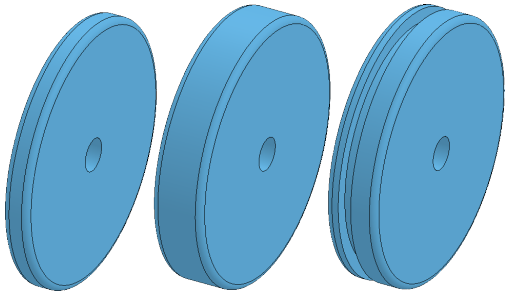
Chapter 3

Solar Car
Wheels



A. Wheel.

Step 1. Click File Menu > New, click **Part** and OK.

Step 2. Click **Right Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 1**.

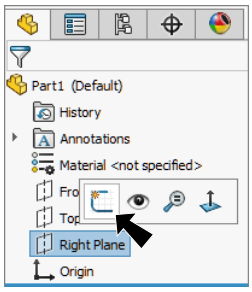


Fig. 1

Step 3. Click **Circle** on the Sketch toolbar.

Step 4. Sketch **two circles** starting at the Origin , **Fig. 2**.

Step 5. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 6. Dimension the circles **2** and **.25 dia**, **Fig. 3**.

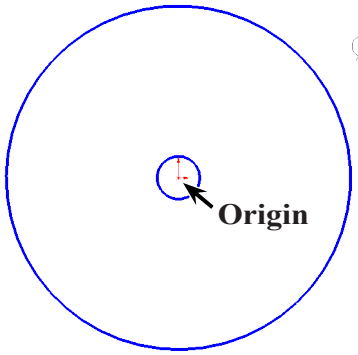


Fig. 2

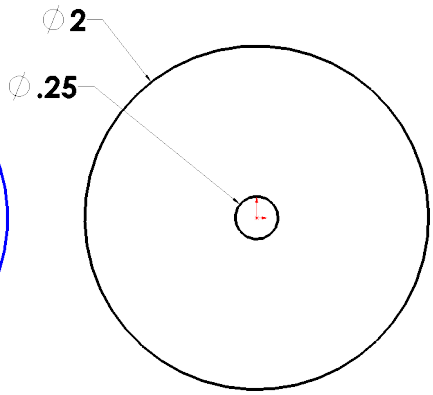


Fig. 3

Step 7. Click **Features** on the Command Manager toolbar.

Step 8. Click **Extruded Boss/Base** on the Features toolbar.

Step 9. In the Boss-Extrude Property Manager set:
under Direction 1, **Fig. 4**
End Condition **Mid Plane**
Depth **.2**
click OK .

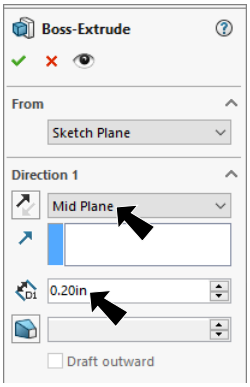


Fig. 4

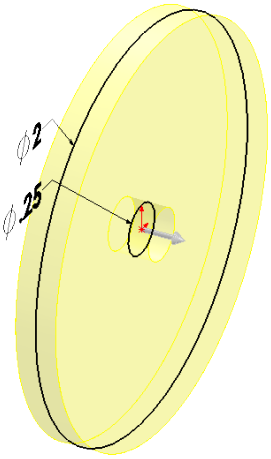


Fig. 5

Step 10. Click Zoom to Fit (F) on the View toolbar.

B. Save as "FRONT WHEEL".

Step 1. Click File Menu > Save As.

Step 2. Key-in **FRONT WHEEL** for the filename and press ENTER.

C. Fillet.

Step 1. Click **Fillet** 

on the Features toolbar.

Step 2. In the Fillet Property Manager set:
select **FilletXpert**, **Fig. 6**

Radius .05
click **cylindrical face of Wheel**, **Fig. 7**
click OK .

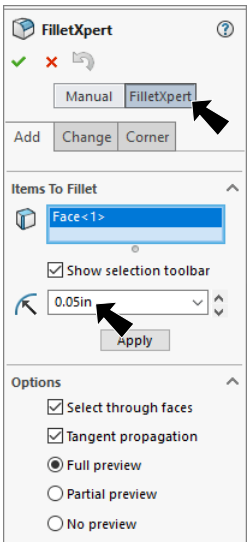


Fig. 6

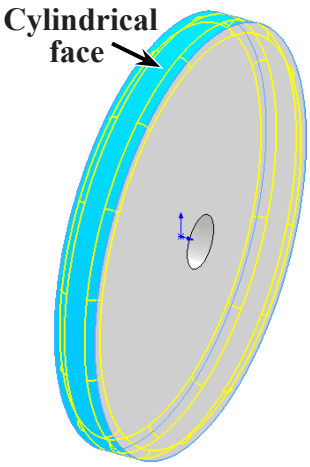
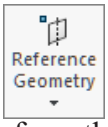


Fig. 7

D. Mate Reference.

Step 1. Click **inside cylindrical face of axle hole** to select it, **Fig. 8**.

Step 2. Click **Reference Geometry** 

on the Features toolbar and **Mate Reference** from the menu.

Step 3. In the Mate Reference Manager, **Fig. 9**
click OK .

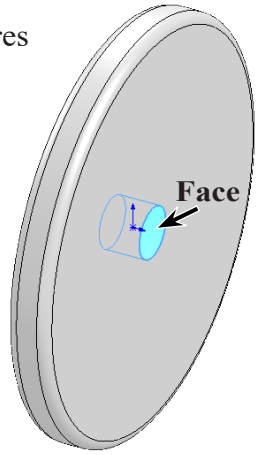


Fig. 8

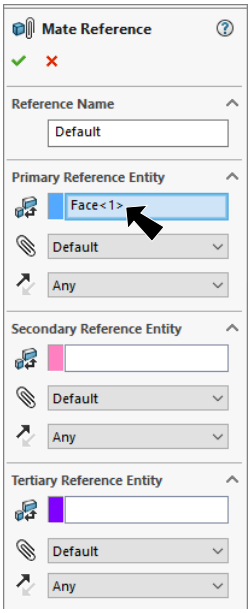


Fig. 9

E. Material PS HI (Polystyrene).

Step 1. **Right click Material**  in the Feature Manager and click **Edit Material**, **Fig. 10**.

Step 2. Expand **Plastics** (click ▸) in the material tree and select **PS HI**. Click **Apply** and **Close**.

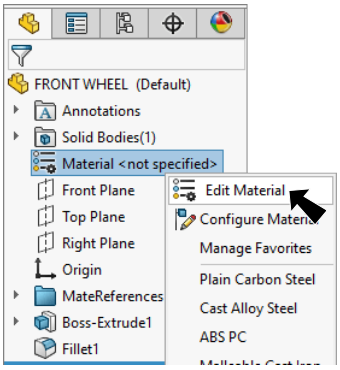


Fig. 10

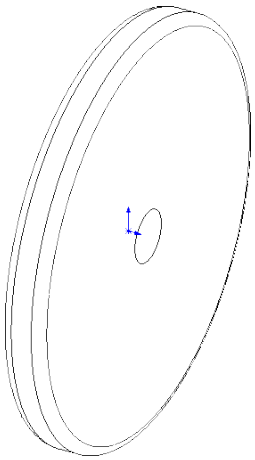


Fig. 11

F. Appearance Color.

Step 1. Click the Chassis, click **Appearance Callout** on the context toolbar and click **FRONT WHEEL**, **Fig. 12**.

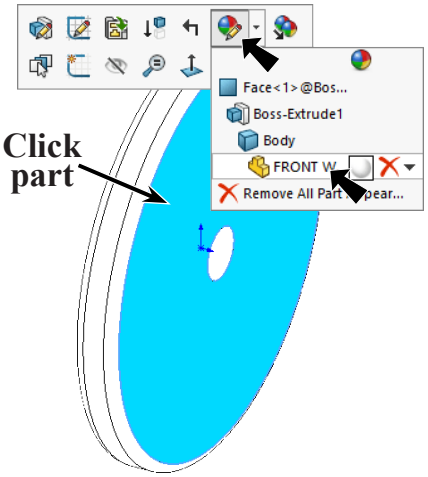


Fig. 12

Step 2. In the Appearances Task pane , expand **Plastic**, click **Soft Touch** and in the lower pane select **blue soft touch plastic**, **Fig. 13**.

Step 3. Back over in the Appearances Property Manager:
under Color, **Fig. 14**
set **RGB values**
R 111
G 202
B 255
click OK .

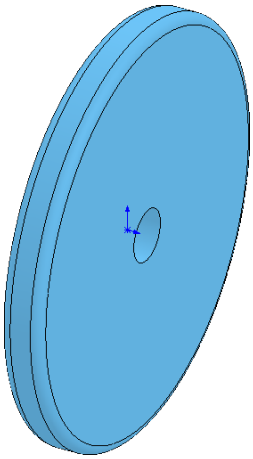


Fig. 15

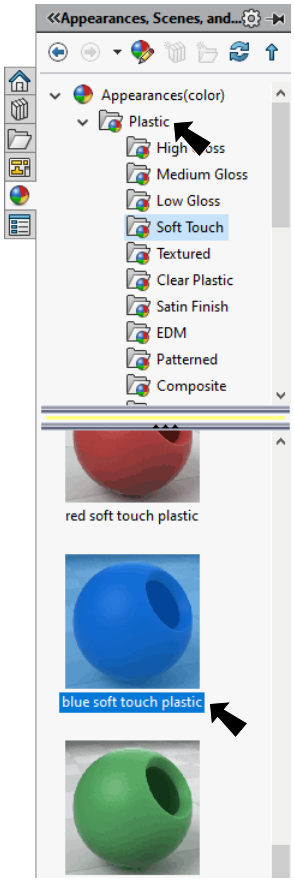


Fig. 13

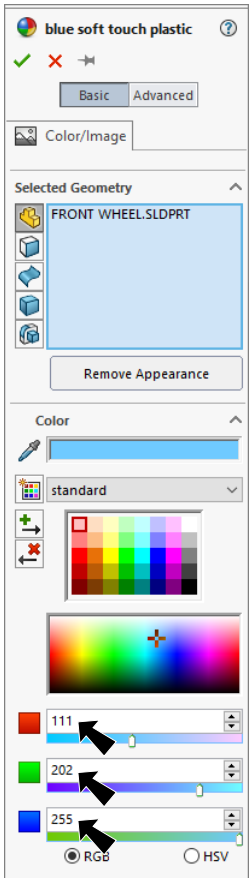


Fig. 14

G. Save as "REAR WHEEL".

Step 1. Save Front Wheel. Use **Ctrl-S**.

Step 2. Click File Menu > Save As.

Step 3. Key-in **REAR WHEEL** for the filename and press ENTER.

H. Change Wheel Thickness.

Step 1. Click **Boss-Extrude1** in the Feature Manager and click **Edit Feature** on the context toolbar, **Fig. 16**.

Step 2. In the Boss-Extrude Property Manager set:
under Direction 1, **Fig. 17**

Depth **.4**

click OK .

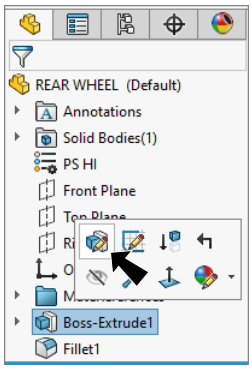


Fig. 16

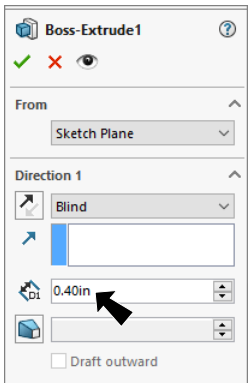


Fig. 17

I. Save as "REAR WHEEL GROOVE".

Step 1. Save Rear Wheel. Use **Ctrl-S**.

Step 2. Click File Menu > Save As.

Step 3. Key-in **REAR WHEEL GROOVE** for the filename and press ENTER.

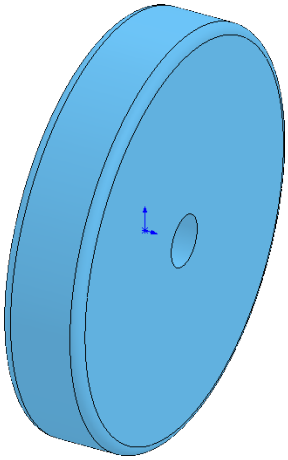


Fig. 18

J. Sketch Groove.

Step 1. Click **Front Plane** in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 19**.

Step 2. Click **Normal To** on the Views toolbar. (**Ctrl-8**)

Step 3. Click **Corner Rectangle** on the Sketch toolbar.

Step 4. Sketch a rectangle along the top edge of the wheel close to the fillet. Move cursor to the top edge of wheel, when the edge highlights, click to start the rectangle. Keep rectangle away from fillet, **Fig. 20**.

Step 5. **Right click graphics area and click Select** from menu to unselect Rectangle tool.

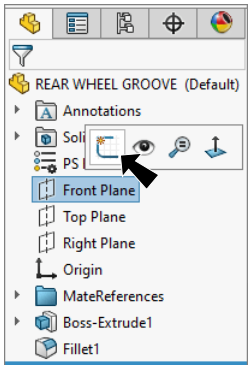


Fig. 19

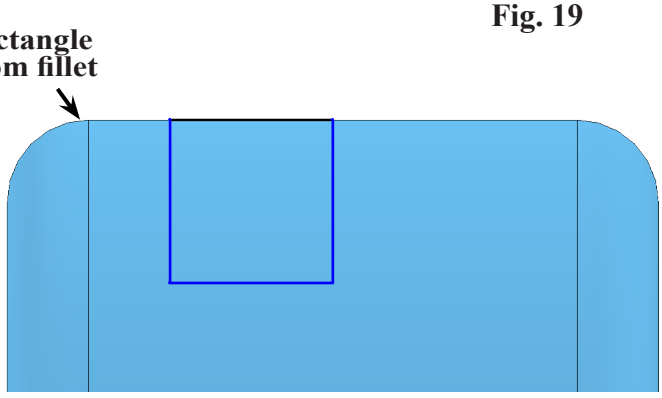


Fig. 20

Step 6. **Ctrl click** the **top edge of wheel** and the **top line of rectangle** to select both. Release Ctrl key and click **Make Collinear** on the context toolbar, **Fig. 21**.

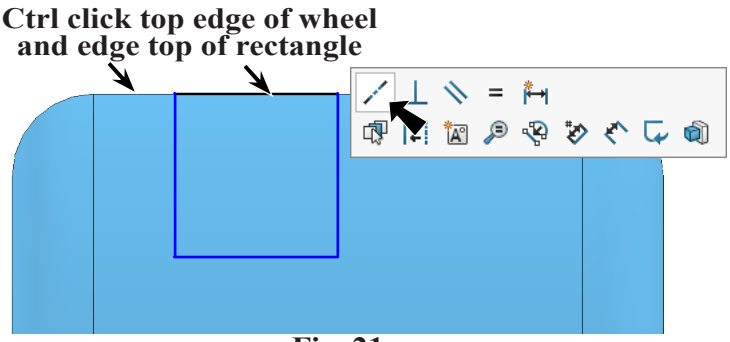


Fig. 21

Step 7. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 8. Dimension rectangle, **Fig. 22**.

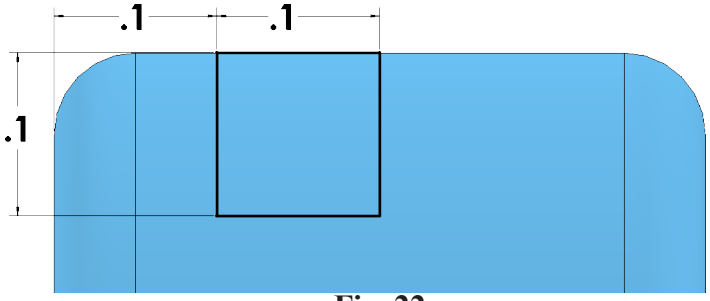


Fig. 22

Step 9. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 10. Starting from the Origin, sketch a horizontal centerline through Wheel, **Fig. 23**.

Step 11. Click **Features** on the Command Manager toolbar.

Step 12. Click **Revolved Cut** on the Features toolbar.

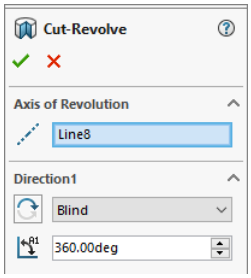


Fig. 24

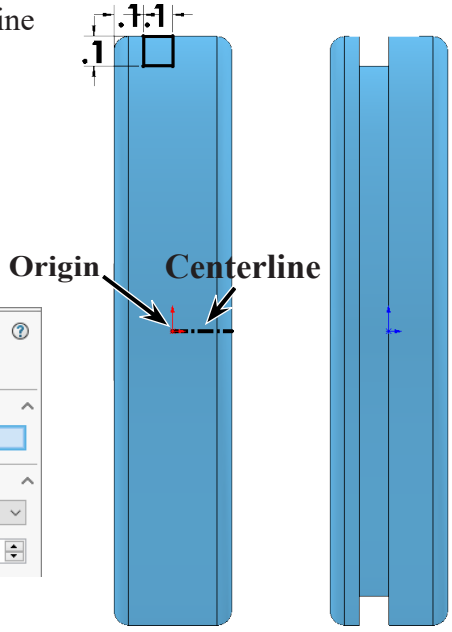


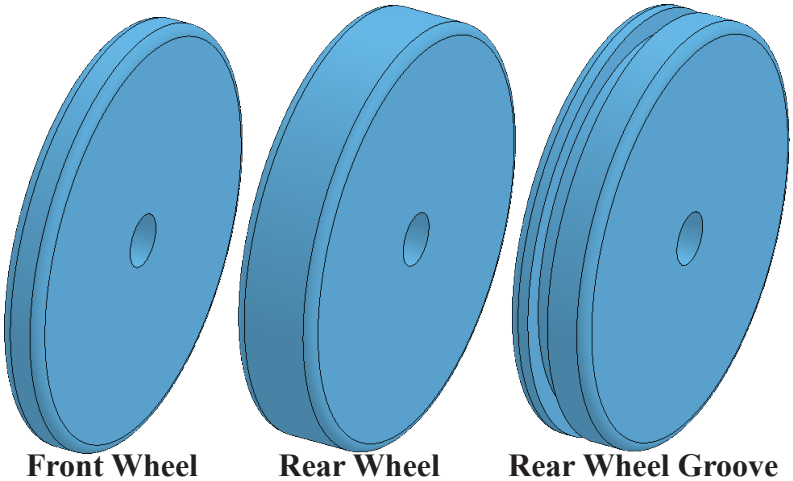
Fig. 23

Fig. 25

Step 13. Click OK in the Cut-Revolve Property Manager.

Step 14. Save. Use **Ctrl-S**.

Step 15. You should have 3 Wheel files saved:


Front Wheel **Rear Wheel** **Rear Wheel Groove**