Van Assembly

Originally Created by Stephen Yaffe

Modified by Bob Claymier

District Technology Center
Delaware City Schools
621 Pennsylvania Avenue
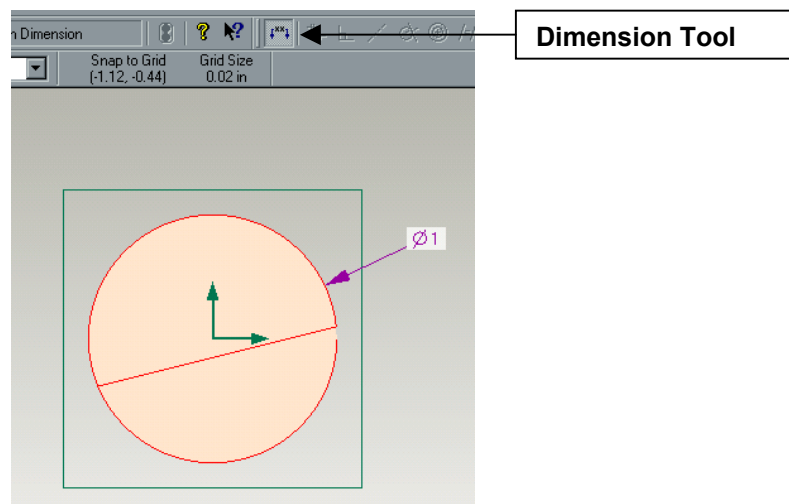Delaware, Ohio 43015

Creating a New Design

1. Go to **File** - **New - Design**

2. Change the units to inches by selecting **Tools - Options - Units Tab** and select **Inches** in both display boxes.
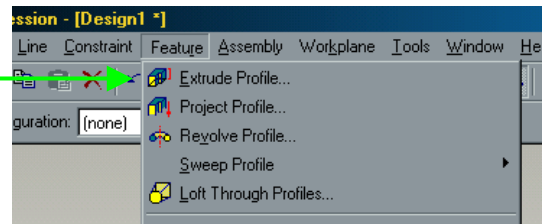
Creating the Axle

1. **Right - click** on the **Lateral Workplane** in the **Browser window**.

2. Select **New Sketch...**

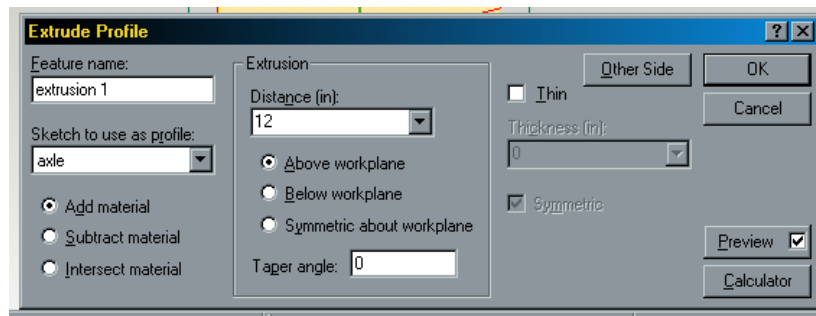3. Type in **axle** for the name of the sketch. Then click **OK.**
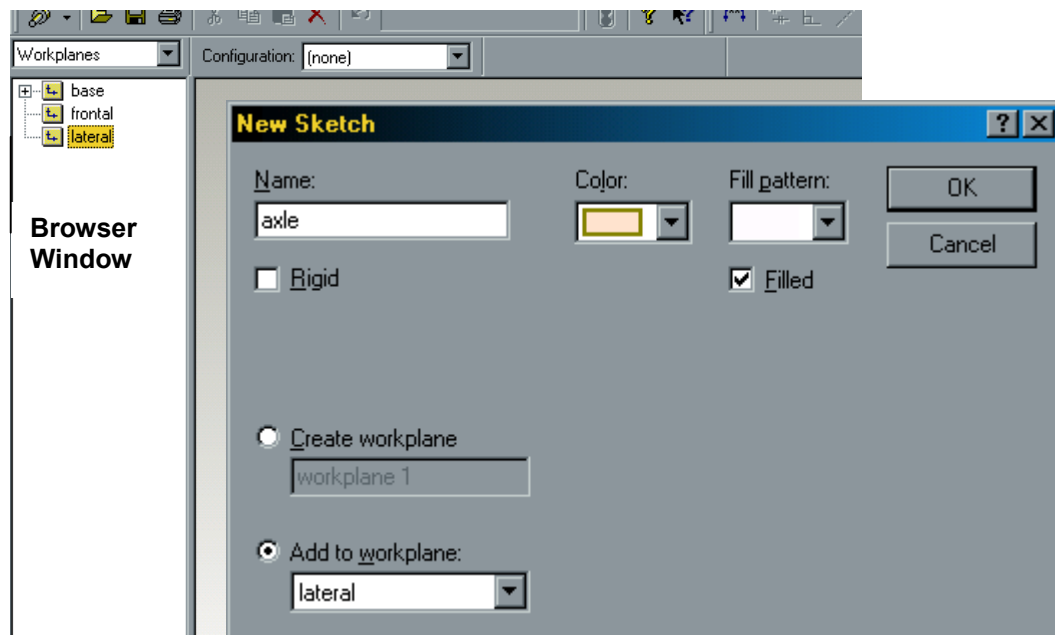
4. Use **Shift - W** to reposition the workplane.

5. Select the **Circle Tool** and draw a circle using the points of origin (where the two arrows meet) as the center of the circle.

6. Use the **Dimension Tool** to give the circle a diameter of **1 inch**.

7. Go to **Features - Extrude Profile**

ssion - [Design1 *]

Line Constraint Feature Assembly Workplane Tools Window He

guration: [none]

Extrude Profile...

Project Profile...

Revolve Profile...

Sweep Profile   ▶

Loft Through Profiles...

7. In the dialog box, **Add Material, 12 inches, above workplane.** Click **OK.**

Extrude Profile   [?][X]

Feature name: ┌ Extrusion ──────   Other Side   OK

extrusion 1   Distance (in):   Cancel

                               12   ▼

Sketch to use as profile: ● Above workplane   ☐ Thin

axle   ▼   ○ Below workplane   Thickness (in):

                                ○ Symmetric about workplane   0   ▼

    ● Add material   ☑ Symmetric

    ○ Subtract material   Taper angle: 0   Preview ☑

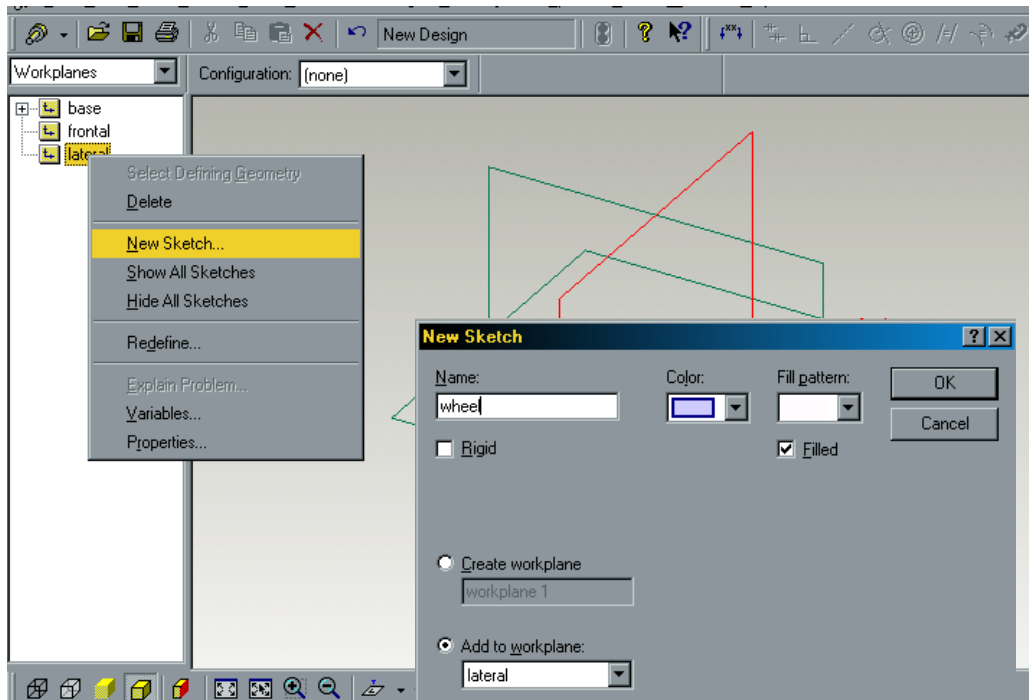   ○ Intersect material   Calculator

8. Type **Shift - T** to put the design in a trimetric view. Then type **Shift - A** to see all the axle.

9. Go to **File - Save** and save your design as **Axle.**
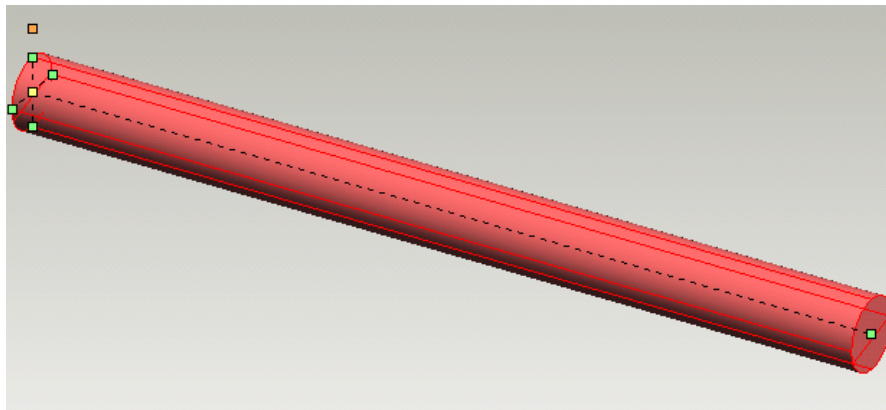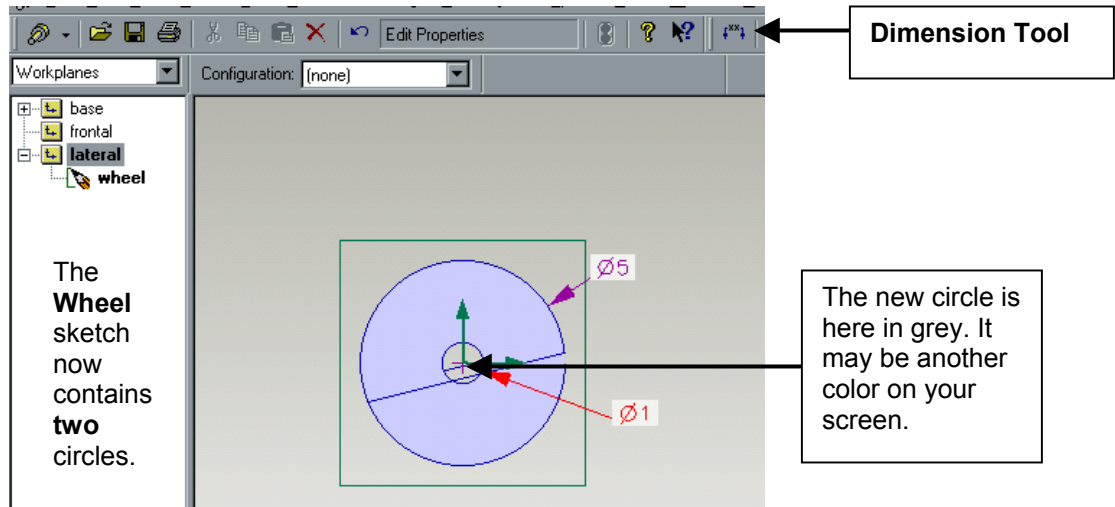
Creating the Wheel

1. Go to **File - New - Design**

2. **Right - click** on the **lateral workplane** in the **browser window.**

3. Select **New Sketch...** In the dialog box, type in **Wheel** for the name.

4. Type **Shift - W** to turn the workplane.

5. Using the **Circle Tool**, draw a circle with a diameter of **5 inches**, having the center of the circle on the point of origin where the two arrows meet.
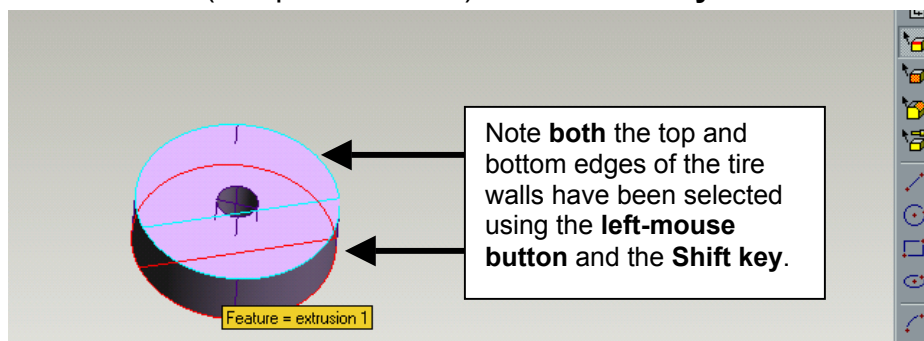

Start the center of the circle at the point of origin, where the arrows come together.
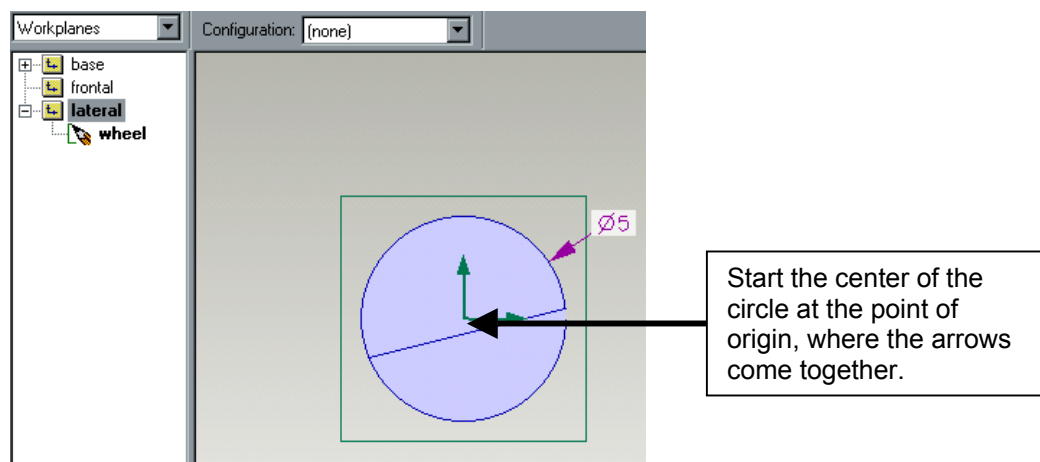
6. Now draw another circle using the same center point. Make this circle with a diameter of **1 inch.** This circle will be right on top of the first circle and is part of the same sketch, **Wheel**.
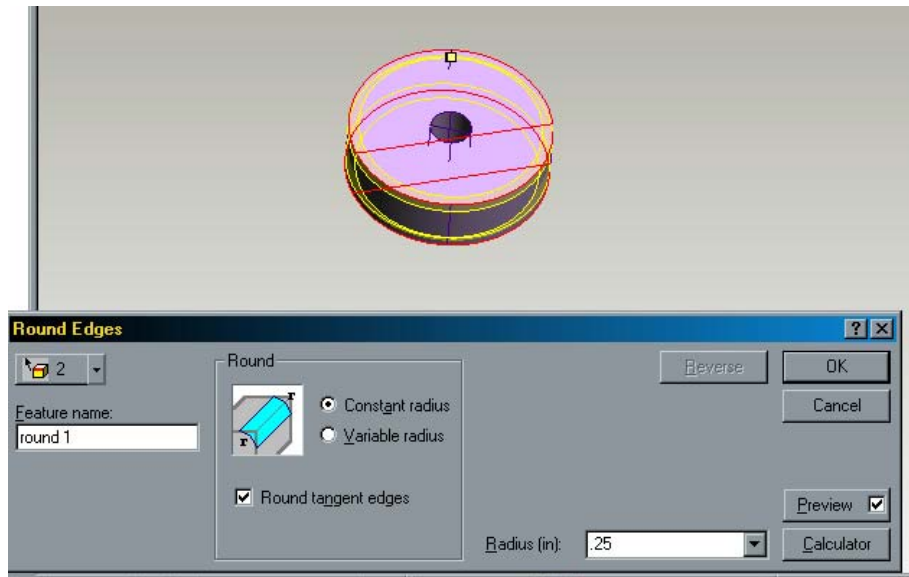

Dimension Tool

The **Wheel** sketch now contains **two** circles.

The new circle is here in grey. It may be another color on your screen.

7. Go to **Features - Extrude Profile**. The dialog box that pops up should say **Add material, 1.5 inches, above workplace.**
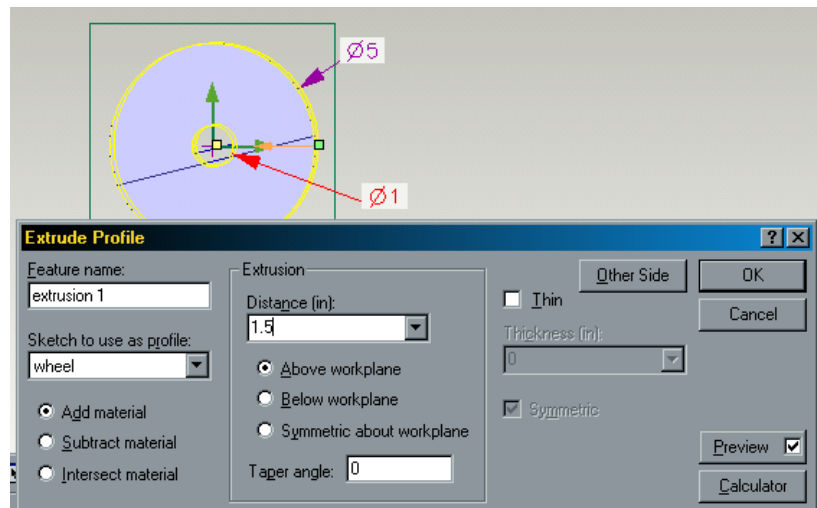
8. Select the **Edges Tool.**

9. Click on the edge of the tire wall. Then hold **Shift** and click the other edge of the tire wall (see picture below). Use **Arrow keys** to turn the wheel.
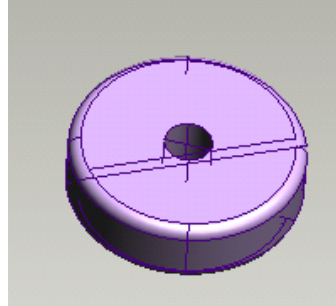

Note **both** the top and bottom edges of the tire walls have been selected using the **left-mouse button** and the **Shift key**.

10. Select **Features - Round Edges**. Type a radius of **.25 inch** in the dialog box.
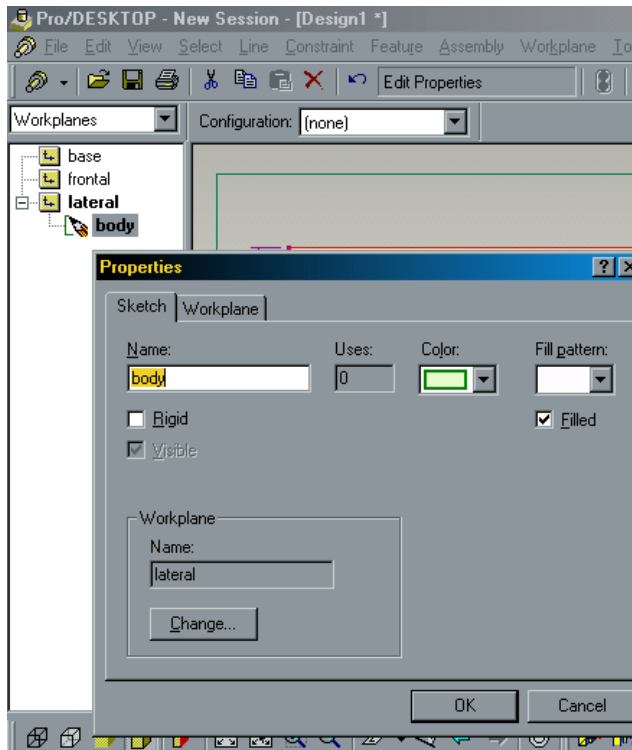

11. Click **OK.**

12. Go to **File - Save** and save your design as **wheel.**
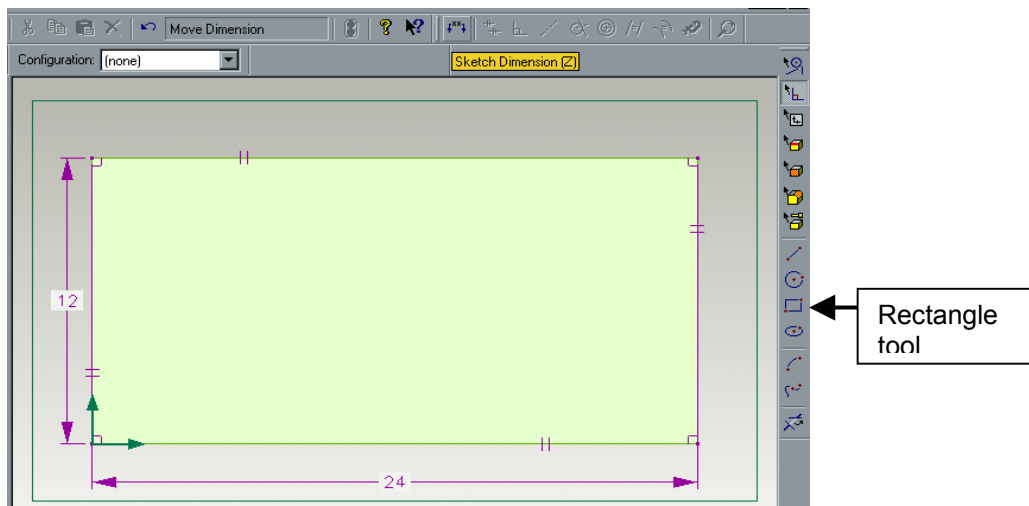
Creating the Body

1. Go to **File - New - Design**

2. **Right - click** on the **lateral workplane** in the **browser** window.

3. Select **New Sketch...** and call the new sketch **body** in the pop up window. Click **OK.**


4. Use the **rectangle tool** to sketch a rectangle.

5. Use the **sketch dimension tool** to make the rectangle **24 inches by 12 inches.**

6. Select the **circle tool** and create a circle **1 inch** in diameter.

7. Use the **sketch dimension tool** to place the circle **3 inches** from the left edge of the rectangle and **1 inch** from the bottom of the rectangle.
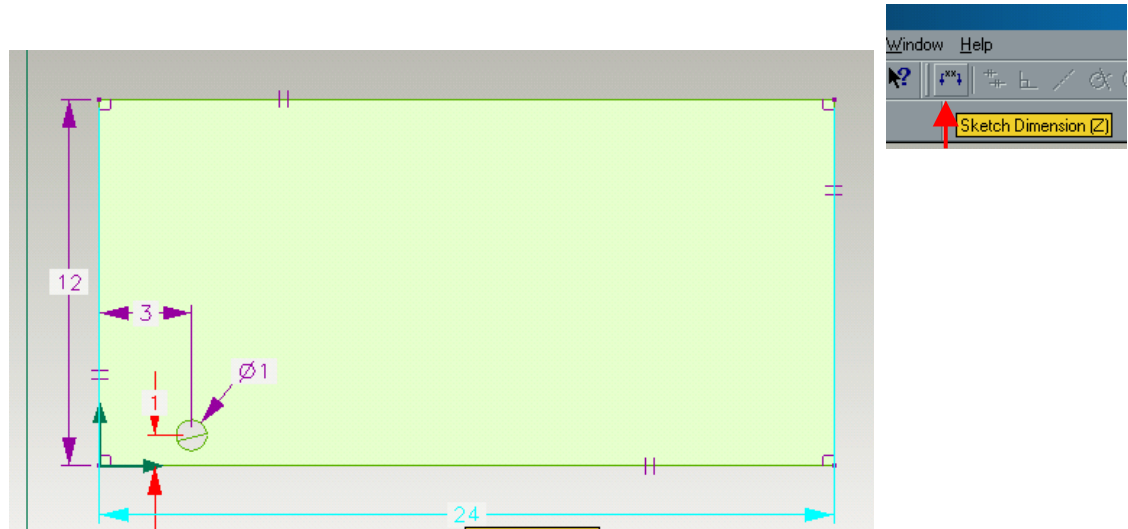

8. Use the **select lines tool** to click on the circle. The circle will now be red.

9. Go to **edit - copy** and **edit - paste** to copy the circle. The copied circle is directly on top of the original circle

10. Hold the **Shift key** and drag the copied circle from the top of the original circle to the other side of the van.

11. The new circle is **1 inch** from the bottom. You will need to use the **sketch dimension tool** to put it **3 inches** from the right edge.
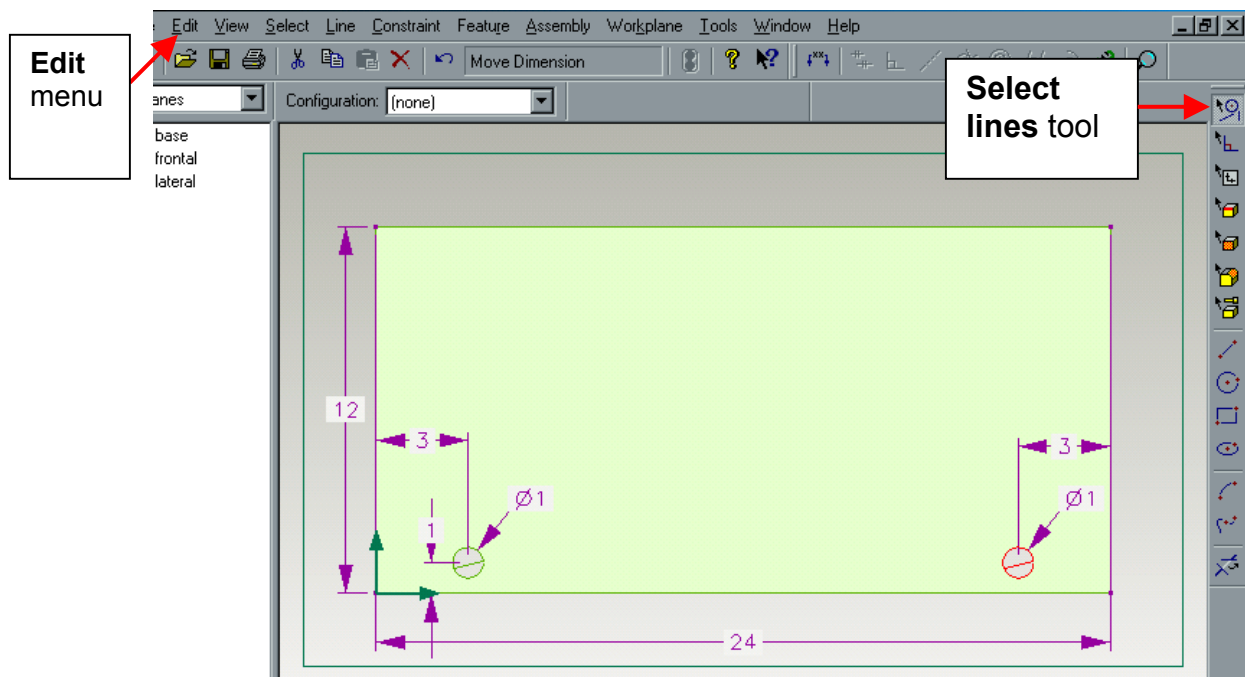
12. Go to the **Workplane Browser** window and double click on the **body sketch** icon under the **lateral workplane.** The rectangle should now be red.
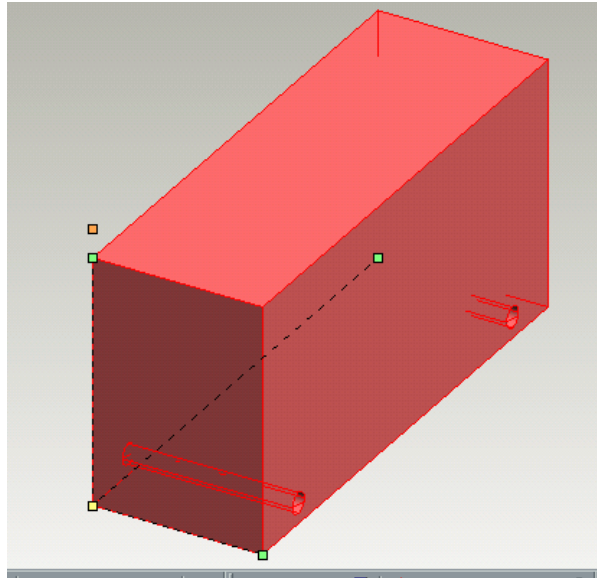
Double click here
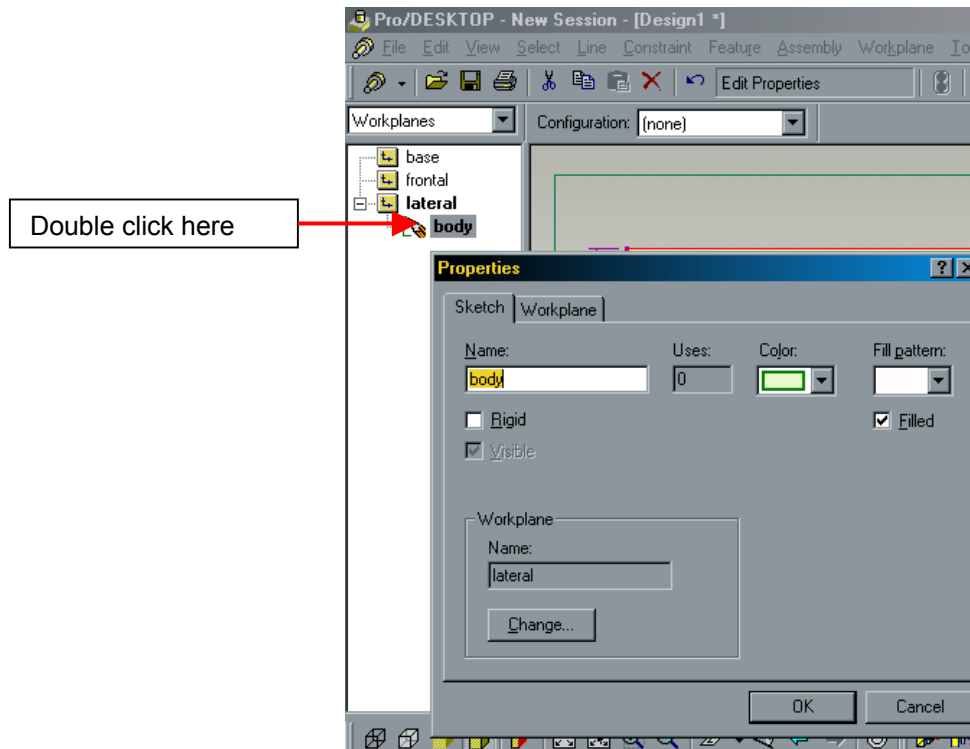
13. Select **Feature - Extrude** and enter **add material, 8.25 inches, above workplane** in the pop up dialog box.

Use the **Feature** pull down menu and select **Extrude**
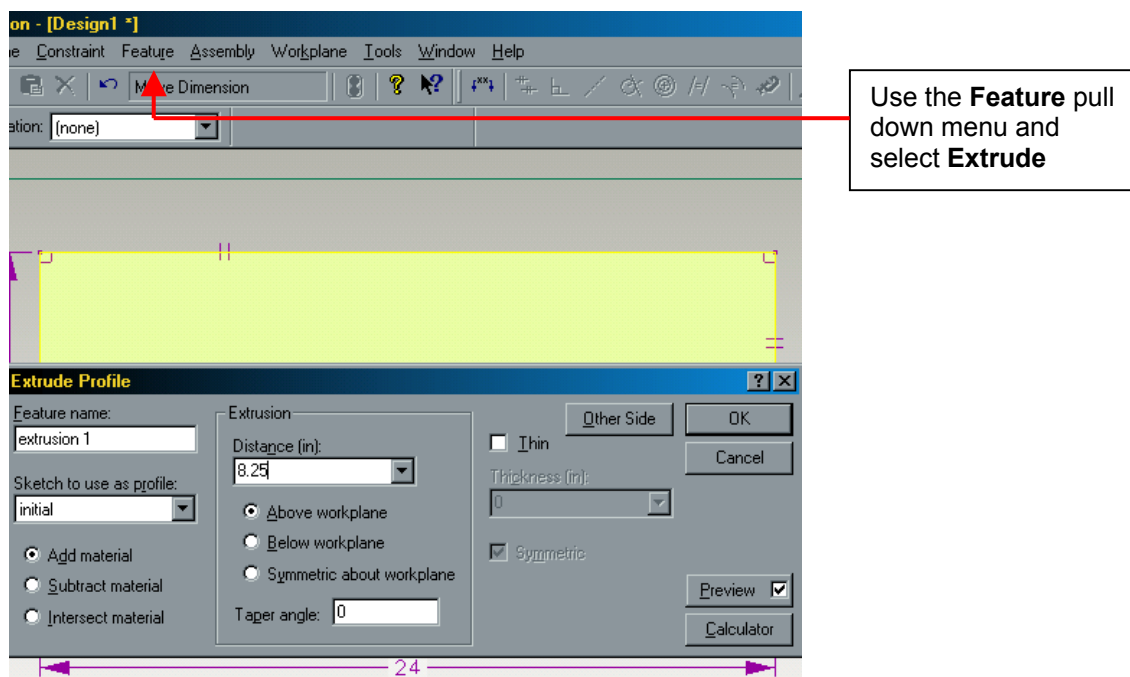
14. Click **OK.**

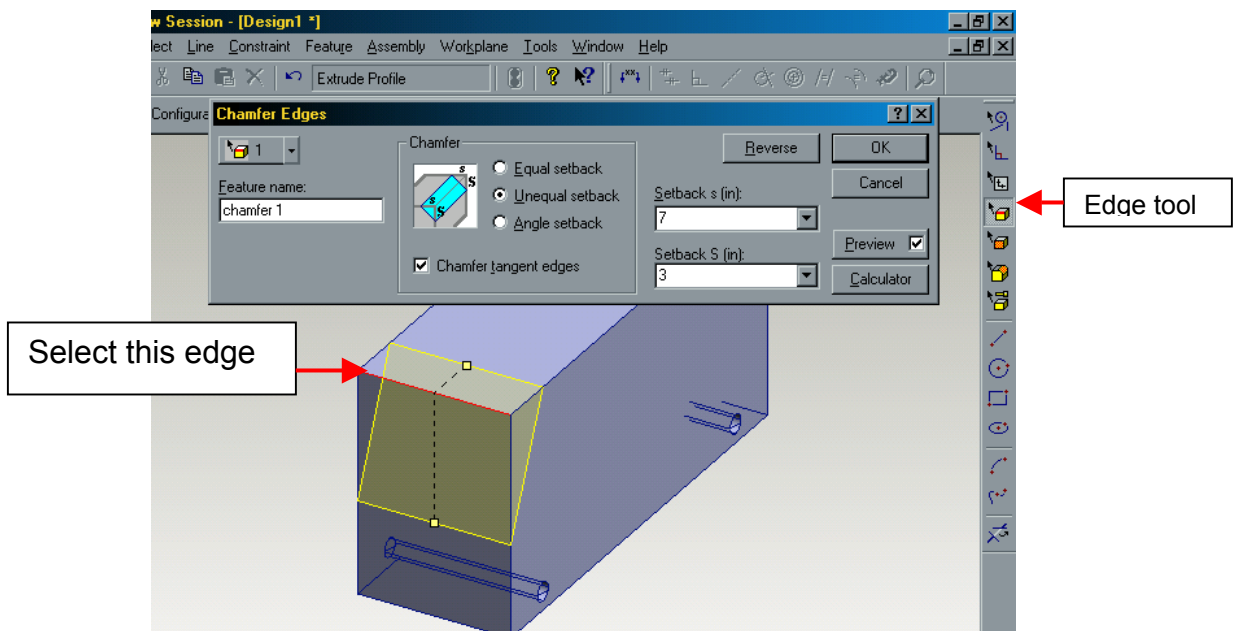15. Type **Shift - T** (trimetric view) and **Shift - A** (autoscale) to change the view of the design.

16. **File - Save** your design as **body.**

17. Select the **edge tool** and click on the top left edge of the body.
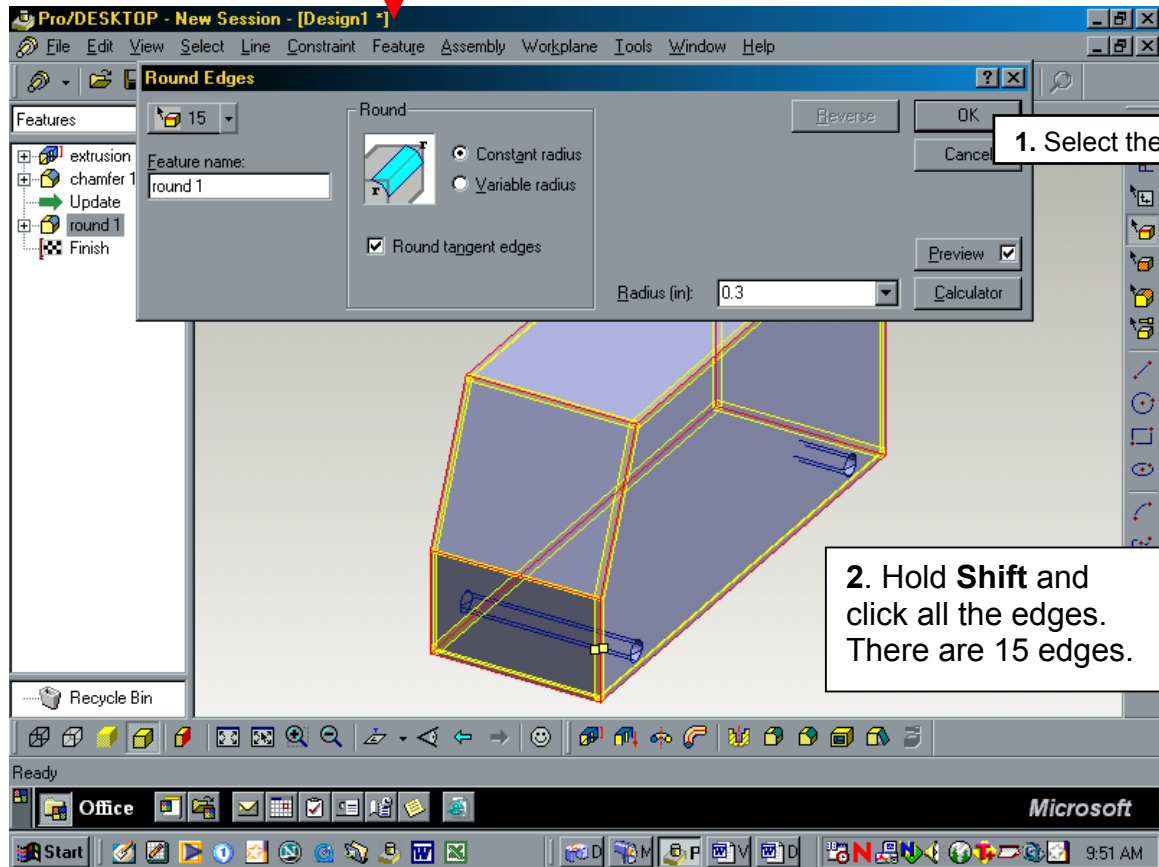
18. Go to **Features - chamfer edges**.

19. In the dialog box, select **unequal setback.** Use **7 inches** for the **front setback** and **3 inches** for the **top setback.** Click **OK.**

20. Select the edges of the body with the **edge tool**, holding **Shift** down to select each edge.

21. Go to **Feature - round edges**. Set the radius at **.3 inches.** Click **OK.**
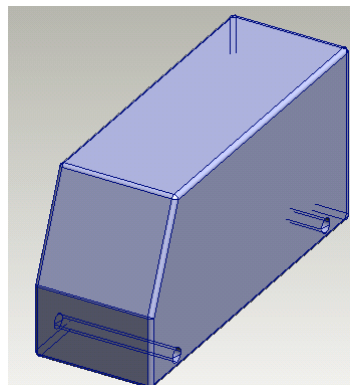
3. Pull down **Features** and select **Round Edges**

1. Select the **Edge tool**

2. Hold **Shift** and click all the edges. There are 15 edges.
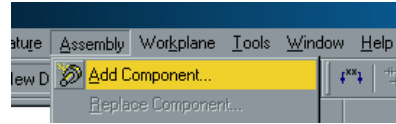
22. **File - Save** your design as **body.**

Assembling the Van

5. Go to **File - New - Design**

NOTE: You MUST start a new design to do an assembly. Have no components in this design to start with.

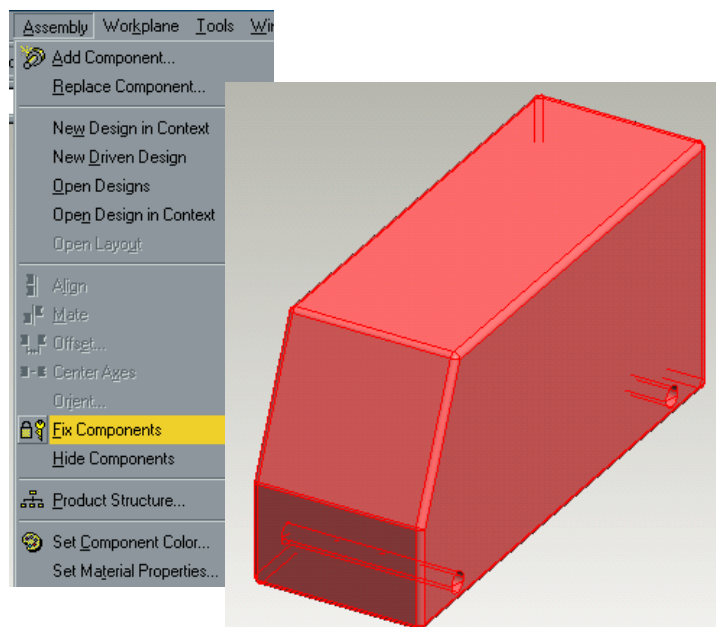6. Go to **Assembly - Add Component.**

7. Click on the **body** design and then **OK.**

8. The two features you will use to assemble the components will be the **Parts tool** to move parts and the **Faces tool** to "glue" the pieces together.

Use the **Faces tool** to "glue" components

Use the **Parts** tool to move a component
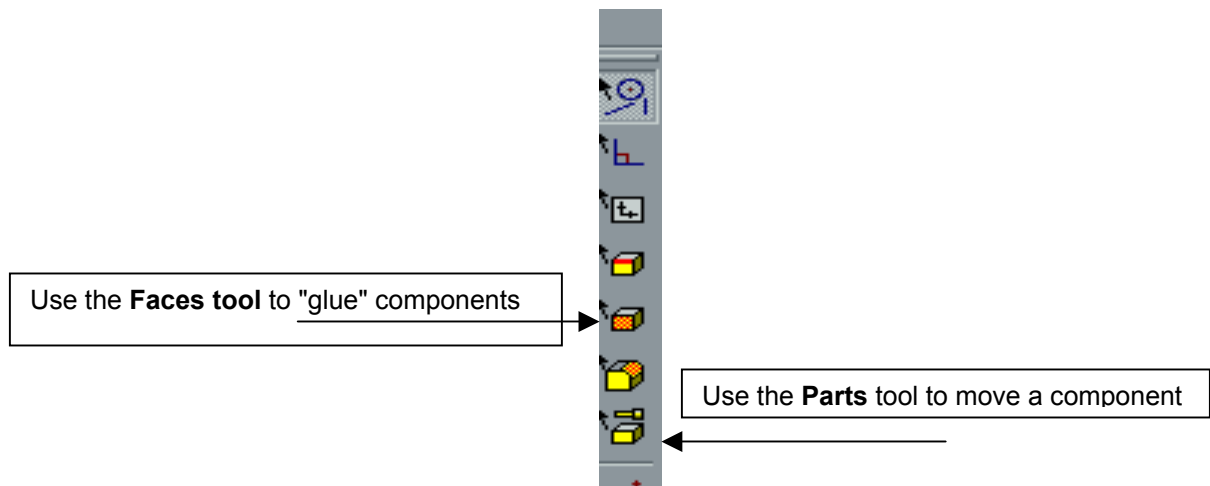
9. Use the **Parts tool** to select the body (it will be red). Then go to **Assembly - Fix Component** to prevent the van from moving during assembly.
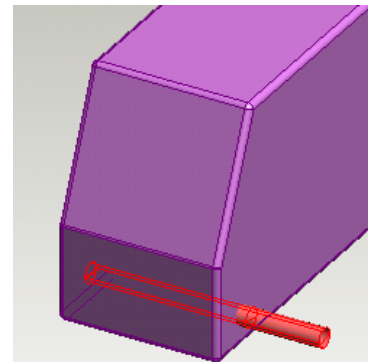
10. Go to **Assembly - Add Component** and get the **Axle**.

11. Use the **Faces tool** to click the axle cylinder and then hold **Shift** to click the inside of the axle hole in the van.

12. Go to **Assembly - Center Axes** and then click **OK.**

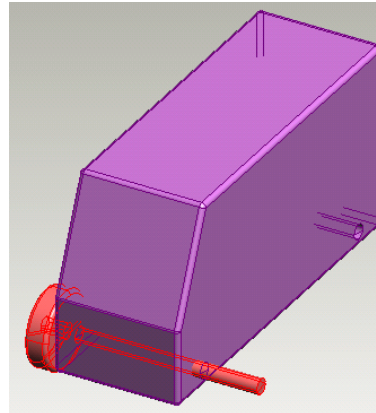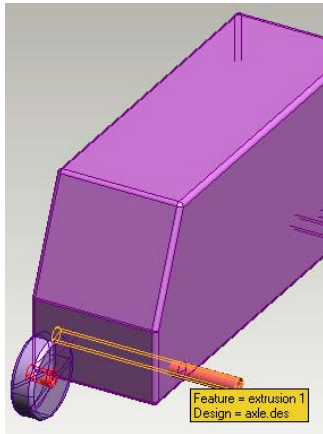Use the **Face tool** to **shift-click** these two faces.
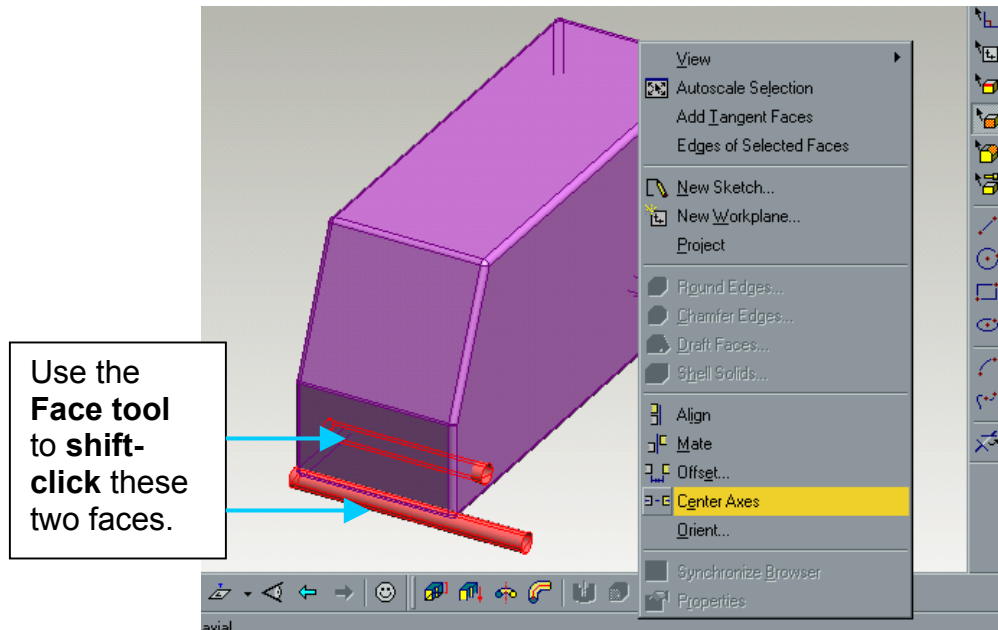
13. The axle will now be in the axle hole on the body.

14. Select **Assembly - Add Component** and bring in a wheel.

15. Click in the axle hole for the wheel and **Shift** and click the axle cylinder.

16. **Assembly - Center Axes**, then **OK** to put the wheel on the axle.

Note: Your wheel may be "in" the body. Don't worry! Just use the **Parts tool** to select and drag the wheel out of the body.

17. Using the **parts tool**, click and drag the axle so it sticks out through the wheel.

18. Now use the **Face tool** to select the end of the axle and the outside wall of the wheel.

19. Select **Assembly - Align**. The axle end and the outside wheel wall will be flush with each other.
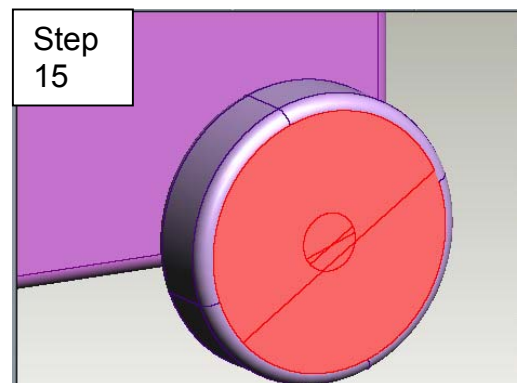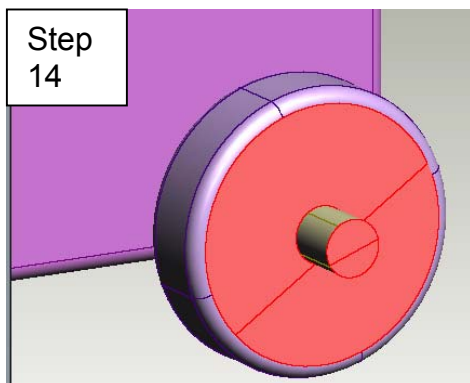
These pictures show the model after it has been turned with the **arrow keys** and magnified with the **zoom command (shift-Z)**

20. Use the **arrow keys** to turn the design. Now use the **face tool** to select the inside wall of the tire and the side of the body nearest the tire.

21. Select **Assembly - Offset**. Set the **offset** as **.375** and be sure **mate** is selected.
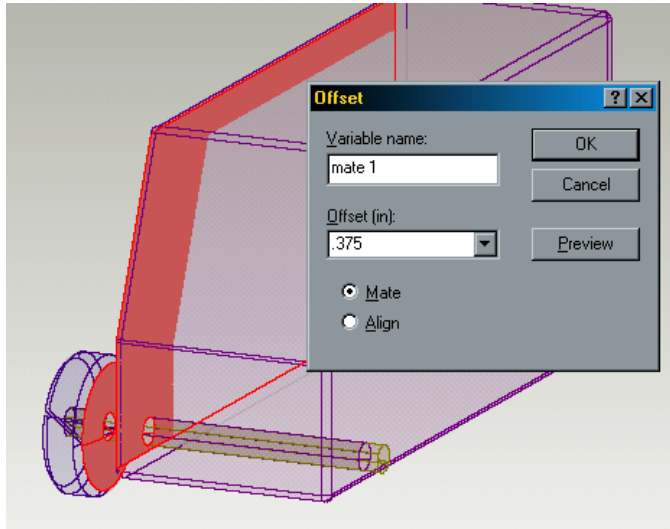
This view is **Transparent** which makes it easier to select the surfaces to mate. Go to **View - Transparent** to use it.
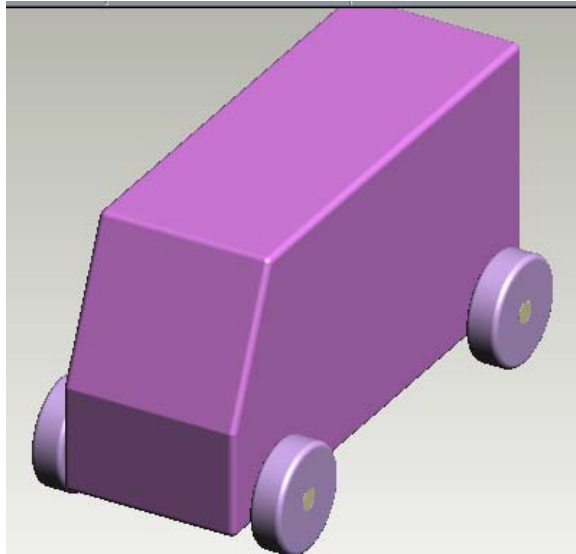
21. Click **OK.** The wheel is now offset from the car body.
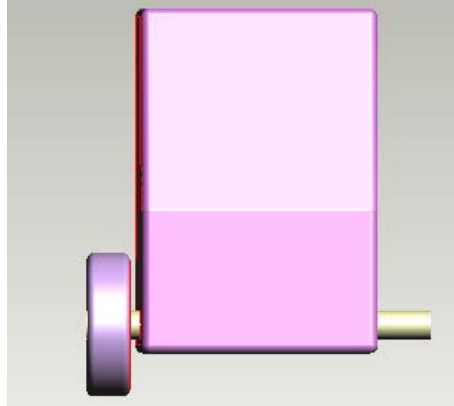
22. Repeat steps 14 - 19 to mount the other wheel on the axle. You do not need to repeat steps 20 - 21 as this will over-constrain the assembly.
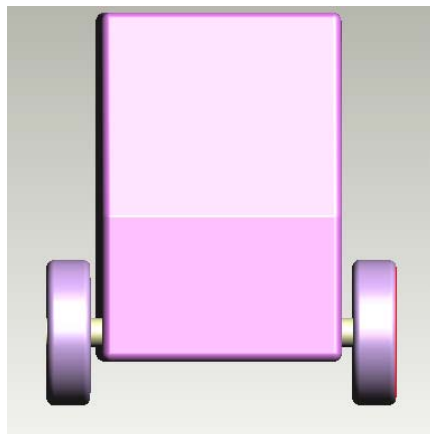
23. Now repeat steps 10 - 22 to finish the van assembly.

24. **File - Save** your van assembly.

Creating an Album Image

1. Have your van assembly on the screeen.

2. **File - New - Photo Album**

3. Go to **Image - New Image**. Click on your van assembly and then click **OK.**

4. Use the **arrow keys** to position the assembly view to your preference.

5. In the **Object browser** click on the **down arrow** and **Select Material**
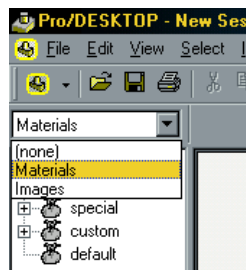
6. Click on the **Plus sign** near **non-metal.**

7. Select the **wood, plain** bag and drag it onto the body of the van (the lines in the van assembly will light up).

8. Click the **Update Light** [icon] at the top of the screen (or press **F5**) to have the material to appear.

9. Try other material bags for the axles and wheels, then use the **Update light** or press **F5** to see the changes.

10. To apply a background, go to **Image - Image Properties.**

11. Select **Effects Tab.**

12. In the **Foreground field.** choose **None.**

13. In the **Background field**, choose **Clouds.**

14. Click the **Update Light** (or press **F5**)

15. Try other materials and background options.

16. Select **File - Save** to save your album. Notice when you save your file it has an **.alb** extension, indicating it is an album.

17. You can export the album rendering as a **JPEG** file (**File - Export - JPEG**) if you want to send the file out as a picture for printing from a picture utility, such as **Paint.**