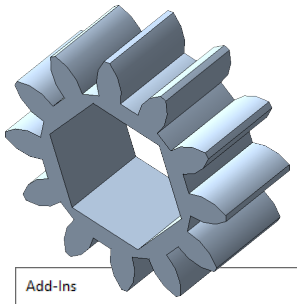
Chapter 10

Wind Up Car
Gear 12T



A. Enable Toolbox Browser.

Step 1. If necessary, turn on Toolbox Browser, click the **flyout of Options** on the Standard toolbar and click **Add-Ins**.

Step 2. Check **SOLIDWORKS Toolbox Library** to place a check in the both check boxes, then click OK, **Fig. 1**.

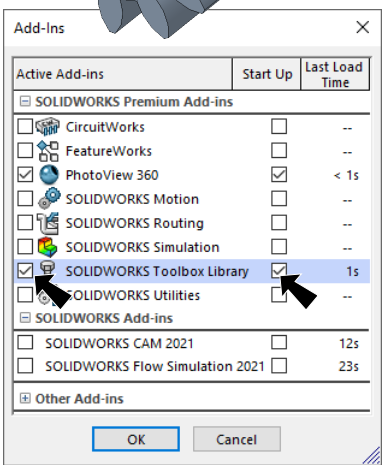


Fig. 1

B. Toolbox New Part Spur Gear 12T.

Step 1. Click **Design Library** tab in the Task Pane (right side of graphics area), **Fig. 2**.

Step 2. Expand the **Toolbox** > Toolbox
Expand **ANSI Metric** folder > ANSI Metric
Expand **Power Transmission** folder > Power Transmission
Click **Gears** folder Gears

Step 3. In the lower pane, **right click Spur Gear** and click **Create Part** from menu, **Fig. 2**.

Step 4. In the Component Property Manager set:
under Properties, **Fig. 3**
Module: 1.5
Number of Teeth: 12
Pressure Angle: 20
Face Width: 8
Hub Style: None
Nominal Shaft Diameter: .8
Keyway: None
click OK .

Step 5. Click **Zoom to Fit** (**F**) on the View toolbar.

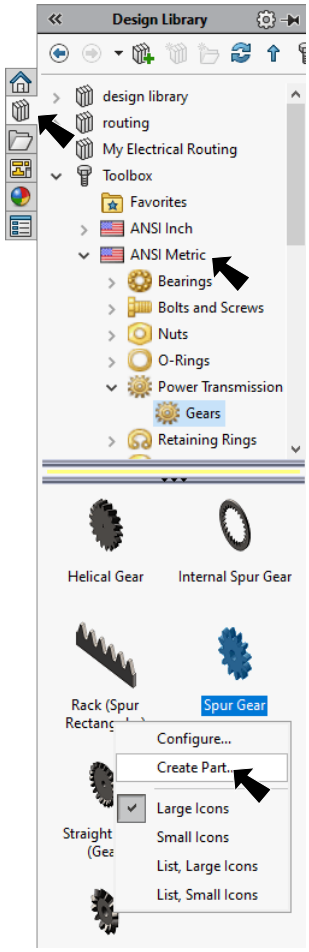


Fig. 2

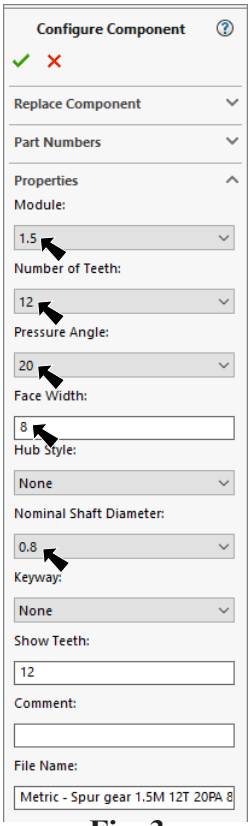


Fig. 3

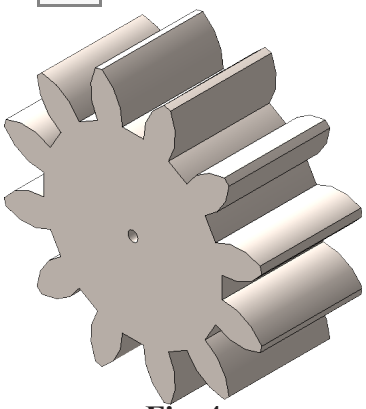


Fig. 4

C. Save as "GEAR 12T".

Step 1. Click File Menu > Save As.

Step 2. In the Save As dialog box:
key in **GEAR 12T** for file name

navigate to your **My Documents/ Tech Ed 20-21/Wind Up Car** folder click **Save**, **Fig. 5**.

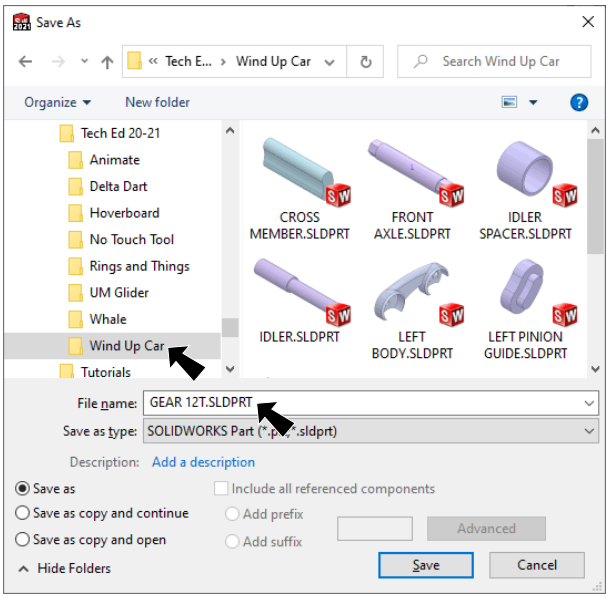


Fig. 5

D. Cut Axle Hex.

Step 1. Click **Plane3** (Front) in the Feature Manager and click **Sketch** on the context toolbar, **Fig. 6**.

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

Step 3. Click **Polygon** on Sketch toolbar.

Step 4. Confirm **6 sides** and sketch **polygon** starting at the Origin , **Fig. 7**.

Step 5. **Right click graphics area and click Select** from menu to un-select Polygon tool.

Step 6. Click **segment** of polygon and click **Make Horizontal** on the context toolbar, **Fig. 8**.

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

Step 8. Dimension **12.7** across corners, **Fig. 9**.

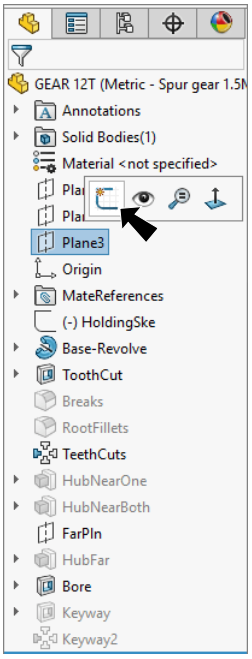


Fig. 6

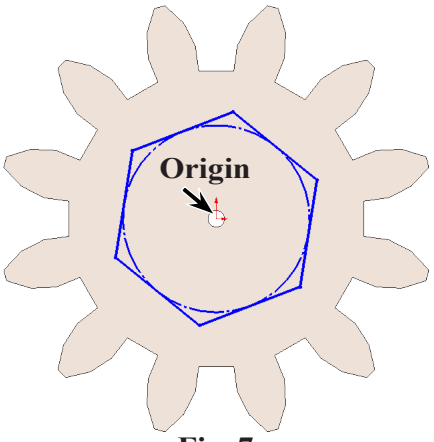


Fig. 7

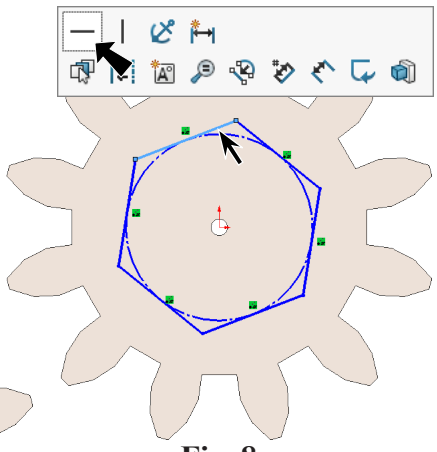


Fig. 8

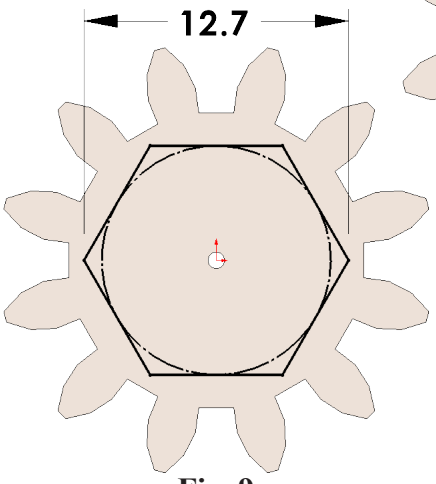


Fig. 9

Step 9. Click **Isometric** on the Standard Views toolbar. (**Ctrl-7**)

Step 10. Click **Features** Features on the Command Manager toolbar.

Step 11. Click **Extruded Cut** Extruded Cut on the Features toolbar.

Step 12. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 10**
End Condition **Through All**
Reverse Direction
click OK .
Next, we will create a Plane and then repair the Mate Reference.

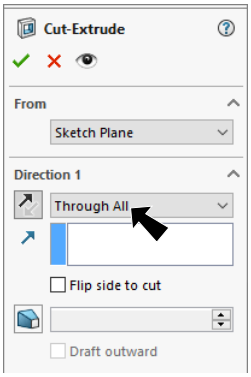


Fig. 10

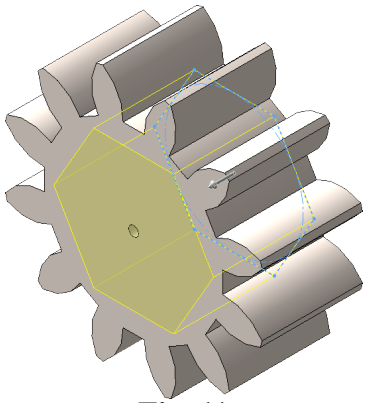


Fig. 11

Step 13. Save (**Ctrl-S**).

E. Create Plane 4.

Step 1. Click **Plane 3** in the Feature Manager to select Plane, **Fig. 12**.

Step 2. Click **Reference Geometry** Reference Geometry on the Features toolbar and **Plane** from the menu.

Step 3. In the Plane Property Manager set:
under First Reference, **Fig. 13**
Plane 3 was preselected
under Second Reference
click in the box and
click **Midpoint** **of tooth face width edge**, **Fig. 14**
click OK .

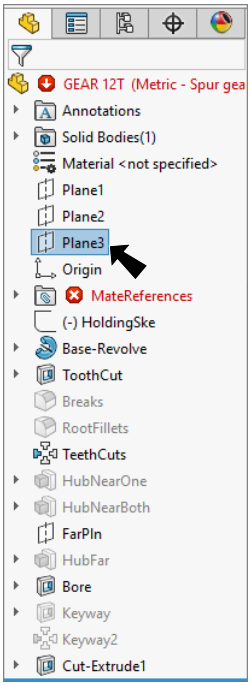


Fig. 12

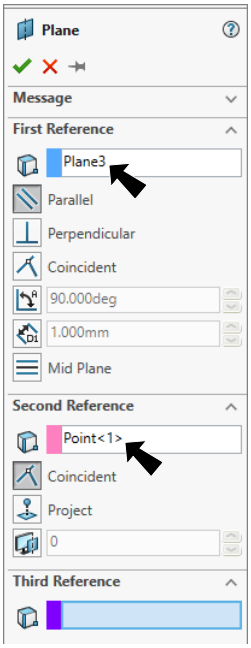


Fig. 13

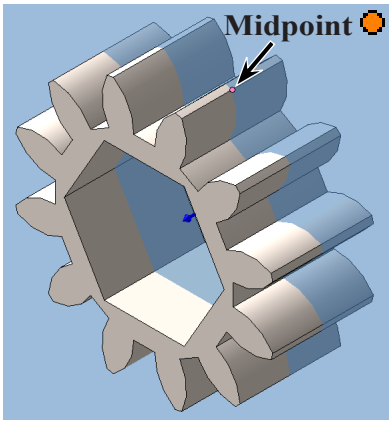


Fig. 14

F. Mate Reference.

Step 1. Expand **MateReferences** **folder** in the Feature Manager, **right click MateReference** and click **Edit Definition** from menu, **Fig. 15**.

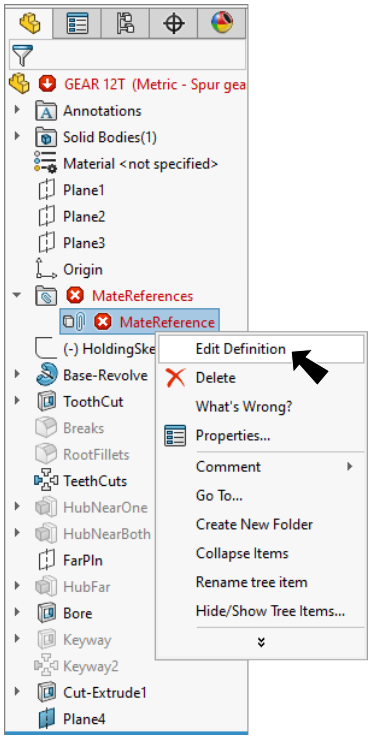


Fig. 15

Step 2. In the Mate Reference Manager:

under Primary Reference Entity, **Fig. 16**

click in the box and
expand the flyout Feature Manager design tree (click ▸) in the top left corner of graphics area click **Plane4**, **Fig. 17**

Mate Reference Type **Coincident**

under **Secondary** Reference Entity

click in Entity box and
click a **cylindrical face**, **Fig. 18**

click OK .

Step 3. Rebuild . To Rebuild, click Rebuild on the Standard toolbar or **Ctrl-B**.

Step 4. Save (**Ctrl-S**).

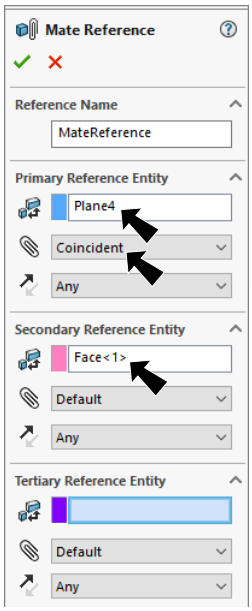


Fig. 16

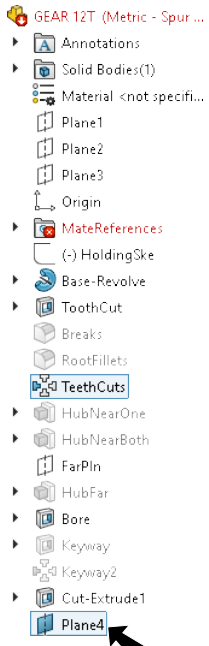


Fig. 17

Tip: Zoom out to see Plane

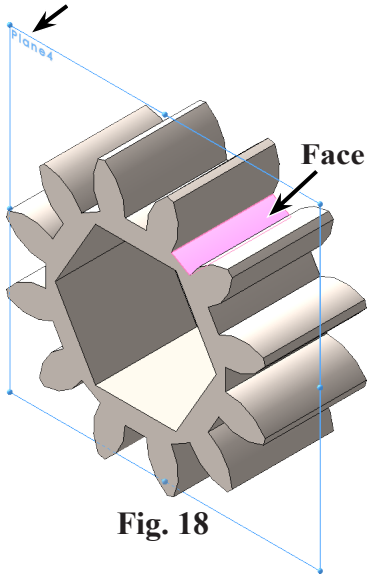


Fig. 18

G. Appearance.

Step 1. Click part, click **Appearance Callout** on the context toolbar and click **GEAR 12T**, **Fig. 19**.

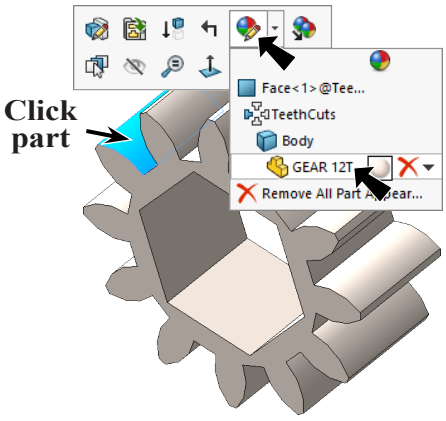


Fig. 19

Step 2. In the Appearances Task pane, expand **Plastic**, click **High Gloss** and in the lower pane select **white high gloss plastic**, **Fig. 20**.

Step 3. In the Appearances Property Manager set:
under Color, **Fig. 21**
set **RGB values**
R 182
G 203
B 227
click OK .

Step 4. Save **(Ctrl-S)**.

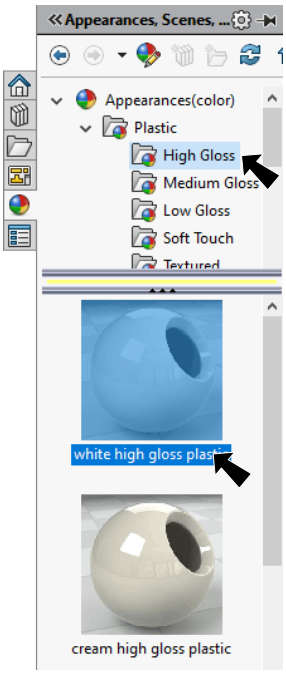


Fig. 20

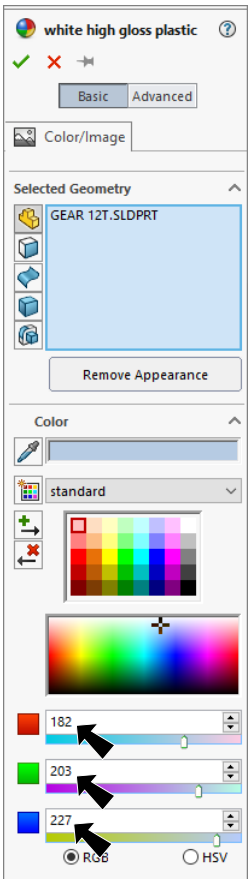


Fig. 21

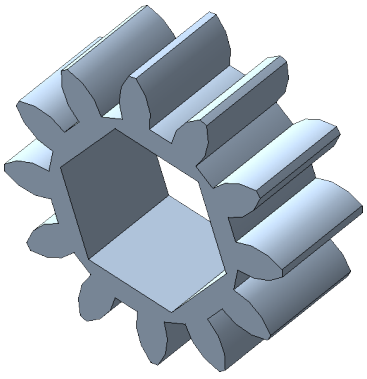


Fig. 22