**F1 in Schools Tutorial Script - 03 Rear Wing**

* ![2017-10-02 10_39_21-Solid Edge ST10 - Assembly - [My F1 Car Assembly .asm].png]()Start your rear wing design by using the previously made F1 Body design assembly. (My\_F1\_Car\_Assembly.asm)
* Create new part in place.
	+ Select “Create Part in Place”
	+ Select OK when dialogue box comes up.
	+ Select Polyurethane for material in dropdown menu.
	+ Click on the Green checkmark button.
	+ ![2017-10-02 10_44_33-Solid Edge ST10 - Assembly - [My F1 Car Assembly .asm].png]()Save the part file ex. (rear\_wing.par)
* Orient the model in order to sketch on the correct plane.
	+ Using the orientation cube in the lower right corner, click on the Right view.
	+ Press F3 to lock to the Right plane.

![2017-10-05 11_01_22-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-05 11_06_06-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* Click on the arc button and select “Arc by 3 Points”.

* Draw an arc using 3 points above the car body.
	+ This is an estimation and correct dimension will be applied later.

![2017-10-10 10_48_09-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* ![2017-10-10 10_48_44-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Using the line sketch feature, draw a line starting from the centerline of the rear wheel axle upwards.
* Click on the connect button in Relate section to align the arc center to the vertical line.
* ![2017-10-10 10_50_46-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-10 10_46_21-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-10 10_50_00-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Using the same connect button, connect the arc and the centerline to remove the remaining arc segments.
* Draw another line from the arc centerline to the other end of the arc.
* ![2017-10-10 10_51_15-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-10 10_51_44-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Click on the construction button and select both straight lines.

![2017-10-10 10_53_50-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* ![2017-10-10 10_56_03-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Using the smart dimensions, define the radius of the arc 70mm.
* Define the angle of the arc 25 degrees.
* To define the thickness of rear wing:
	+ Offset the arc by clicking on the offset button and selecting the arc.
	+ Offset the arc to the inside 3 mm.
* Sketch an angled line from the lower endpoint of the arc
	+ Line should be at a 135° angle as shown.
	+ ![2017-10-10 10_57_51-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-10 10_57_20-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Press the tab key to enter the angle dimensions instead of length.
* Sketch a circle on the trailing edge to create the back end of the wing.
	+ Select the tangent circle option from the dropdown menu.
	+ Place the circle between the two arcs.
	+ ![2017-10-10 11_01_13-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-10 11_01_46-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Apply a third tangent relationship between the arc and
	the angled line as shown.

* ![2017-10-10 11_12_47-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Taking advantage of the synchronous technology,
click and drag a box around the sketch
to select the enclosed shape.
* ![2017-10-10 11_12_05-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Extrude the enclosed shape 80 mm.
	+ Press shift to toggle symmetry.



* Since we no longer need the sketch,
we can delete the sketch in the pathfinder.



* Sketch 3 lines on the center plane to create the
 mounting structure for the rear wing.
	+ Using the smart dimensions, add a few
	dimensions to the sketch.
* Use the extrude feature to create a solid extrusion.
	+ Extrude the structure 20 mm symmetrically.
	+ Make sure to select chain option from the dropdown menu.

![2017-10-17 10_42_06-Solid Edge ST10 - Synchronous Part - [Part1].png]()

![2017-10-16 10_00_02-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* ![2017-10-02 12_34_45-Solid Edge ST10 - Assembly - [My F1 Car Assembly .asm].png]()Use the subtract feature to subtract the wing from the car body.

![2017-10-10 11_23_11-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* Add rounds to the model to make it aesthetically pleasing.
	+ ![2017-10-10 11_24_25-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-10 11_24_40-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Round the 4 corners on the support structure.

![2017-10-10 11_25_26-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* Sketch a rectangle by center on the back side of the wing.
	+ ![2017-10-10 11_27_46-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-10 11_26_55-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Dimension the rectangle 3 mm wide and 6 mm height.
* Extrude the lower region of the rectangle.
	+ Extrude 22 mm towards the leading edge of the wing.

![2017-10-10 11_28_04-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* Using the Pathfinder, delete the rectangle sketch.
* Use the coincident plane feature to create a plane coincident to the side of the mounting structure.
	+ ![2017-10-16 09_37_02-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-16 09_34_07-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Using the steering wheel, translate the plane so that it is coincident to the end face of the wing.
* Use the new sketch plane to create a sketch for the support structure at the end of the wing.
	+ Use smart dimensions to add a few measurements to the sketch.

![2017-10-16 10_10_13-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()

* Select the sketch and the wing arc to
extrude 3mm towards the center plane.

* Add rounds to the 4 corners of the structure for aesthetic purposes.
	+ ![2017-10-16 10_13_30-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-16 10_12_13-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Select face round option in the drop down menu to add round to the entire face of the support structure.
* Click and drag a box around the entire support structure to select it.
	+ ![2017-10-16 10_17_11-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-17 11_13_48-Solid Edge ST10 - Synchronous Part - [Part1].png]()Mirror the entire structure across the center plane using the mirror feature command.

* Use part painter feature to paint the two end structures of the wing.
	+ Paint the structures Black (dull).
* ![2017-10-02 12_34_45-Solid Edge ST10 - Assembly - [My F1 Car Assembly .asm].png]()Click on the “Close and Return” button to close and return to the top level assembly.
* Use the subtract feature to subtract the rear wing body from the
car body to remove the interference
* Uncheck the box next to rear wing part in the pathfinder so
that you can see the slot in the car body.
* Click on the car body and select edit in place
	+ Extend the resulting slot by dragging
	the end face beyond the edge of the part
	+ ![2017-10-16 10_28_07-Solid Edge ST10 - Ordered Part - [My F1 Car.par in My F1 Car Assembly .asm].png]()![2017-10-16 10_27_06-Solid Edge ST10 - Ordered Part - [My F1 Car.par in My F1 Car Assembly .asm].png]()![2017-10-16 10_27_18-Solid Edge ST10 - Ordered Part - [My F1 Car.par in My F1 Car Assembly .asm].png]()Also drag the front end of the slot an extra 2 mm.

![2017-10-16 10_29_37-Solid Edge ST10 - Ordered Part - [My F1 Car.par in My F1 Car Assembly .asm].png]()

* Add rounds to the corners of the slot using
the Round feature.
	+ Specify a 0.5 mm radius for these
	rounds.
* Click on “Close and return” button to exit and return to the assembly.
* Check the box next to rear wing part in pathfinder to see the entire assembly.
* Select the rear wing and click Edit in Place option to work with only the wing.
	+ Add chamfers to the bottom edge of the key.
	+ ![2017-10-16 10_31_46-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()![2017-10-02 14_10_50-Solid Edge ST10 - Synchronous Part - [Front Wing.par in My F1 Car Assembly .asm].png]()Select “Chamfer Equal Setbacks” from the dropdown menu.
* Add 2 mm rounds to the bottom of the wing.
	+ ![2017-10-16 10_33_52-Solid Edge ST10 - Synchronous Part - [Rear Wing.par in My F1 Car Assembly .asm].png]()Make sure to round all four sides of the wing as shown in the picture below.
* Click on Close and Return button.
* Save the assembly to save the changes to the parts.
* Now you have completed the rear wing of the F1 Car.