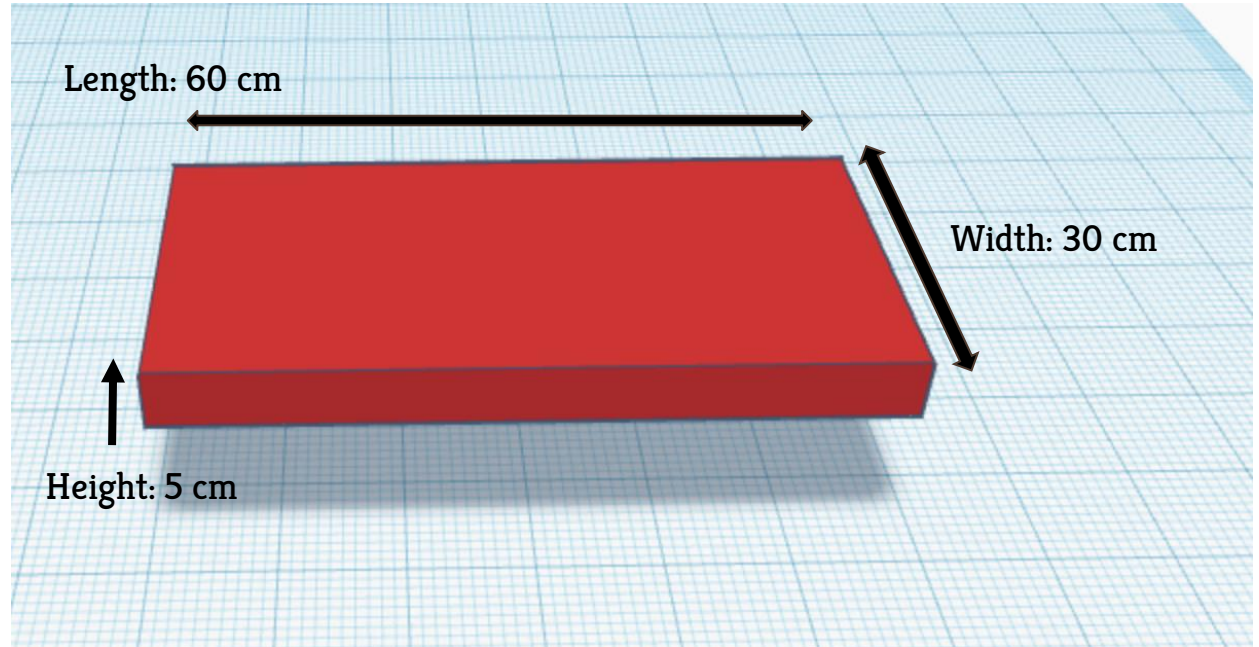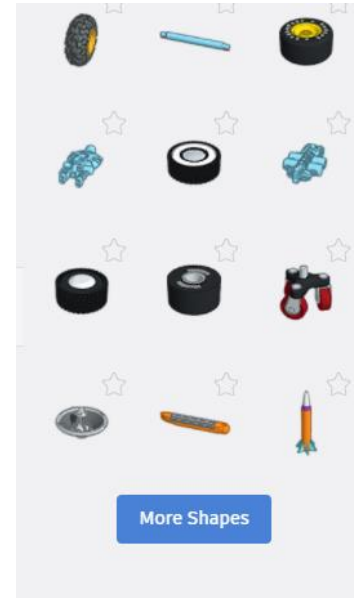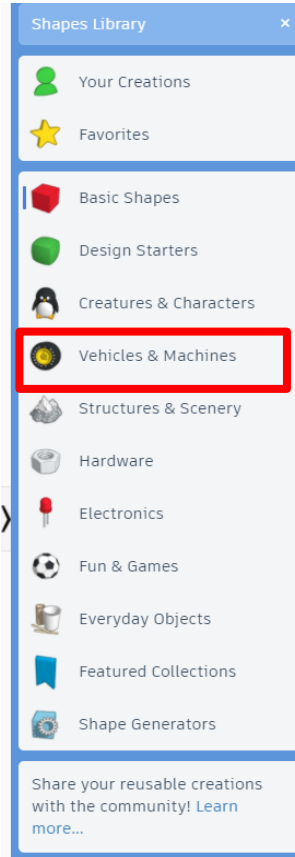
Add a wheel to your project
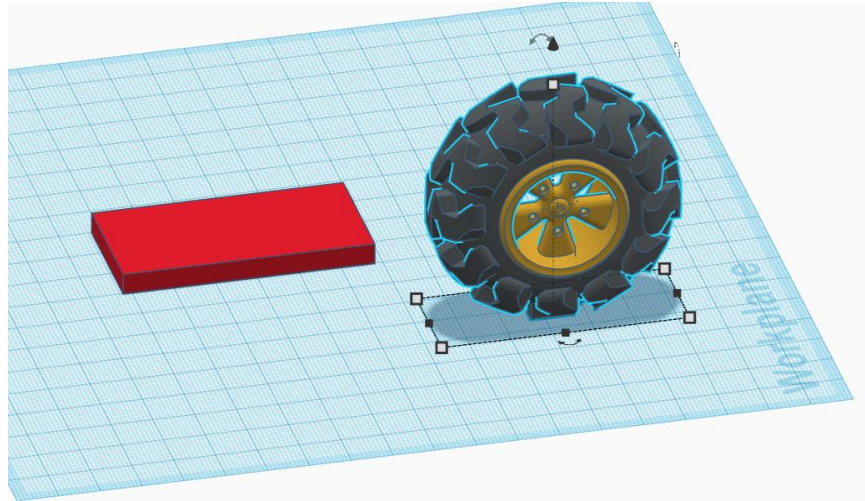
Scale the wheel
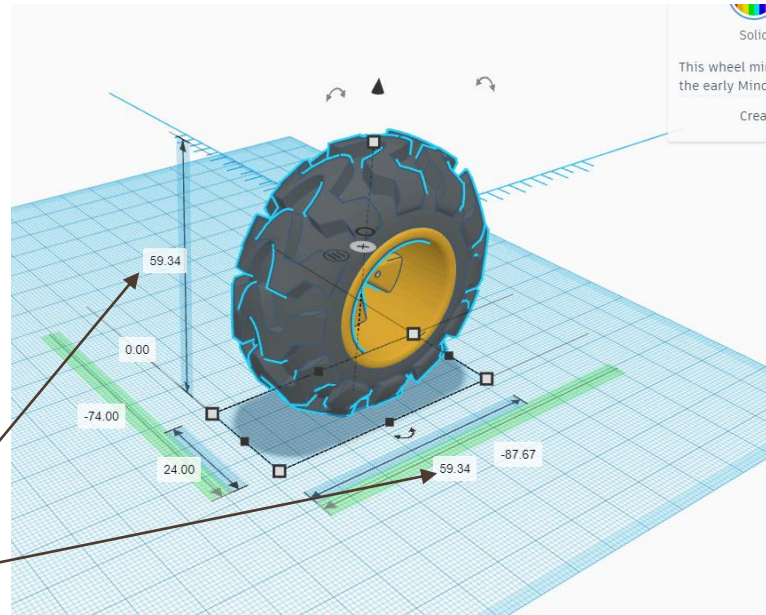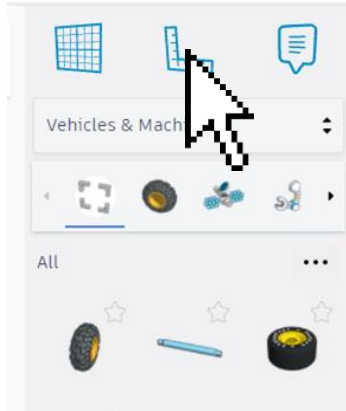
Change to 20

Scale the wheel (cont.)
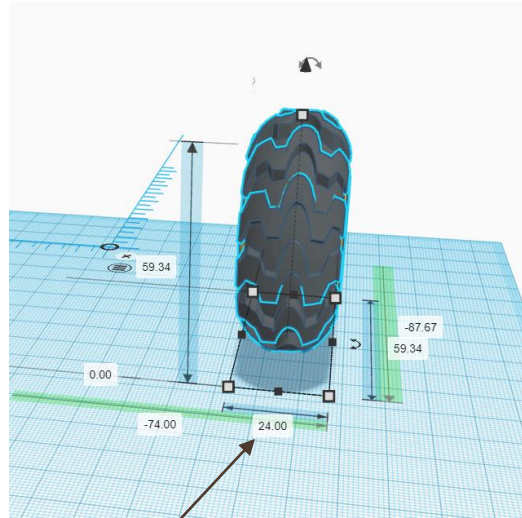
Change
to 12

Duplicate your first wheel
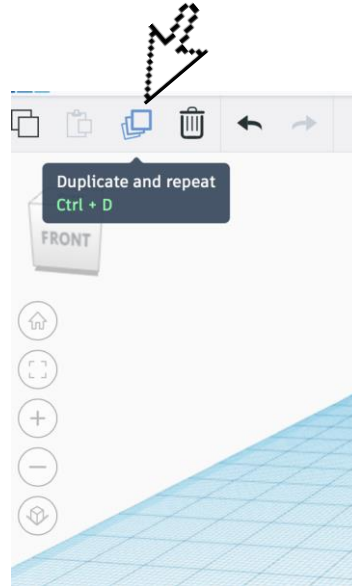
Pull it out from the first wheel

Make an axle

To create an axle, take a new cylinder and rotate it 90° (click on the 0° and type in 90).
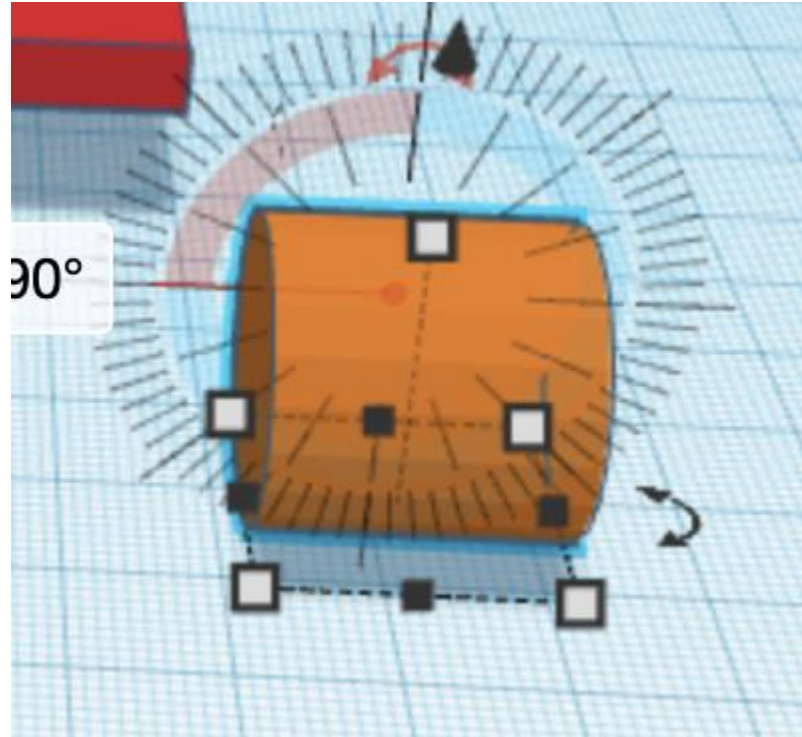
Make an axle (cont.)

Length = 55 cm

Width = 2 cm

Height = 2 cm

Make it thin

Adjust the dimensions to your liking, you are able to modify this as you work.

Centering objects

Pull the axle off the ground and try to put it in the center of the two wheels.
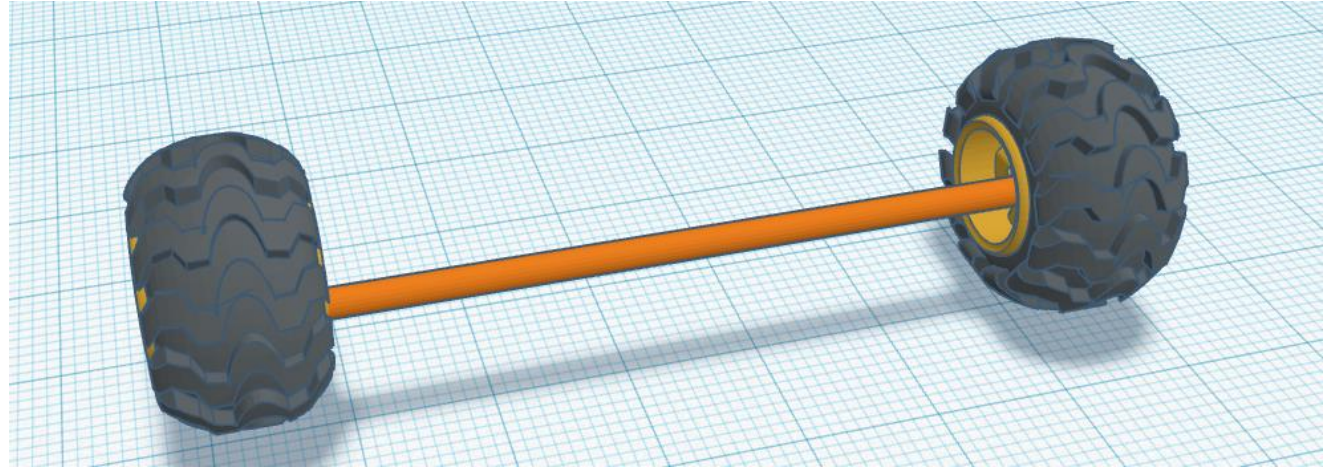
Centering (cont.)

Your design does not have to be perfect yet.

Just make sure the chassis is between the axle and wheels.
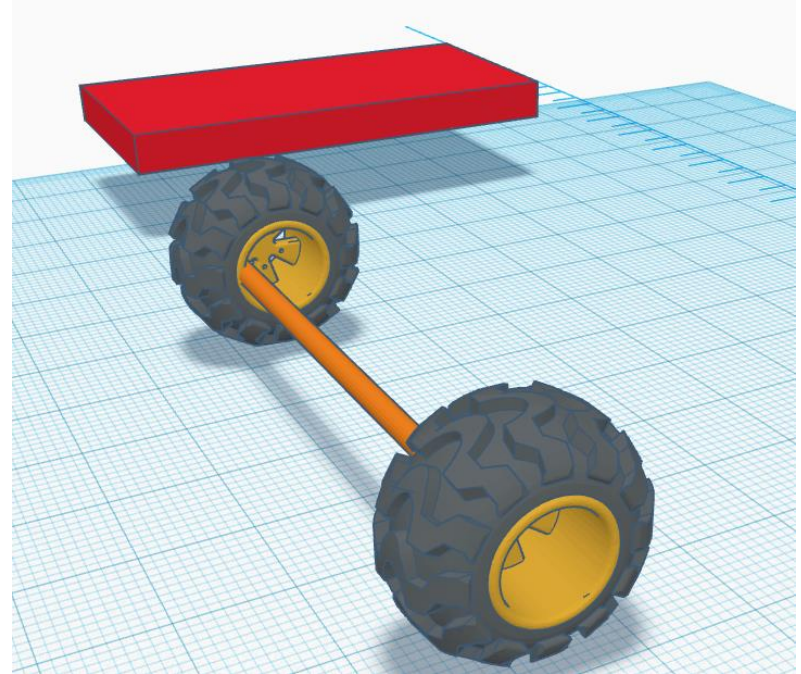
Selecting a group

Hold shift, click on your axle and wheels, all three should be highlighted in blue.
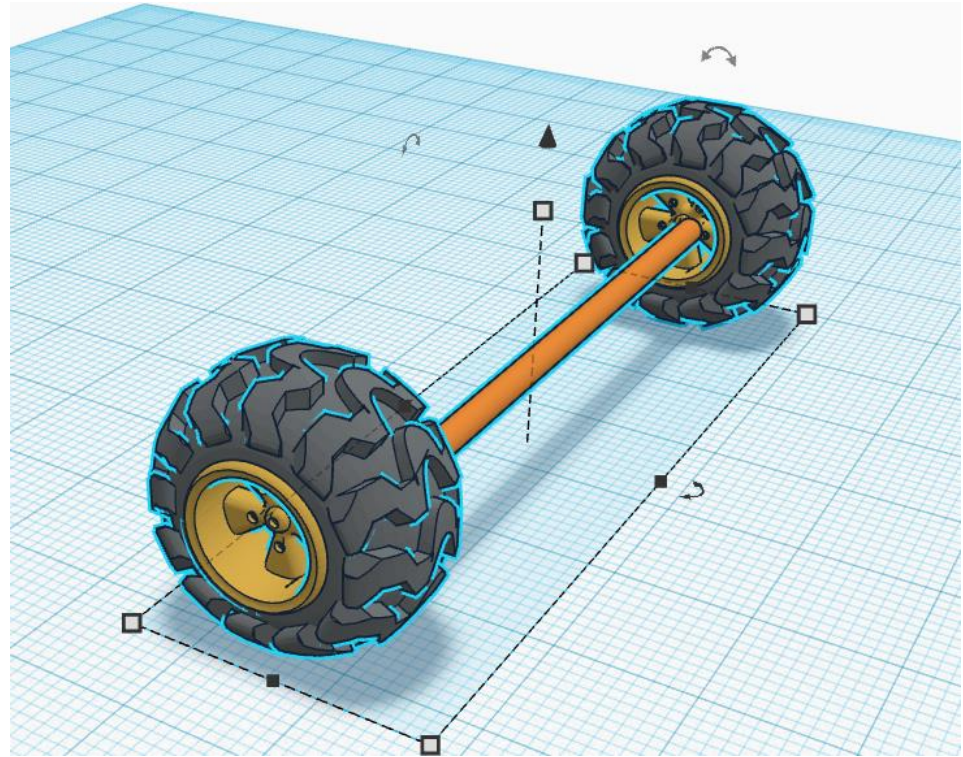
Align objects

Click on the align tool.
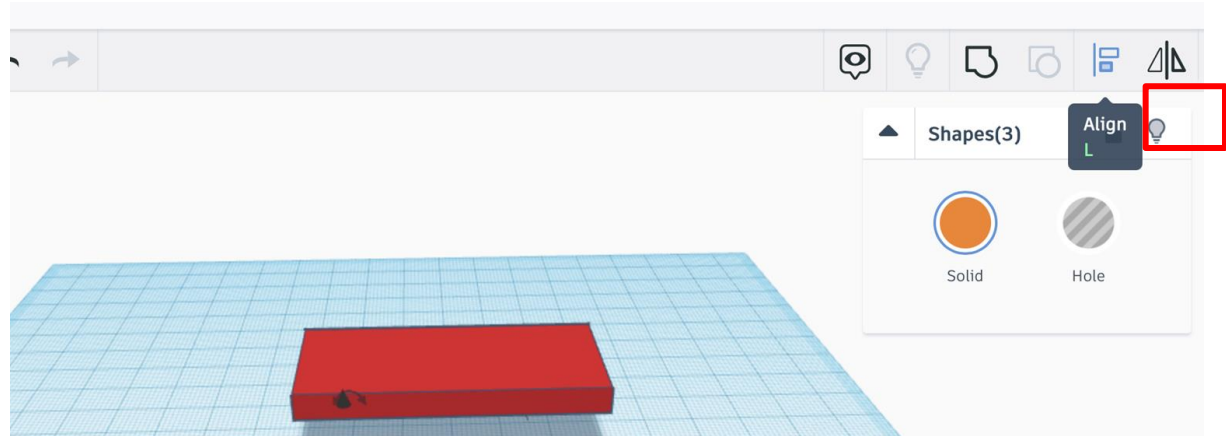
Align (cont.)

Align the centre two dots, which will align it in the center of this view.

Then view it from the side and align it again.
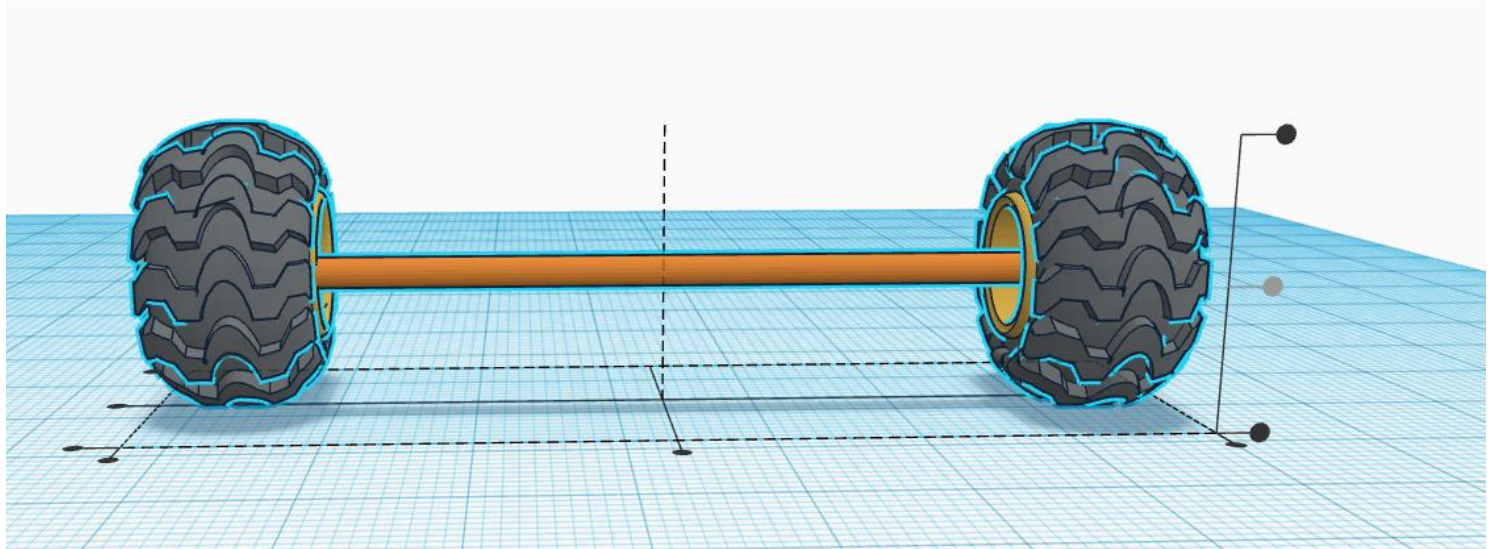
Grouping parts

Group the axle and the wheels to prevent them from separating.
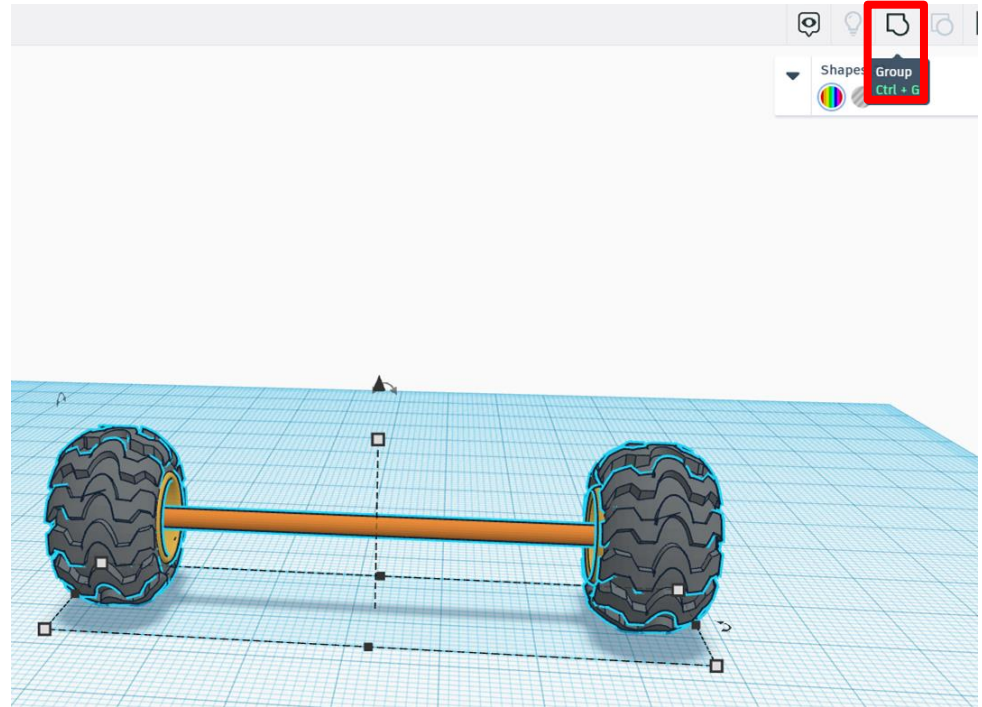
Create more wheels

Duplicate again!
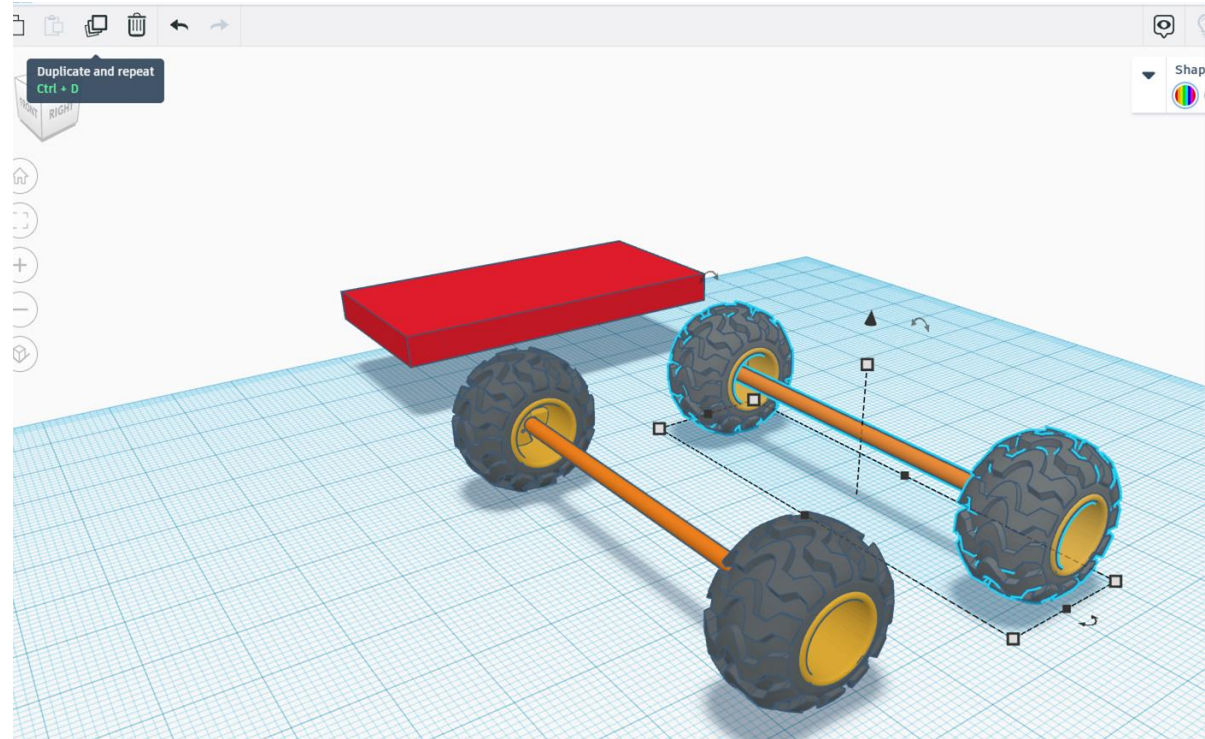
Changing sizes

If one part is too narrow or too wide, you can always change the dimensions.

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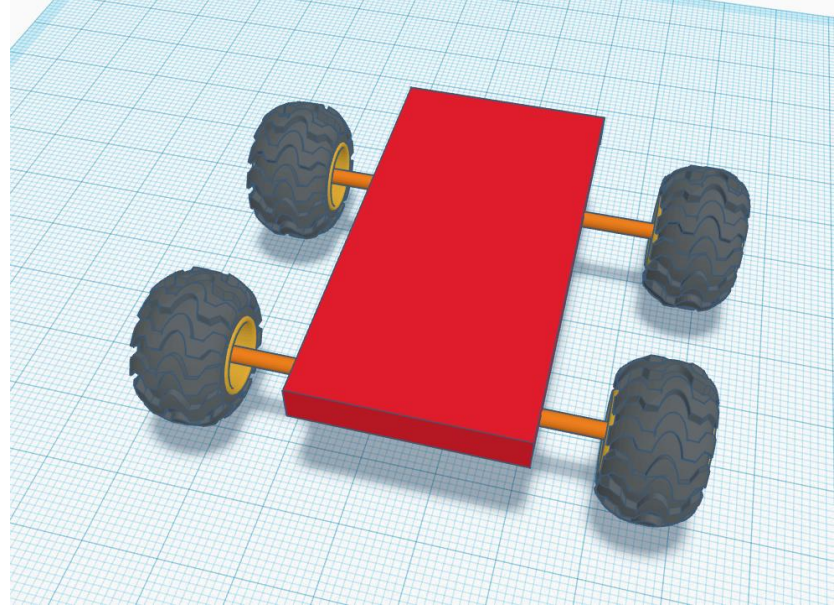
Chassis design

Use the "Align" tool to align the wheels, axles, and chassis.
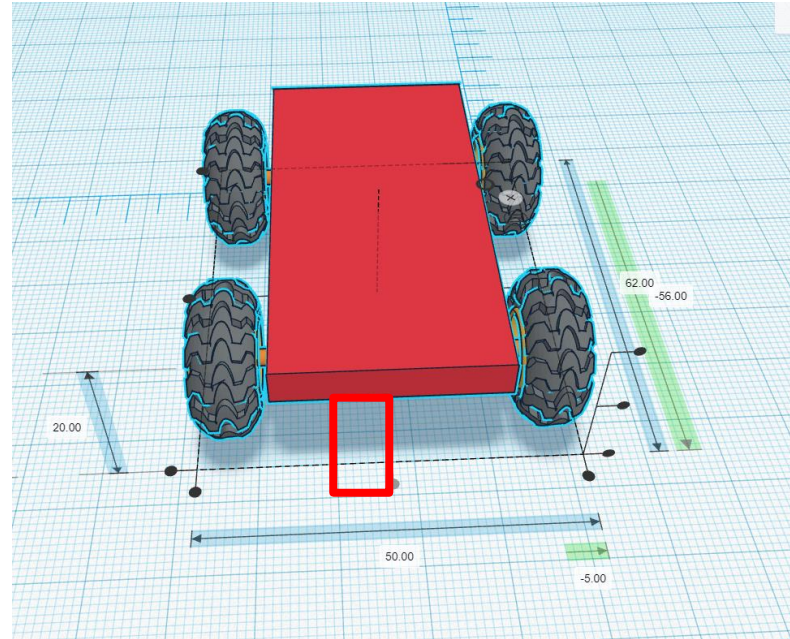
Keeping wheels on the road

Place the axle below the chassis.

Finish the chassis

Group all items together.
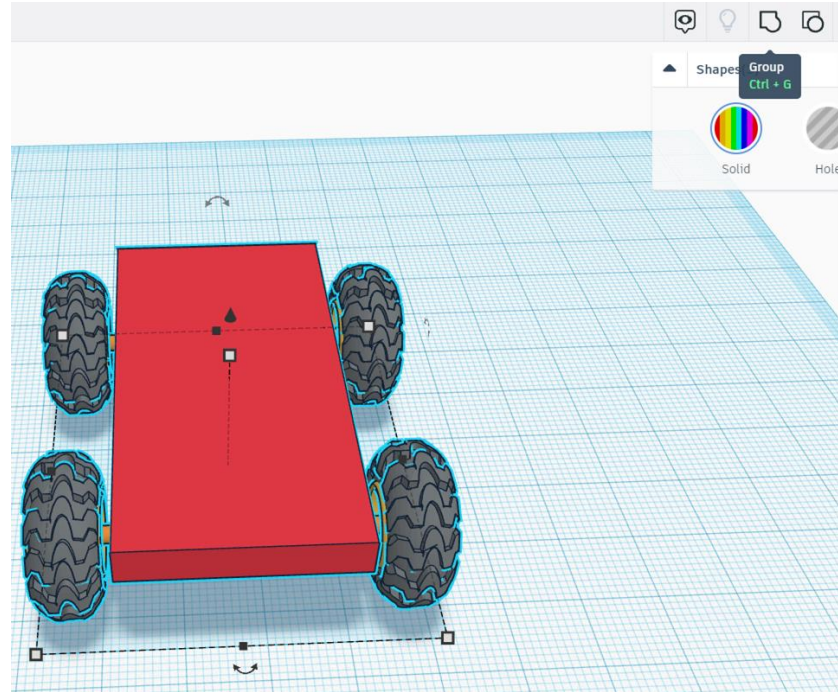
Tinkercad 3D Design &
EV Concept Car Workshop

Part 2: Concept Car Body Design & Review

Session 3: Concept Car Body Design

- Get creative!
- Choose shapes to combine to form the custom car body (fit within 30cm by 60cm chassis)
- Select color(s)
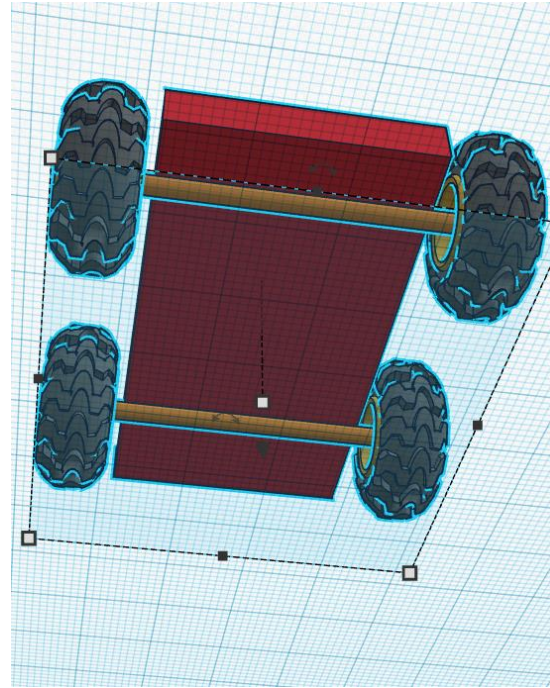- Make "holes" and then group them with a body
- Customize the wheels, body shape, etc.
- Group objects as you go and on the final draft design

What shapes work best?

Session 4: Concept Car Design Review

- Take a screenshot of your 3D model EV Dream Car design.

- Share it with the class!

- What was the best part of creating your design?

- What was the most challenging part of creating your design?

- How would you change your design next time?

End of Workshop

You CAD do it!