

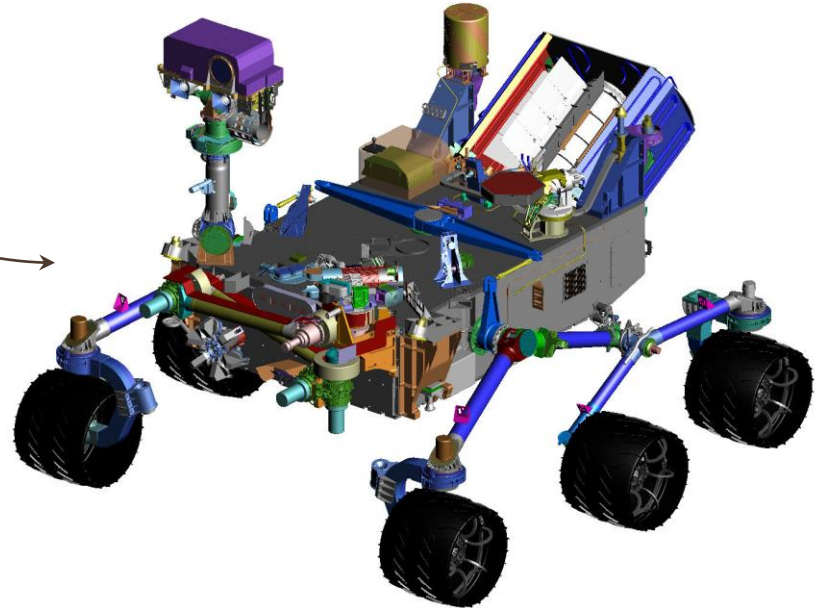
Tinkercad 3D Design & EV Concept Car Workshop

Part 1: Introduction to Tinkercad & Car Chassis Design



Session 1: Introduction to Tinkercad

Guess what? Even
NASA uses CAD!



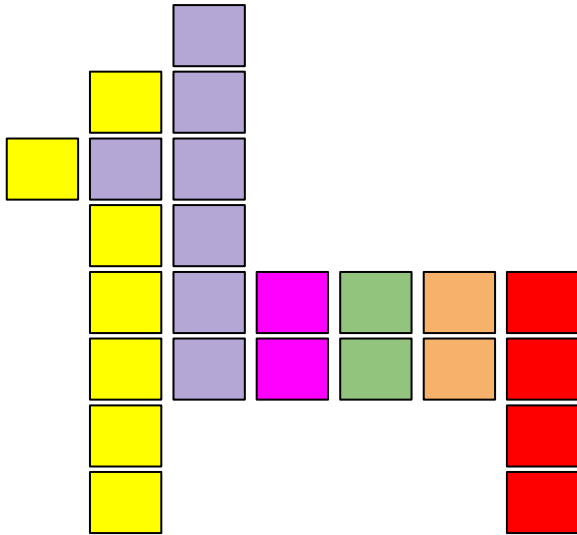


- CAD stands for **computer-aided design** software.

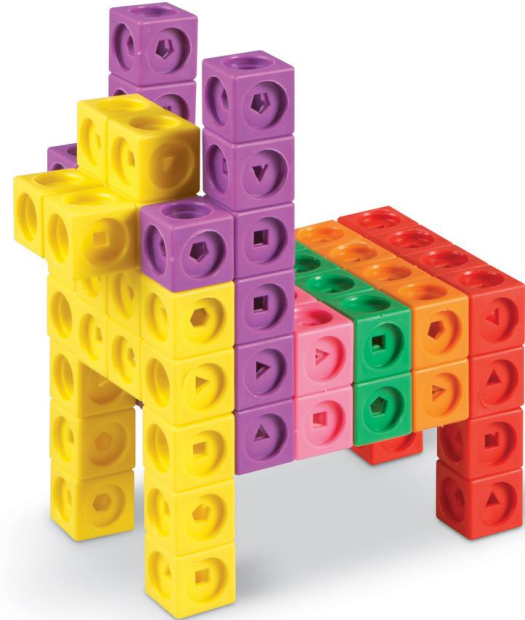


- Engineers, architects, artists, and others use CAD to create precise **2D drawings and 3D models**.

2-dimensional isometric view

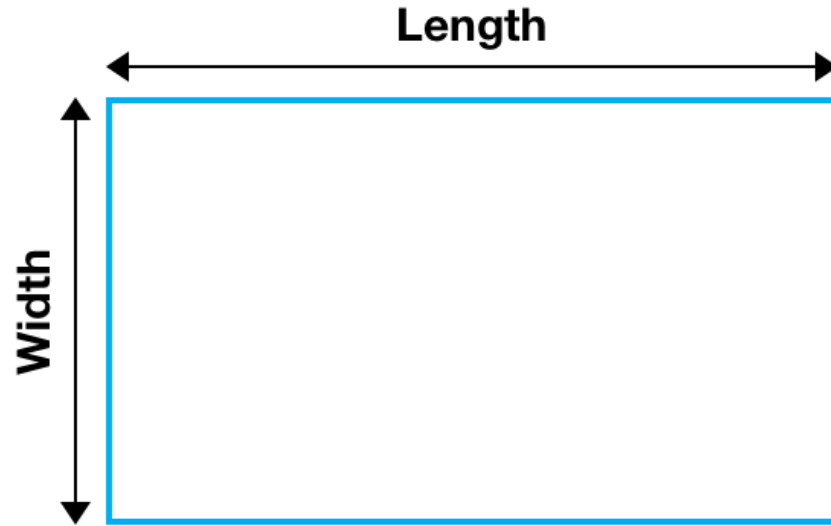


3-dimensional orthographic view



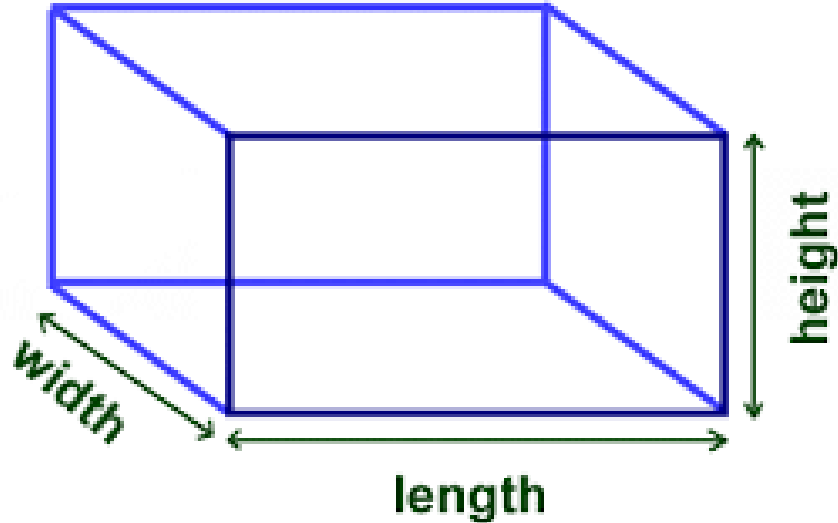
Measuring in 2D

2D objects have a length and width



Measuring in 3D

3D objects have a length, width, and height

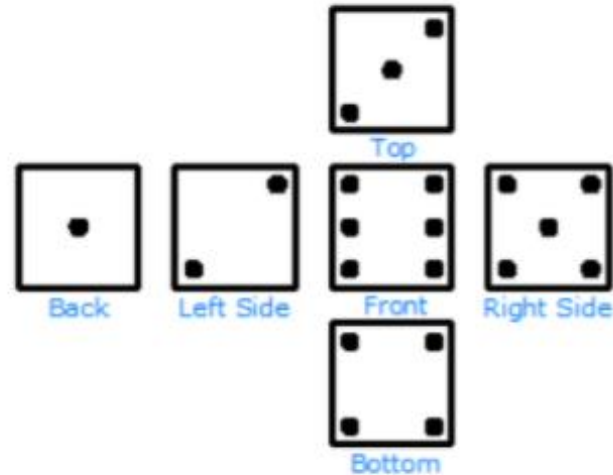


Spatial Visualization:
Looking at objects ALL ways!

Isometric (3D) view
and
Orthographic (2D) view




Isometric view
of a Die




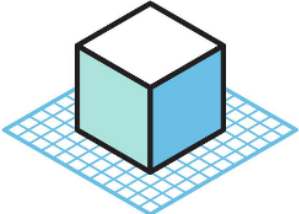
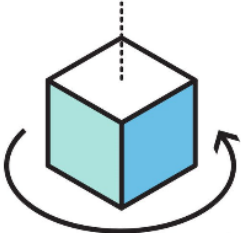

Orthographic views
of a Die

Tinkercad 3D Design



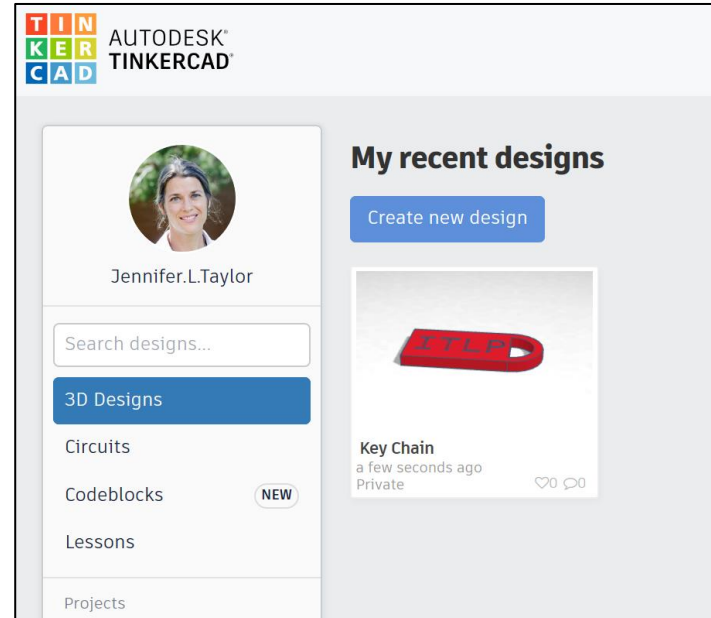
AUTODESK®
TINKERCAD®



<p>Place</p>  <p>Place a shape to add or remove material.</p>	<p>Adjust</p>  <p>Move, rotate, and adjust shapes freely in space.</p>	<p>Combine</p>  <p>Group together a set of shapes to create models as detailed as you want.</p>
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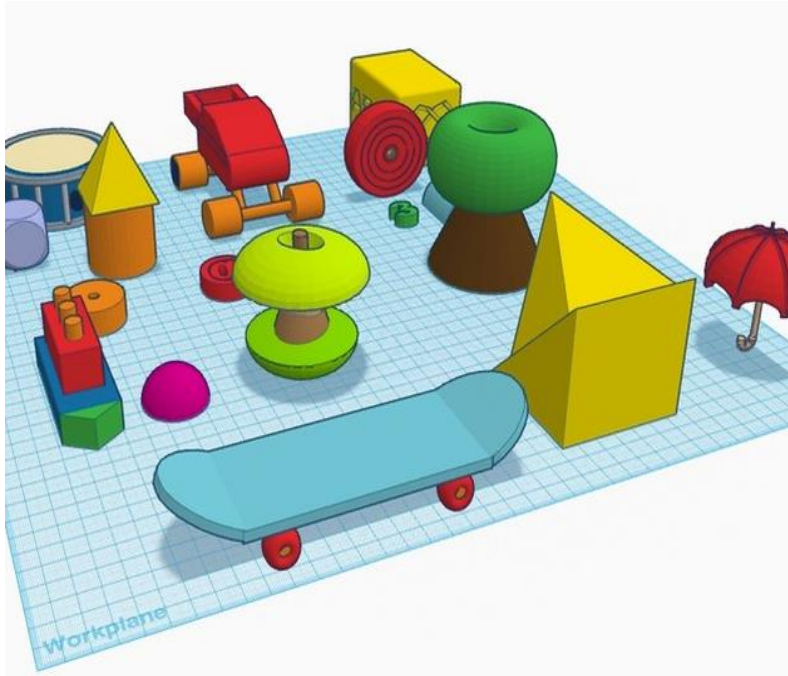
Tinkercad Tips

- 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

https://www.tinkercad.com

TINKERCAD AUTODESK TINKERCAD

Gallery Blog Learn Teach Q Sign in JOIN NOW

PLATS BORING

From mind to design in minutes

Tinkercad Tutorials



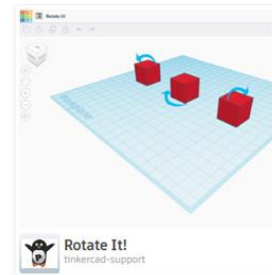
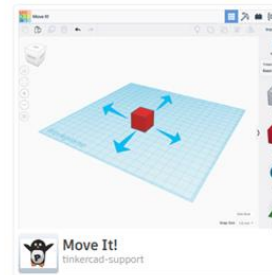
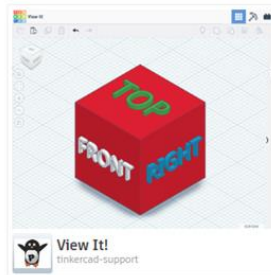
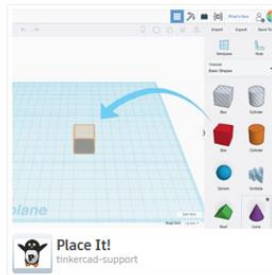
Classes Gallery Blog Learn **Teach**

Learn how to Tinker
Sharpen your design and making skills

3D-

Starters Lessons Projects

Starters define basic 3D design functions, and link to relevant Lessons to develop your skills.



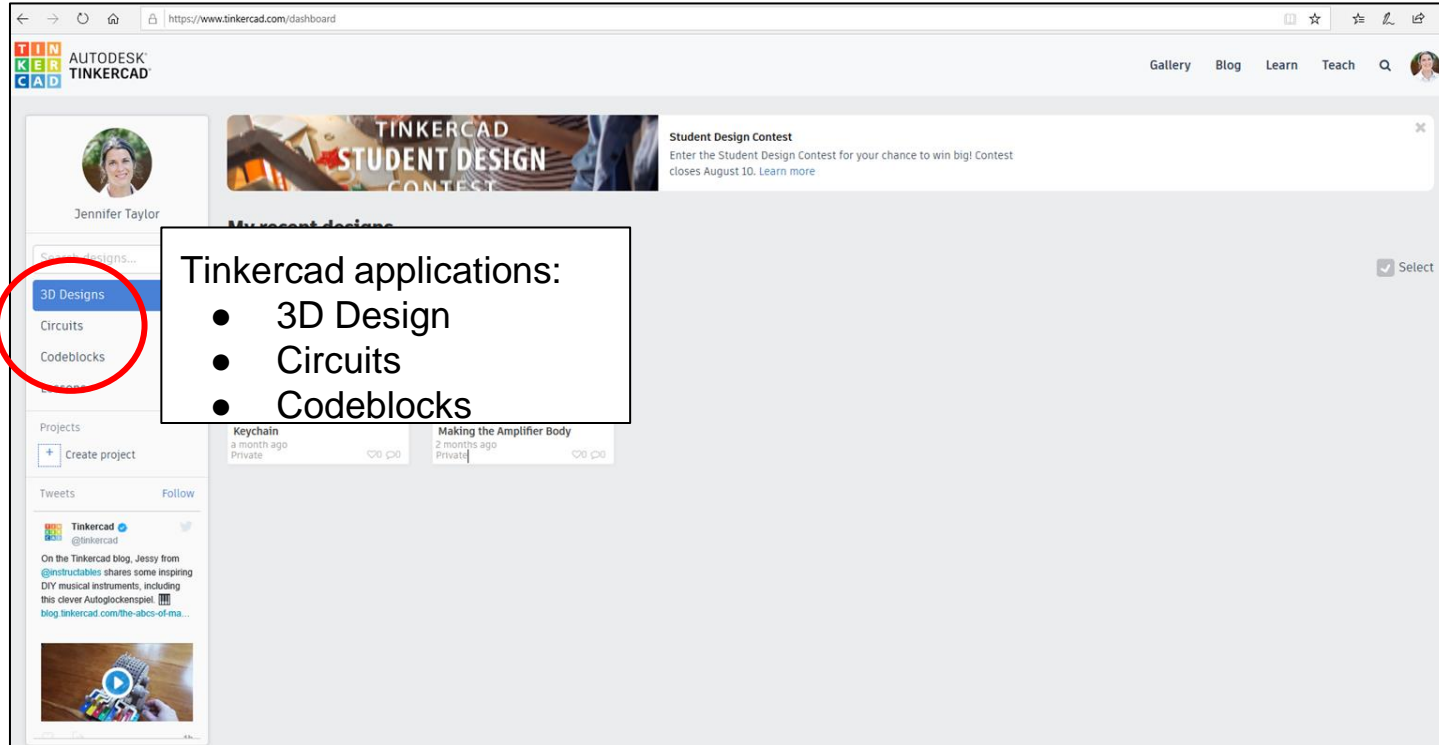
Tinkercad Project Page

The screenshot shows the Tinkercad dashboard interface. At the top left, the Tinkercad logo is displayed, with a red circle highlighting the 'waffle box' icon. The browser's address bar shows the URL 'https://www.tinkercad.com/dashboard'. In the top right corner, there are navigation links for 'Gallery', 'Blog', 'Learn', and 'Teach', along with a search icon and a user profile picture. A banner for the 'Student Design Contest' is visible, with the text 'Enter the Student Design Contest for your chance to win big! Contest closes August 10. Learn more'. Below the banner, there is a 'Create new design' button and a grid of design thumbnails. The left sidebar contains a search bar, a list of design categories (3D Designs, Circuits, Codeblocks, Lessons), a 'Projects' section with a 'Create project' button, and a 'Tweets' section with a tweet from Tinkercad. A callout box with a black border and white background is positioned over the 'waffle box' icon, containing the text: 'Click the “waffle box” icon to return to project home page.'

Tinkercad Project Page

The screenshot shows the Tinkercad dashboard interface. At the top, the navigation bar includes the Tinkercad logo, the text 'AUTODESK TINKERCAD', and a search bar. The search bar is circled in red and contains the links 'Gallery', 'Blog', 'Learn', and 'Teach'. Below the navigation bar, the user profile for 'Jennifer Taylor' is visible on the left. The main content area features a 'Student Design Contest' banner, a 'My recent designs' section with two project thumbnails ('Keychain' and 'Making the Amplifier Body'), and a 'Tweets' section with a tweet from Tinkercad. A red box on the right side of the dashboard is labeled 'Tinkercad resources'.

Tinkercad Project Page



The screenshot shows the Tinkercad dashboard interface. On the left sidebar, the navigation menu includes '3D Designs', 'Circuits', and 'Codeblocks'. The '3D Designs' option is highlighted with a red circle. In the center, a white box with a black border contains the text 'Tinkercad applications:' followed by a bulleted list: '3D Design', 'Circuits', and 'Codeblocks'. The background shows the user's profile (Jennifer Taylor), a 'Student Design Contest' banner, and a 'My recent designs' section with two project thumbnails: 'Keychain' and 'Making the Amplifier Body'.

Tinkercad applications:

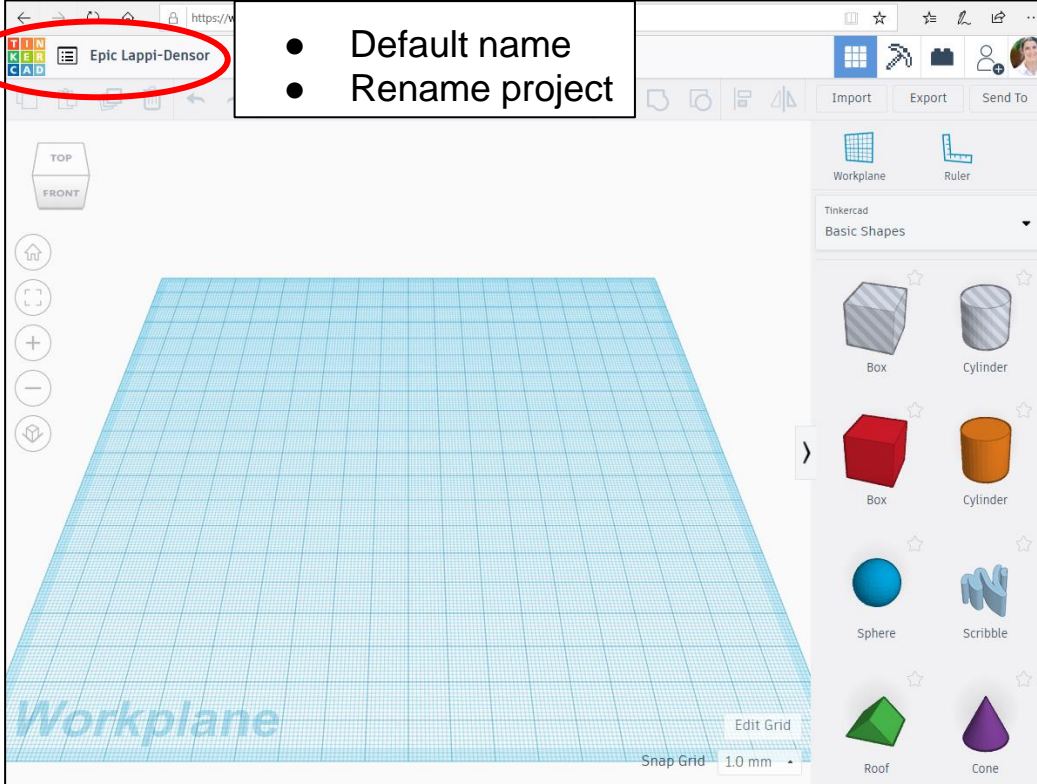
- 3D Design
- Circuits
- Codeblocks

Tinkercad Project Page

The screenshot shows the Tinkercad dashboard for user Jennifer Taylor. The interface includes a navigation bar with 'Gallery', 'Blog', 'Learn', and 'Teach'. A 'Student Design Contest' banner is visible at the top. The main content area is titled 'My recent designs' and features a 'Create new design' button. Below this, there are two design thumbnails: 'Keychain' and 'Making the Amplifier Body'. A red circle highlights the search bar and the '3D Designs' filter button. A white box with a black border contains two bullet points: 'Click a Tinkercad application' and 'Create a new design'.

- Click a Tinkercad application
- Create a new design

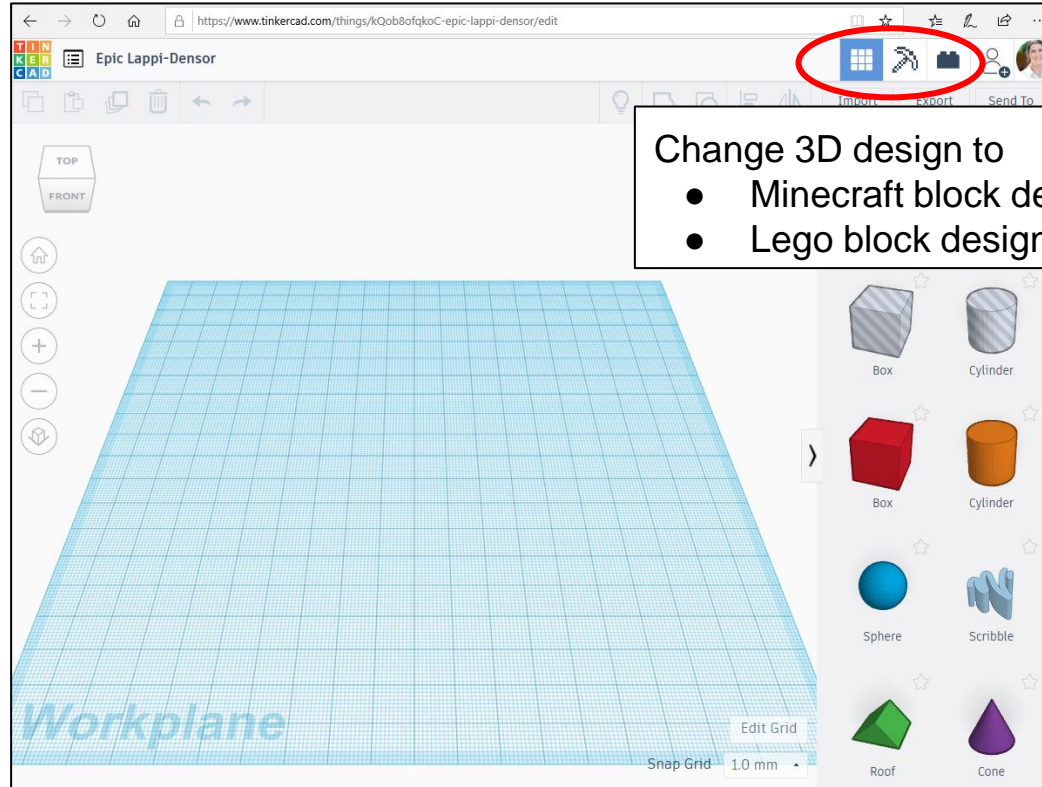
Tinkercad Workplane



The screenshot displays the Tinkercad web interface. At the top, the browser address bar shows the URL and the user's name, "Epic Lappi-Densor", which is circled in red. A text box to the right of the browser bar contains two bullet points: "• Default name" and "• Rename project". The main workspace features a blue grid labeled "Workplane" with a "Snap Grid" of 1.0 mm. On the left, there are navigation icons for home, zoom, and view. On the right, the "Basic Shapes" panel is visible, containing icons for Box, Cylinder, Sphere, Scribble, Roof, and Cone. The "Workplane" and "Ruler" options are also visible in the top right of the workspace area.

- Default name
- Rename project

Tinkercad Workplane

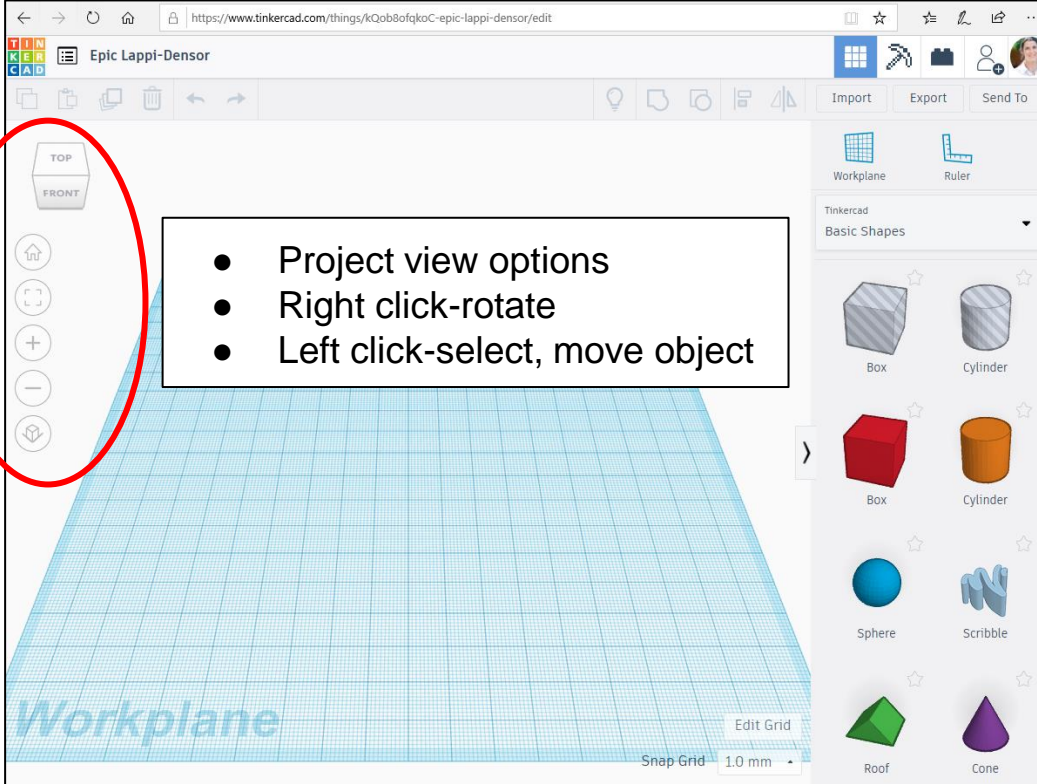


The screenshot shows the Tinkercad web interface. The browser address bar displays the URL: <https://www.tinkercad.com/things/kQob8ofqkoC-epic-lappi-densor/edit>. The page title is "Epic Lappi-Densor". A red circle highlights the "Grid" icon in the top toolbar. The main workspace features a blue grid labeled "Workplane" with a "Snap Grid" of 1.0 mm. On the left, there are view controls for "TOP" and "FRONT" views, along with navigation icons. On the right, a parts library is visible, containing various 3D shapes such as Box, Cylinder, Sphere, Scribble, Roof, and Cone.

Change 3D design to

- Minecraft block design
- Lego block design

Tinkercad Workplane

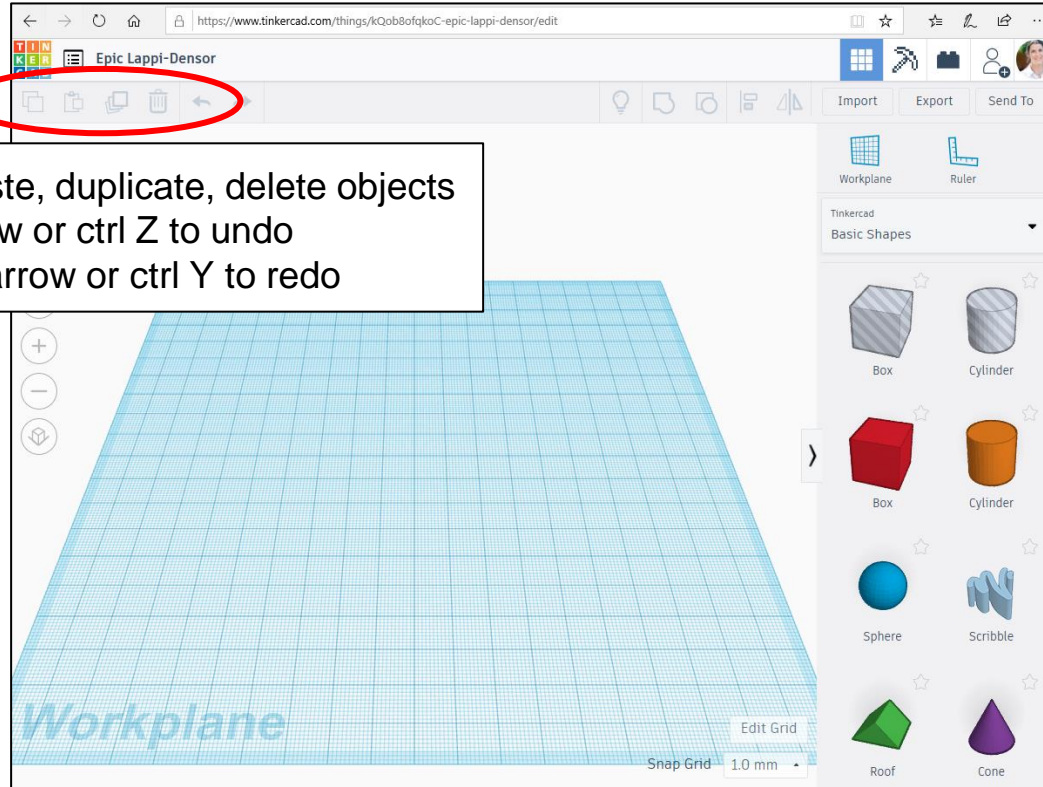


The screenshot displays the Tinkercad web interface. A red circle highlights a vertical toolbar on the left side of the workplane. This toolbar contains several icons: a home icon, a top view icon, a front view icon, a zoom in (+) icon, a zoom out (-) icon, and a rotate icon. A text box with a black border is overlaid on the workplane, containing a list of three bullet points:

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

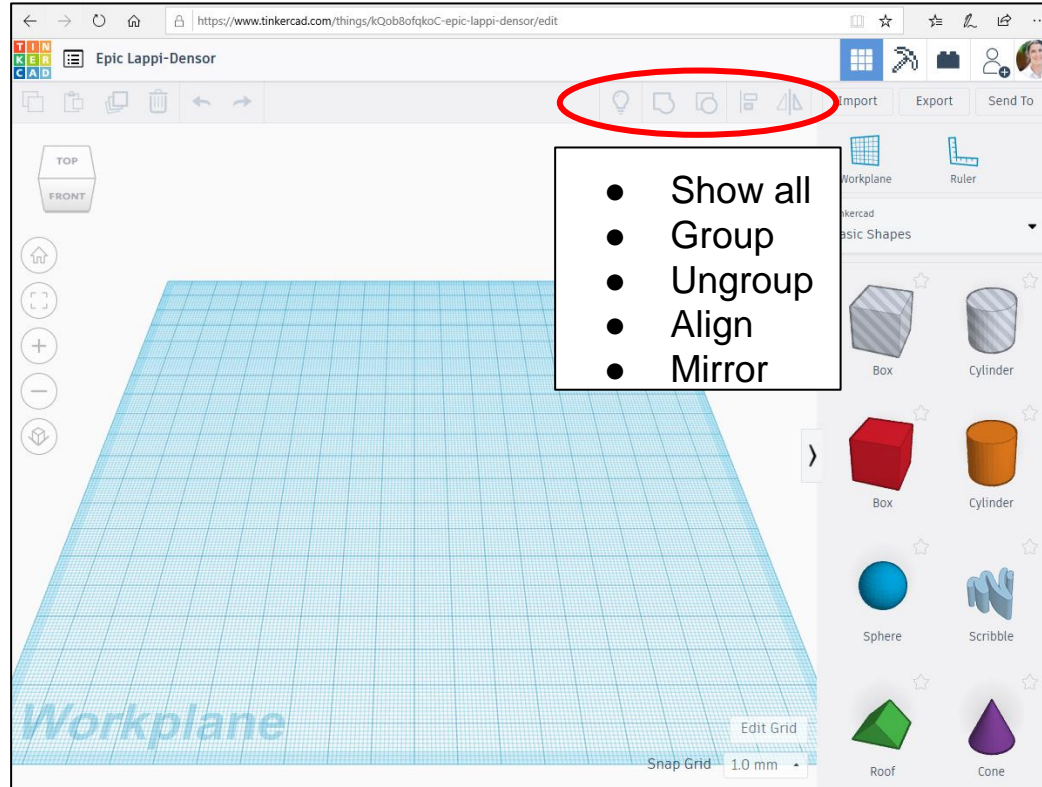
The workplane itself is a blue grid. The right sidebar shows the 'Basic Shapes' section with icons for Box, Cylinder, Sphere, Scribble, Roof, and Cone. The top navigation bar includes 'Import', 'Export', and 'Send To' buttons. The URL in the browser address bar is <https://www.tinkercad.com/things/kQob8ofqkoC-epic-lappi-densor/edit>.

Tinkercad Workplane

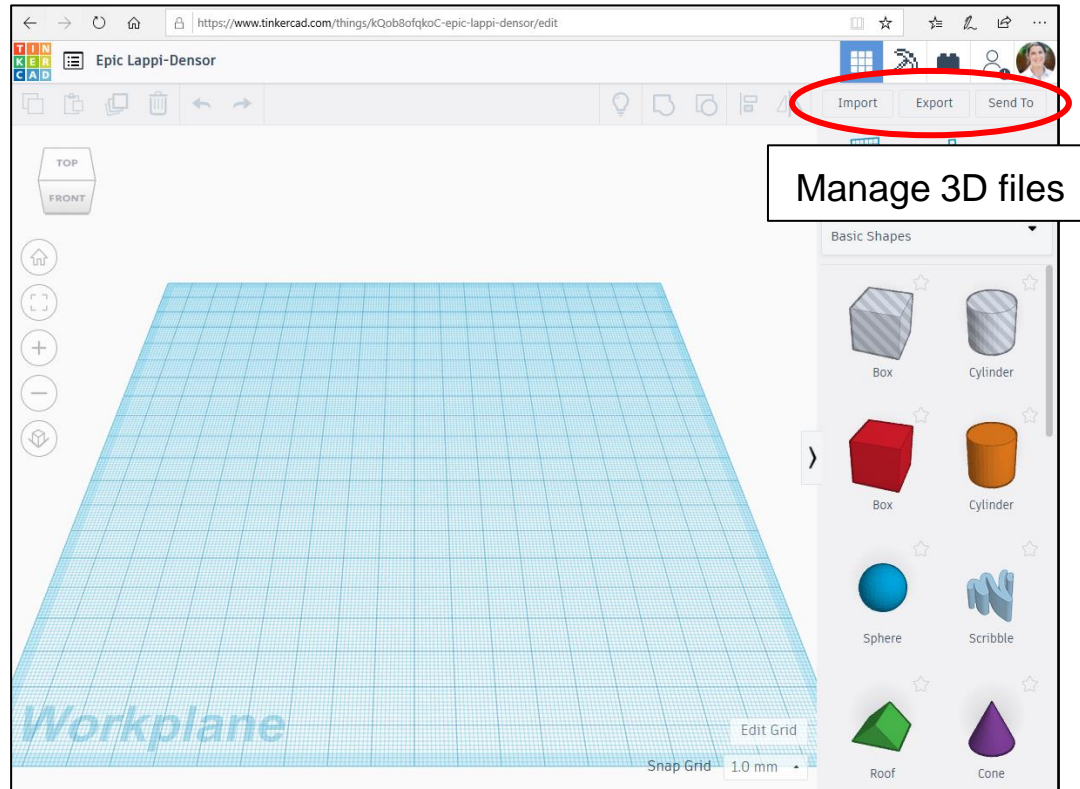


- Copy, paste, duplicate, delete objects
- Back arrow or ctrl Z to undo
- Forward arrow or ctrl Y to redo

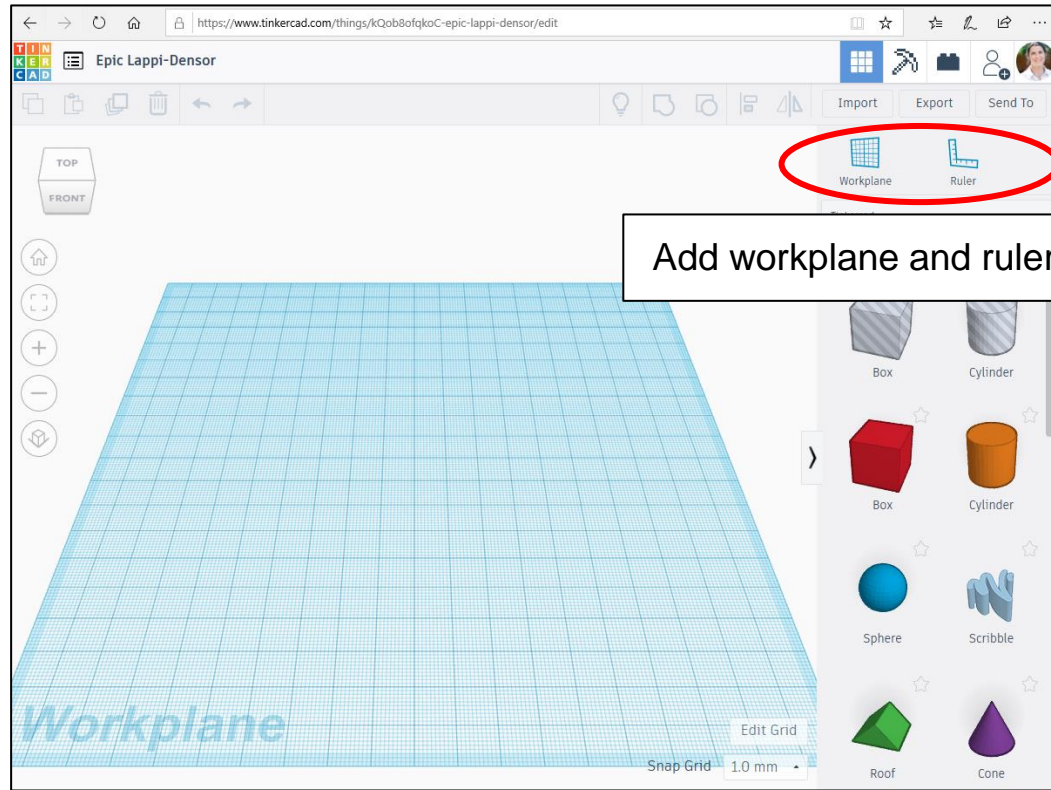
Tinkercad Workplane



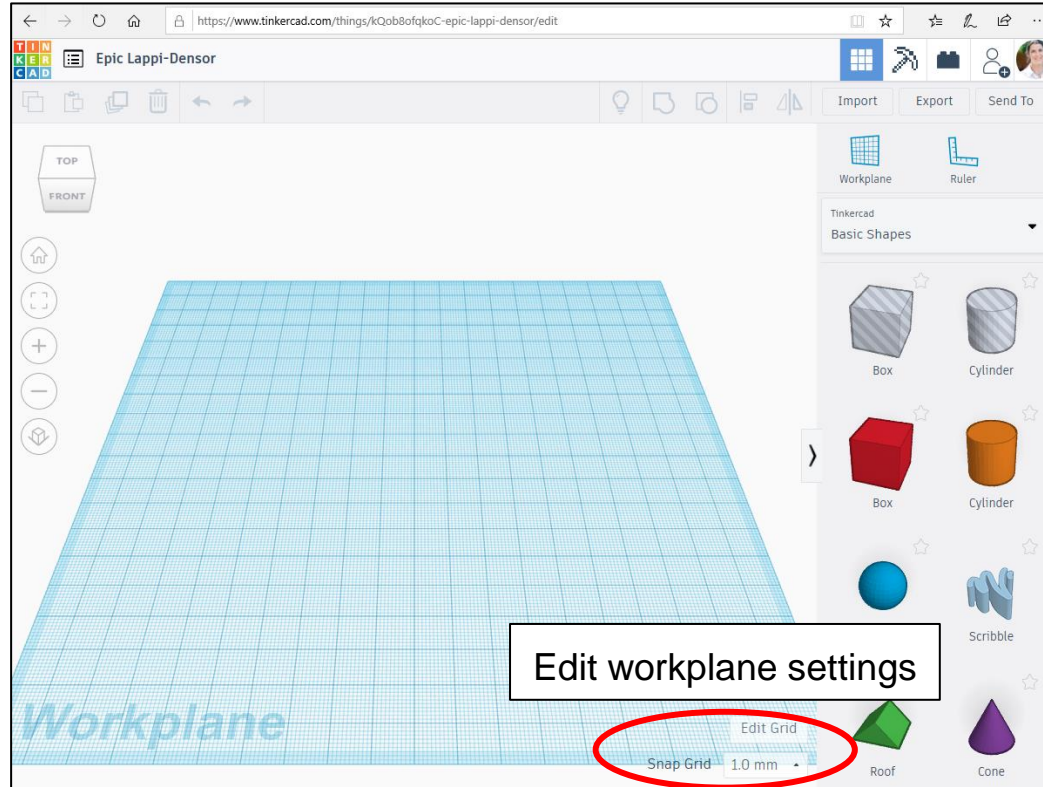
Tinkercad Workplane



Tinkercad Workplane



Tinkercad Workplane



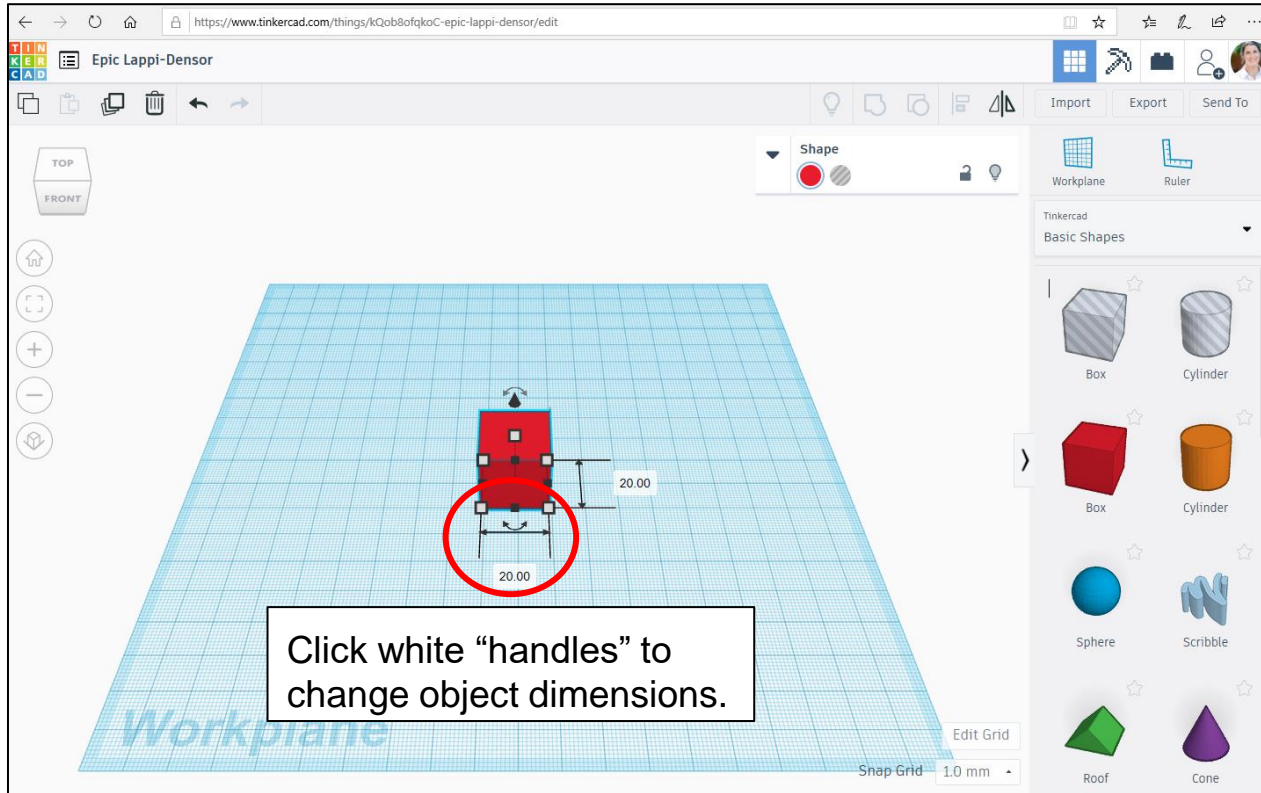
Tinkercad Shape Interface

The screenshot displays the Tinkercad web interface. The main workspace shows a blue grid labeled "Workplane" with a red cube centered on it. The sidebar on the right contains a "Shape" menu with options for "Workplane" and "Ruler". Below these are "Tinkercad Basic Shapes", which are circled in red. The shapes include a Box, Cylinder, Sphere, Scribble, Roof, and Cone. A text box in the center of the workspace lists "3D Design options:" followed by a bulleted list: Shapes, Text & numbers, Characters, and Connectors.

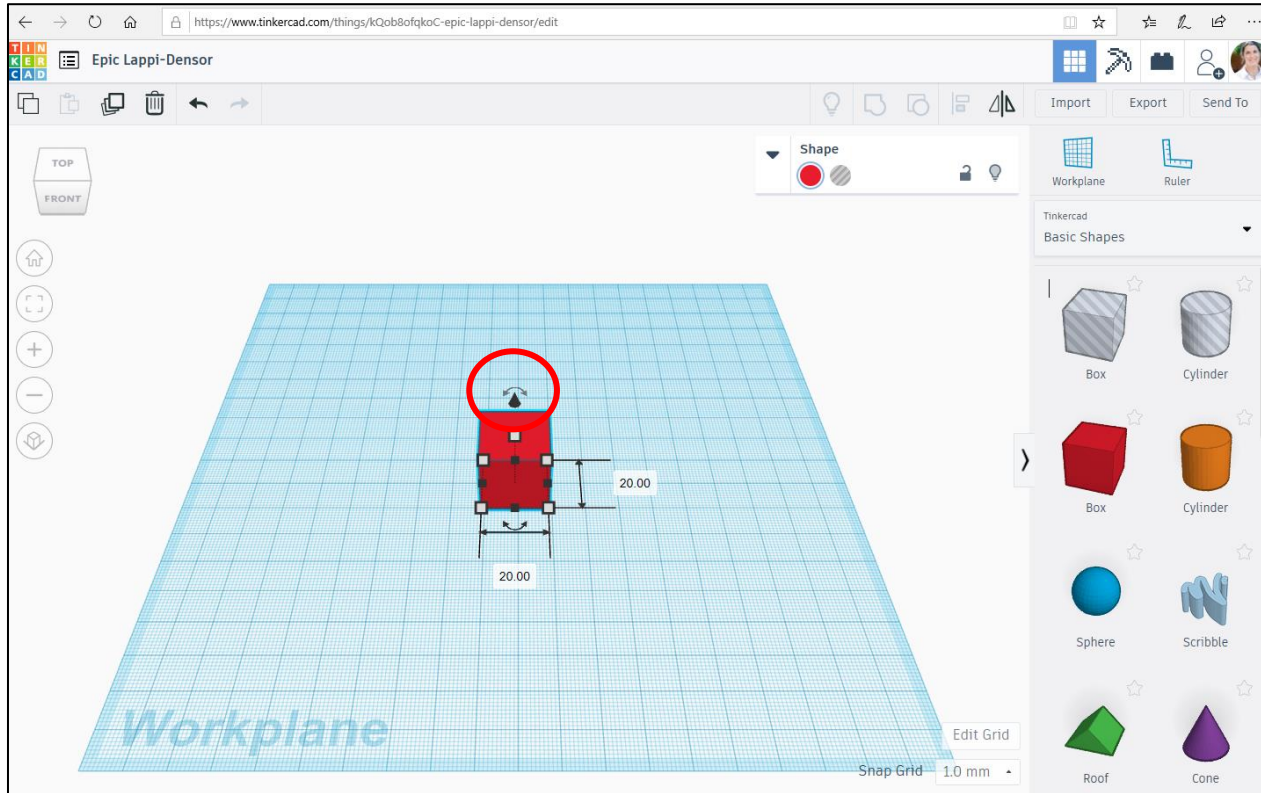
3D Design options:

- Shapes
- Text & numbers
- Characters
- Connectors

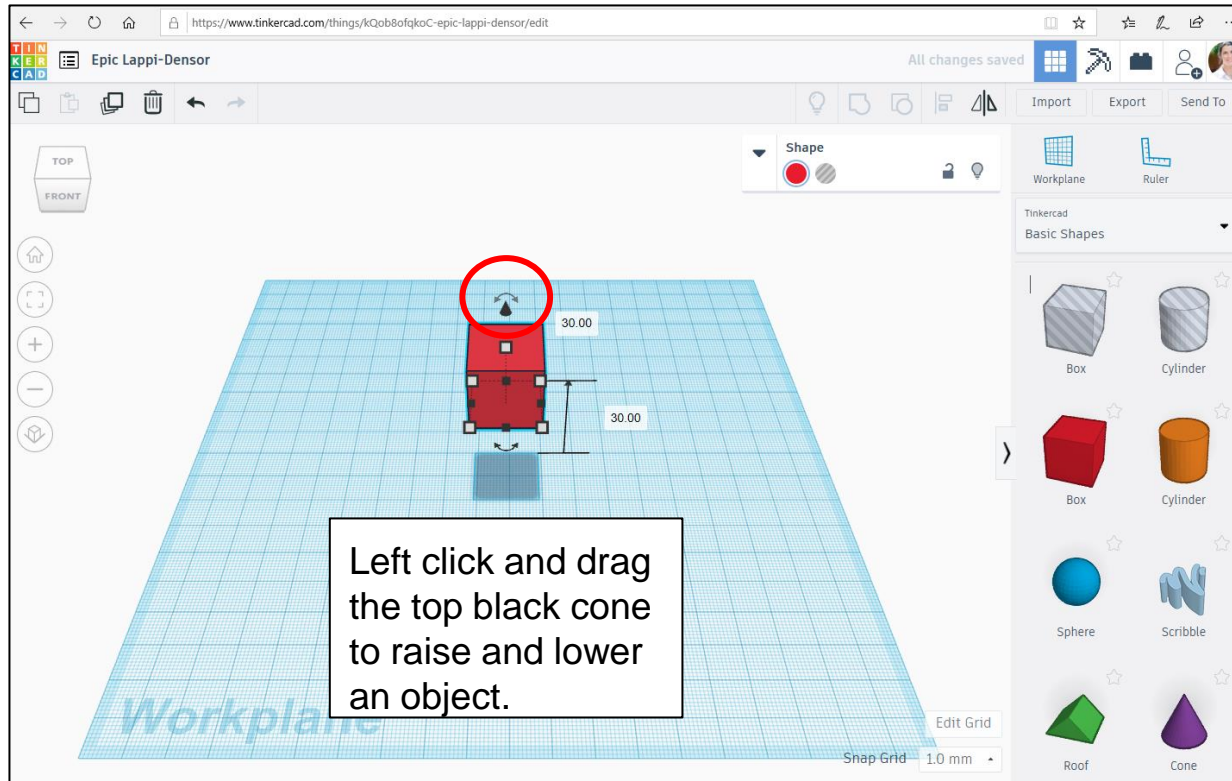
Tinkercad Shape Interface



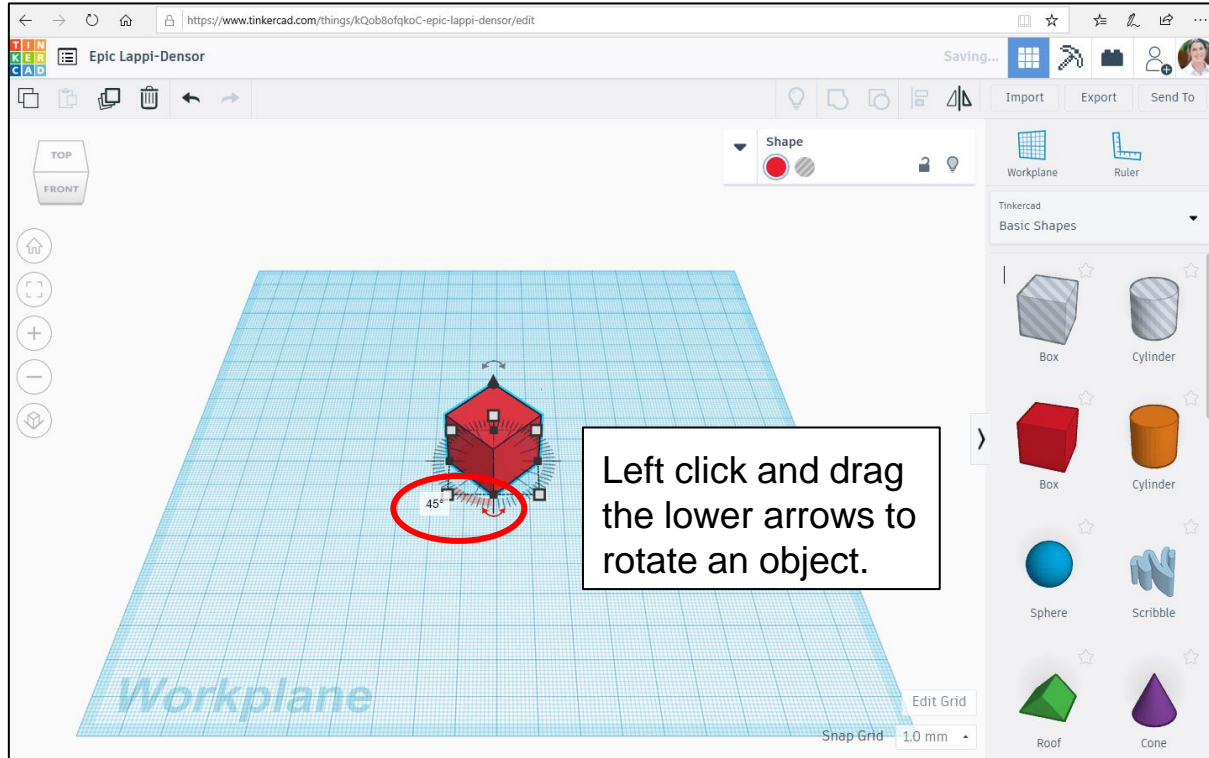
Tinkercad Shape Interface



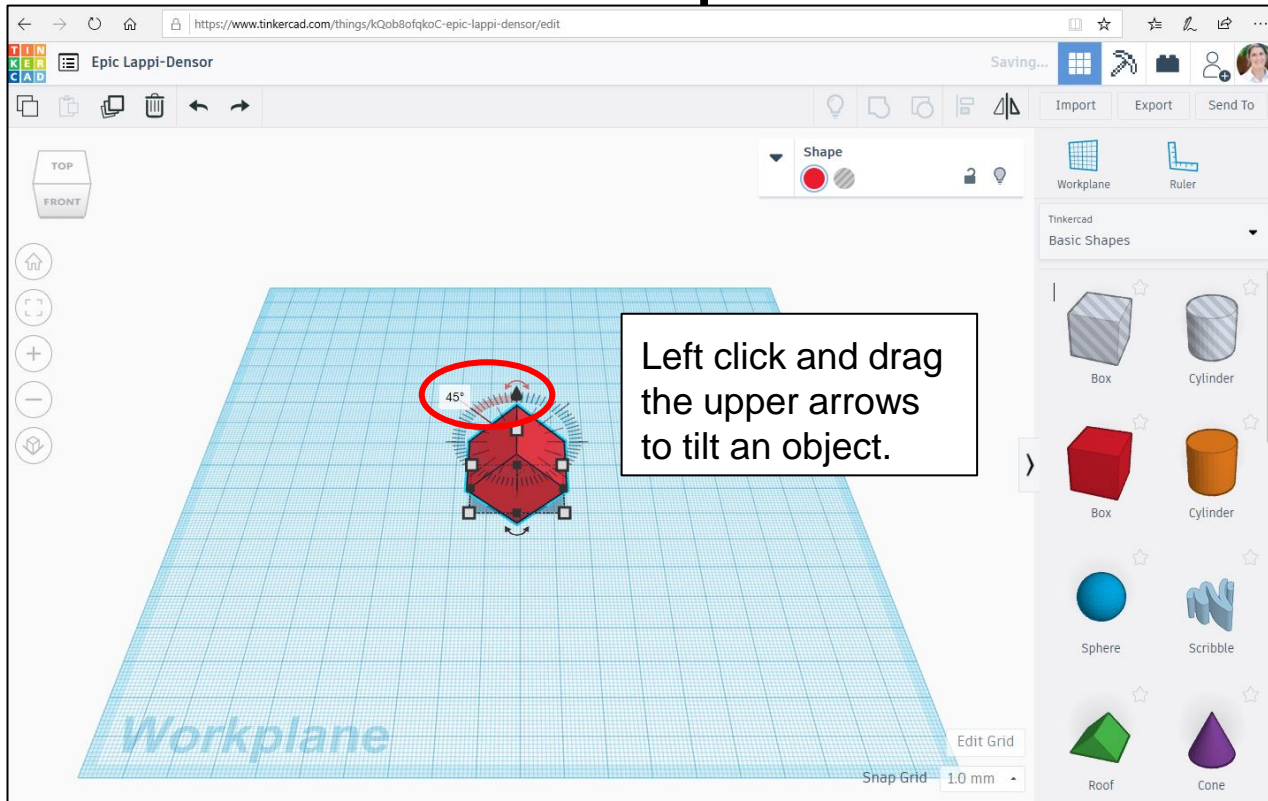
Tinkercad Shape Interface



Tinkercad Shape Interface



Tinkercad Shape Interface



It's YOUR turn to get creative with 3D design!

Instructions:

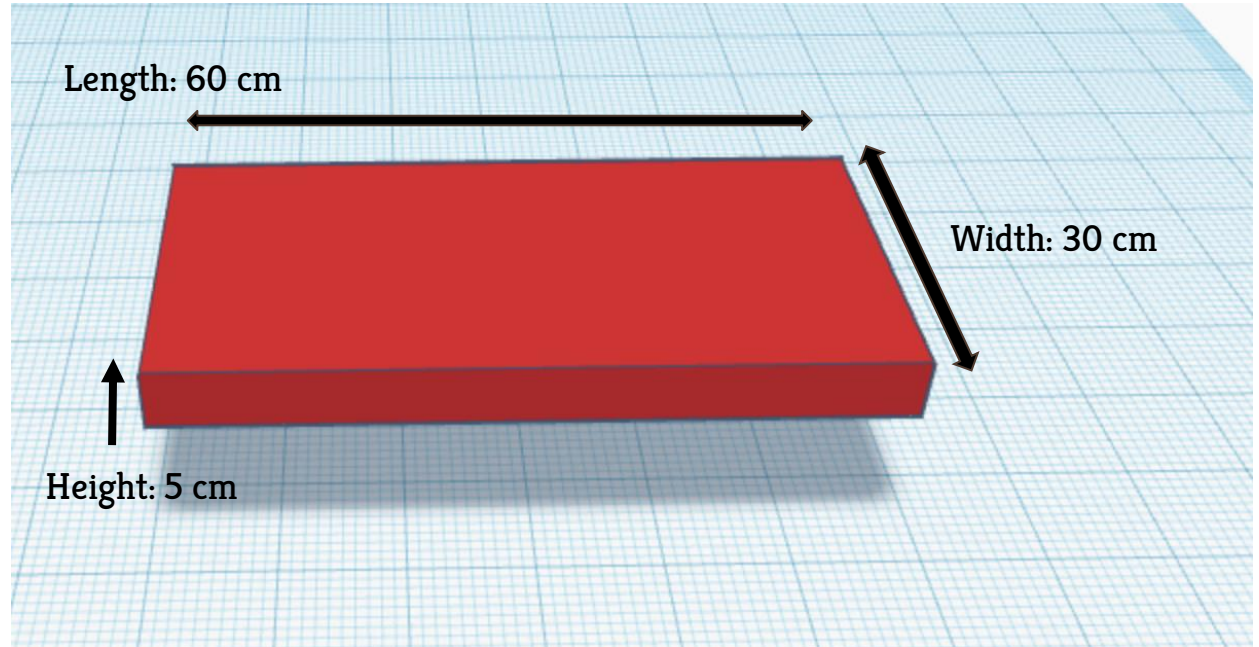
1. Go to the “**3D**” tab in Tinkercad
2. Click “**Create New Design**”
3. File name: “EV Concept Car”

Reminders:

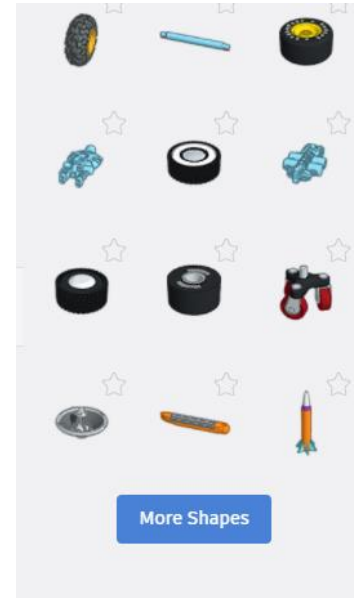
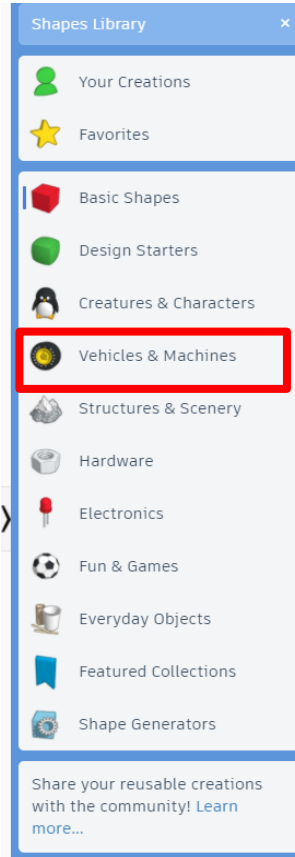
- Project is flat on the workspace
- Objects are touching
- Back arrow or “Control Z” to undo
- Click on the Tinkercad “waffle box”. icon to get back to your project page
- Don't get frustrated, have fun!

Session 2: Car Chassis Design

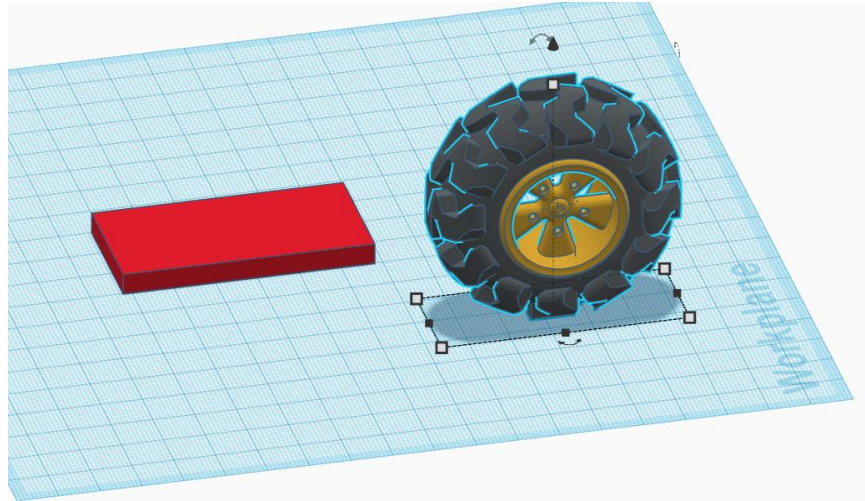
Drag a cube onto your workplane, and change the dimensions.



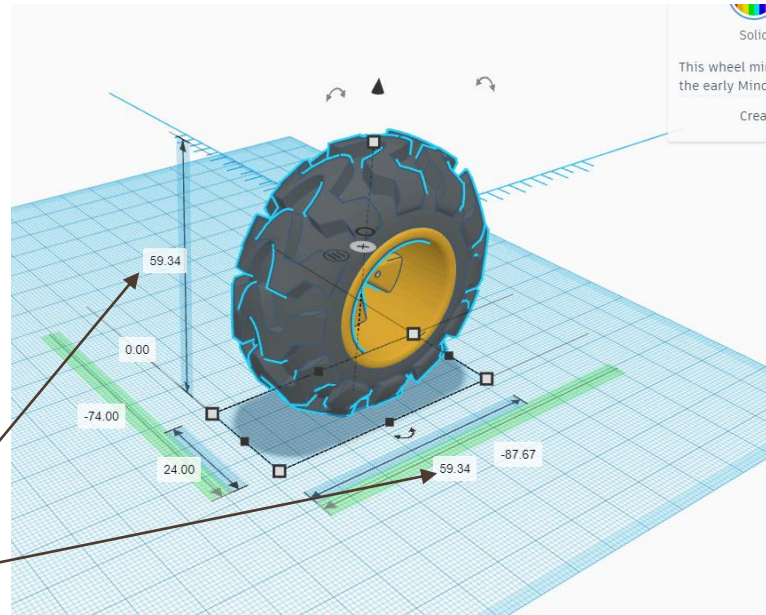
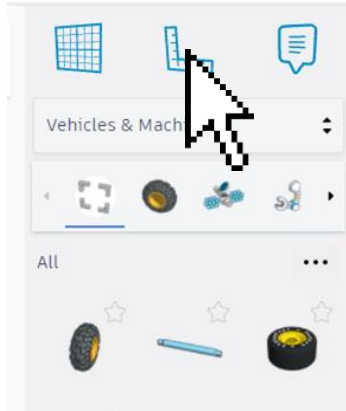
More shapes!



Add a wheel to your project

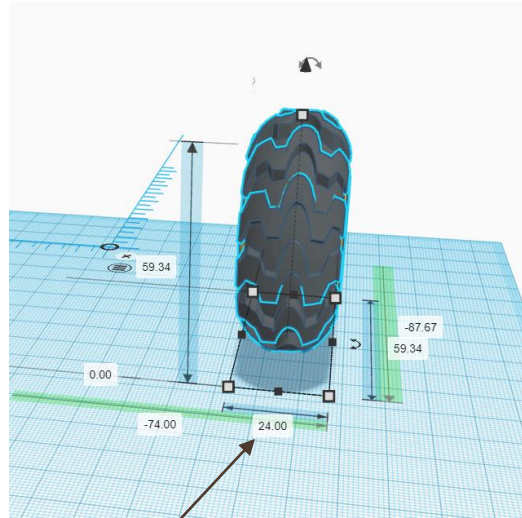


Scale the wheel



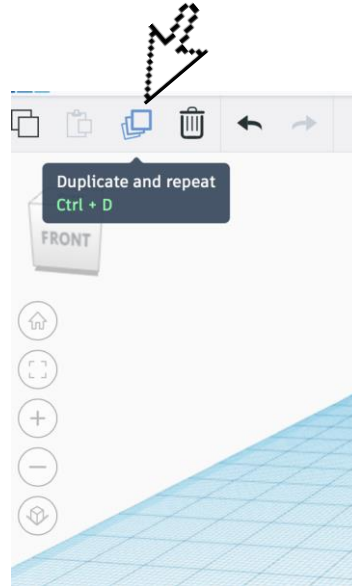
Change
to 20

Scale the wheel (cont.)



Change
to 12

Duplicate your first wheel

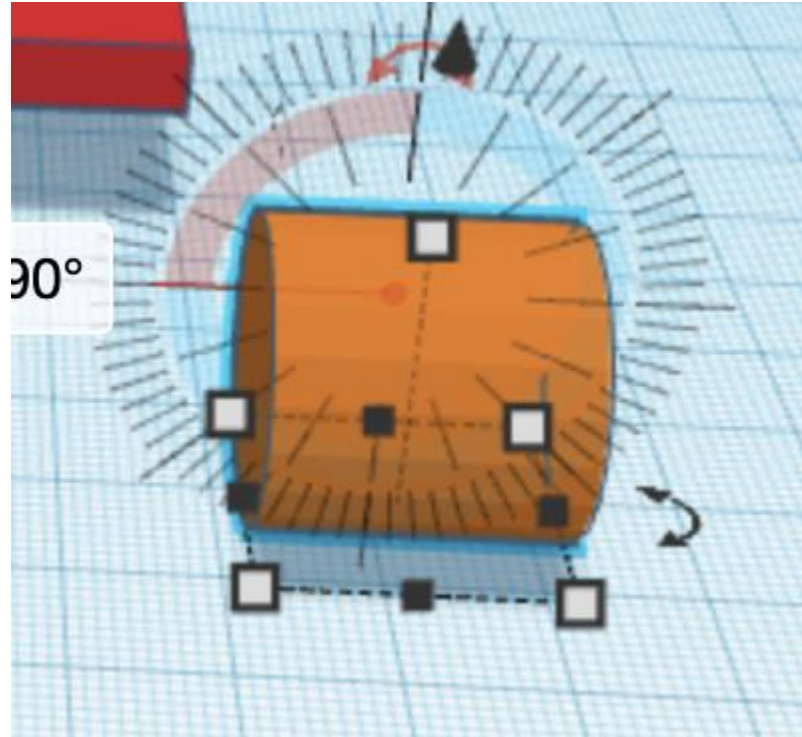


Pull it out from the first wheel



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

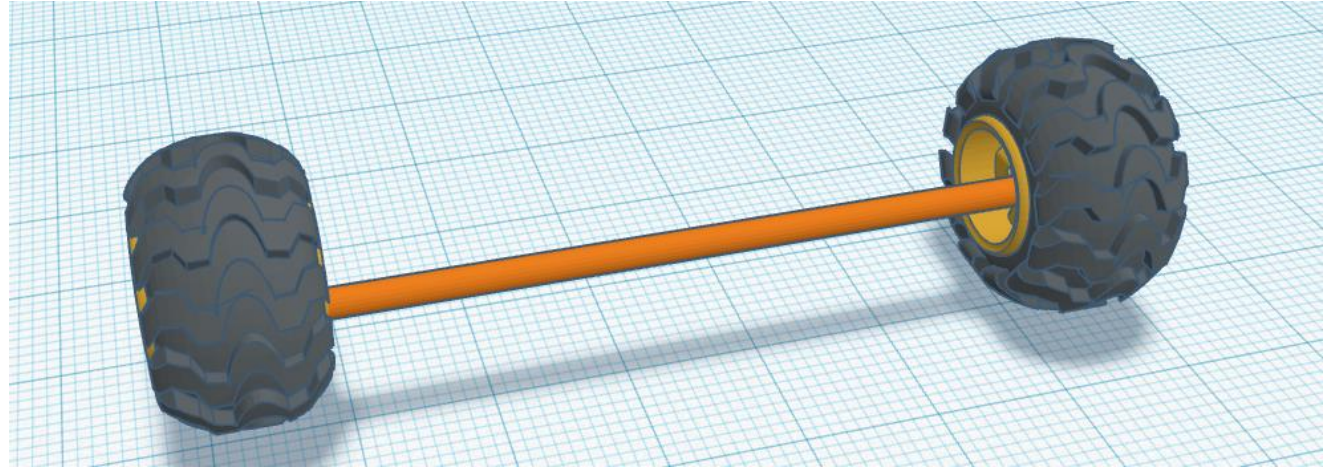
Make it thin



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

Centering objects

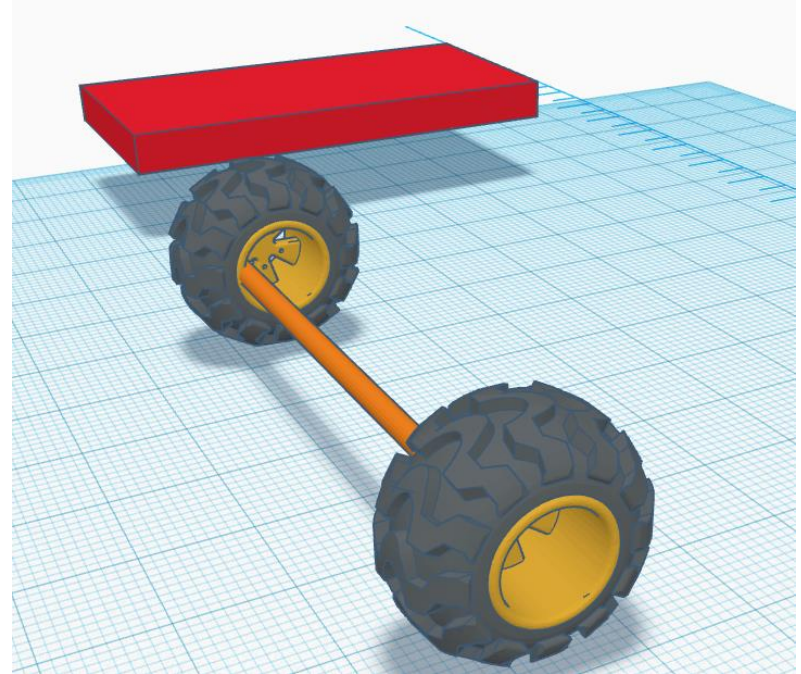
Pull the axle off the ground and try to put it in the center of the two wheels.



Centering (cont.)

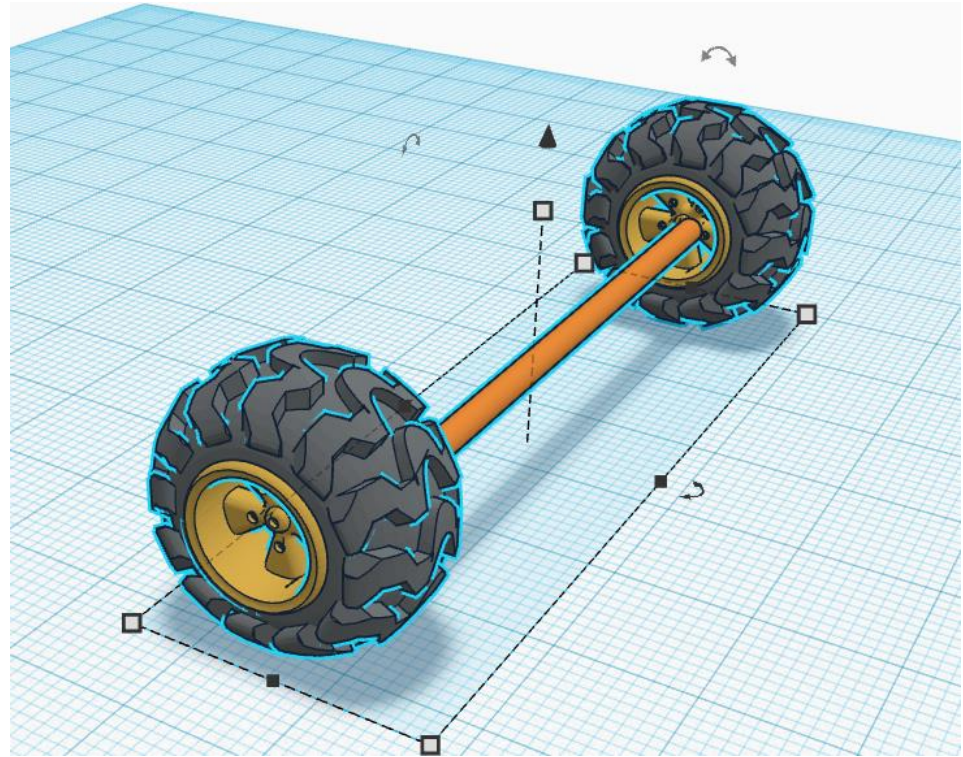
Your design does not have to be perfect yet.

Just make sure the chassis is between the axle and wheels.



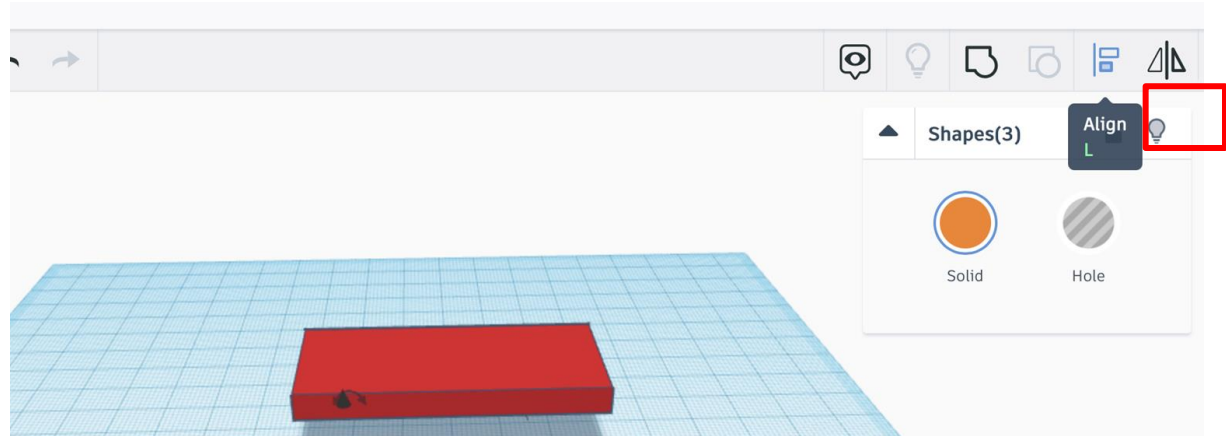
Selecting a group

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



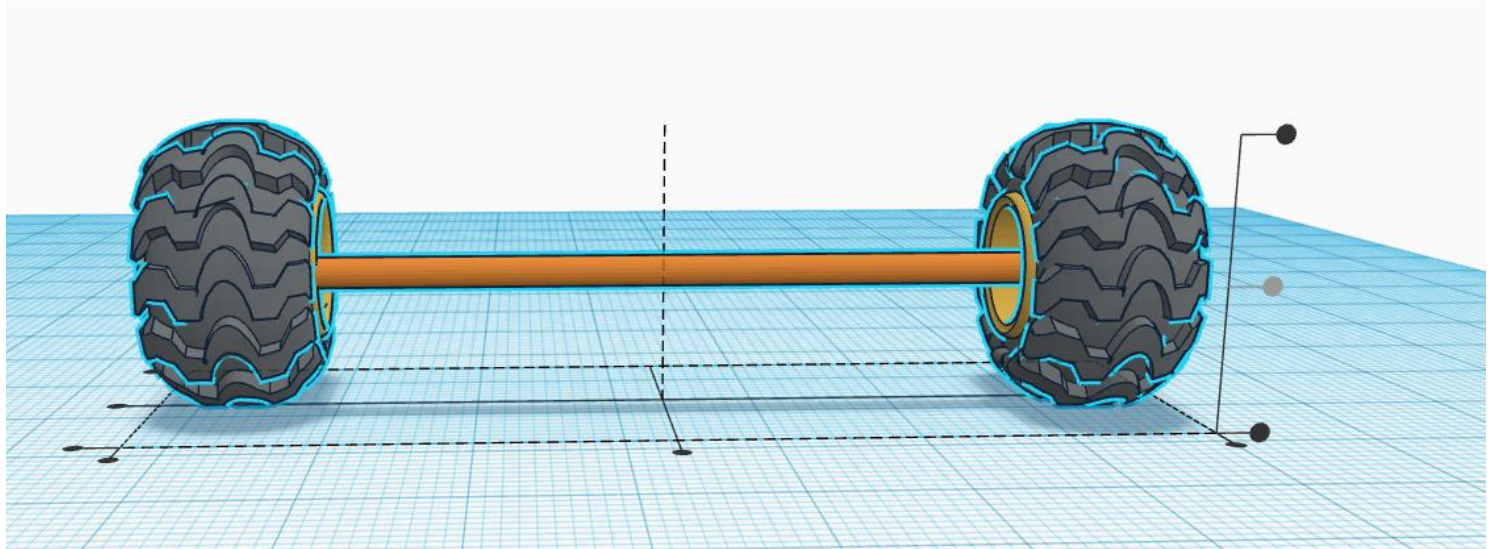
Align objects

Click on the align tool.



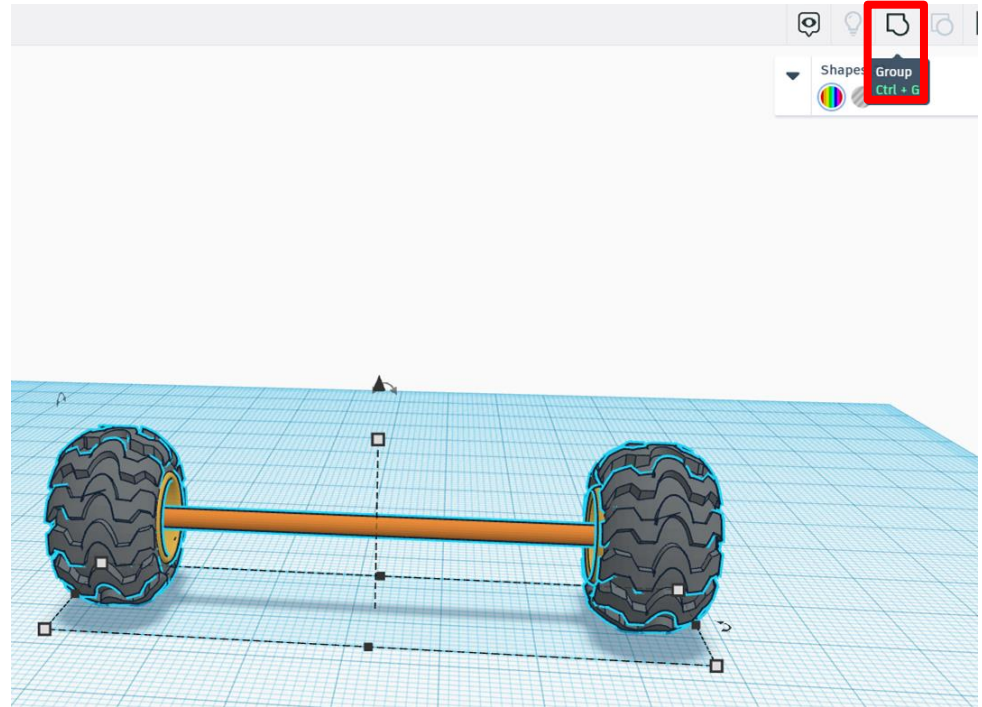
Align (cont.)

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.



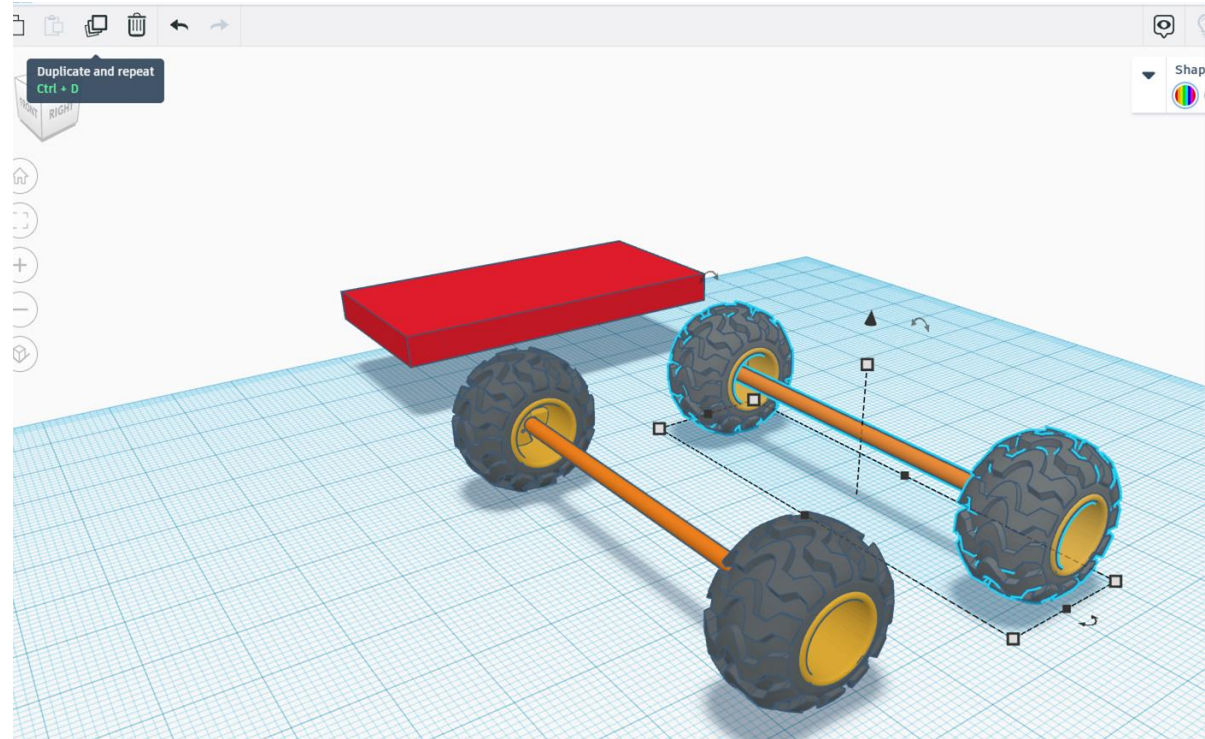
Grouping parts

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



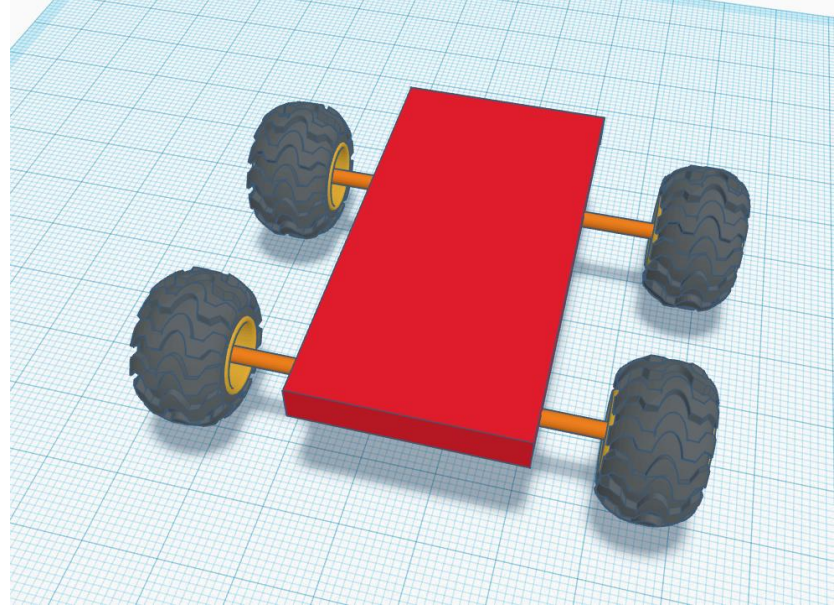
Create more wheels

Duplicate again!



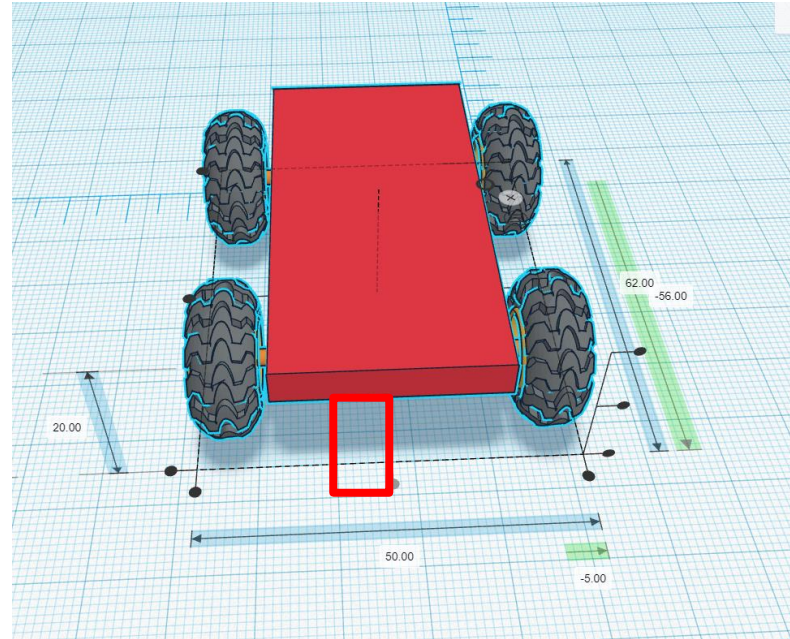
Changing sizes

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



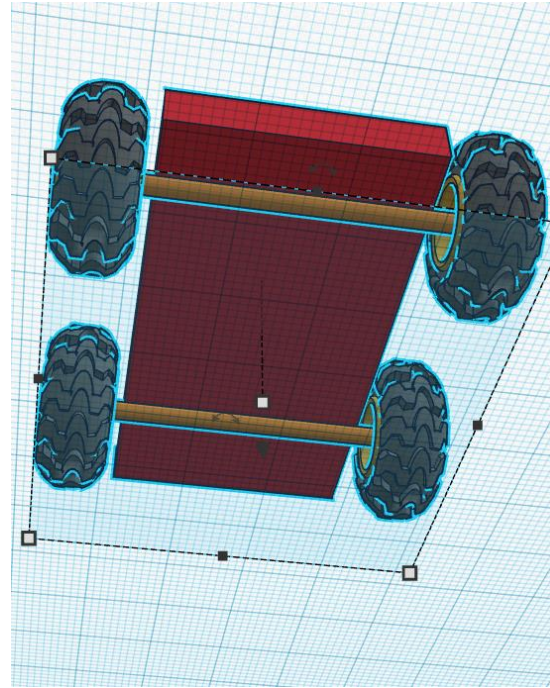
Chassis design

Use the “Align” tool to align the wheels, axles, and chassis.



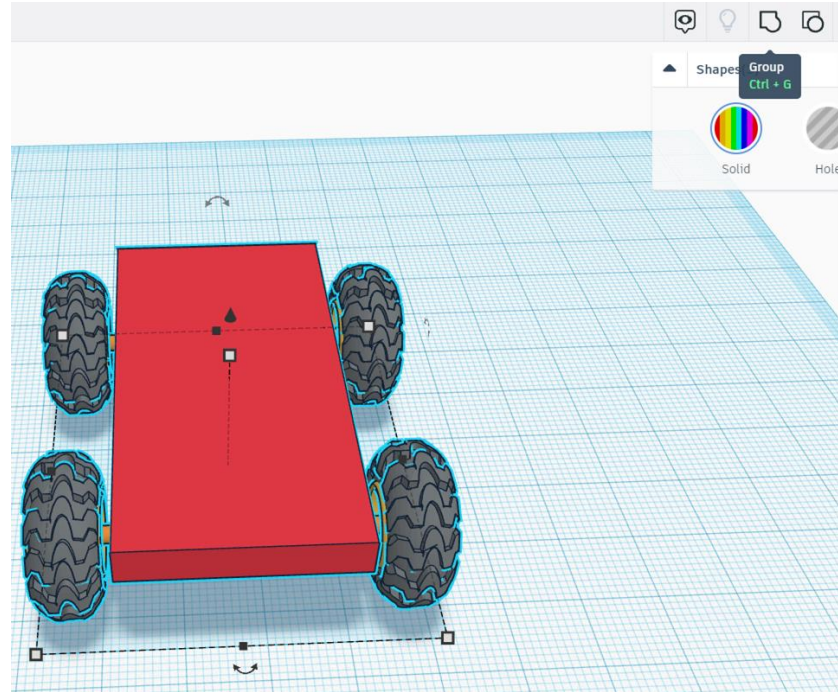
Keeping wheels on the road

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



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!