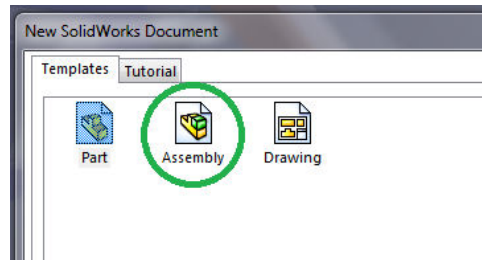


Creating an Assembly

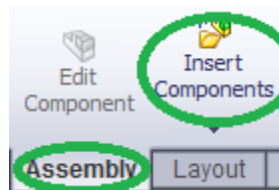
- Start up SolidWorks as normal.
- Instead of selecting the usual part file, select the 'Assembly' template instead (circled).



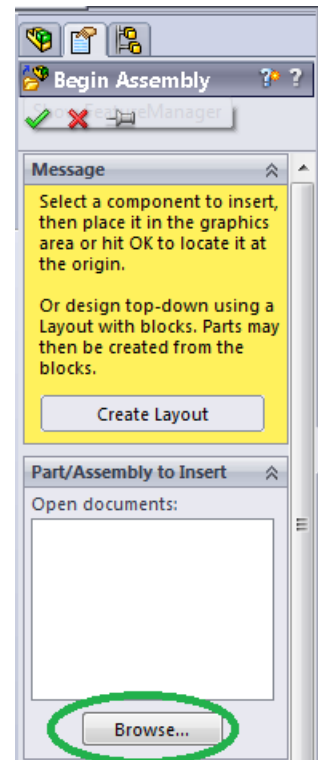
- When you open up the assembly template, a text box will appear on the left of the computer screen. This text box allows us to browse for the different part files that are required to create this model engine. These files are all on the website.

- Select browse and select your part files. Click on the work area to fix each part to the work area rather than having the part following the cursor around the screen. Each part must be brought in separately.

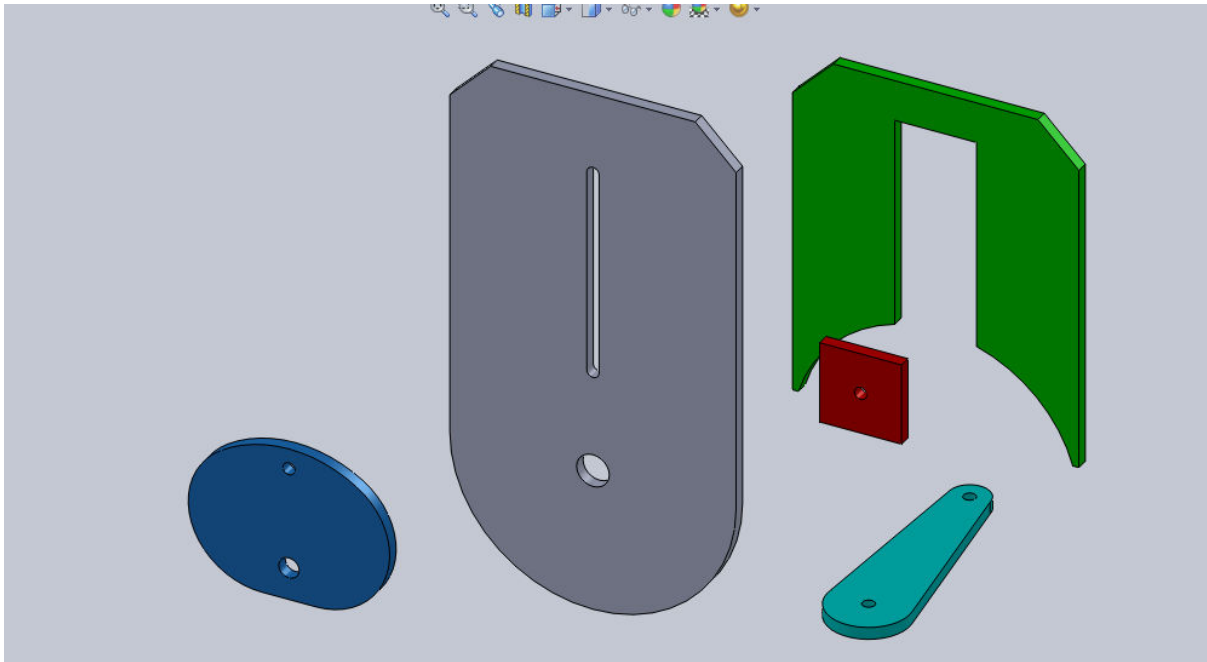
- Once you've inserted the first component, the browse option will disappear. Select the assembly tab and Insert components to browse for more components.



- Bring in a maximum of 5 part onto the screen, otherwise you will get confused.



- Insert the Back plate, Front plate, Piston, Crank and Con rod into your assembly.



- The next step is to fasten these bodies together. This is done by mating surfaces together. The mate icon is found under the assembly tab.

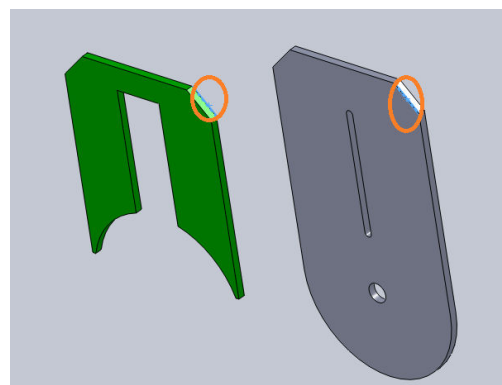


- We'll start by mating the front plate and back plate together.

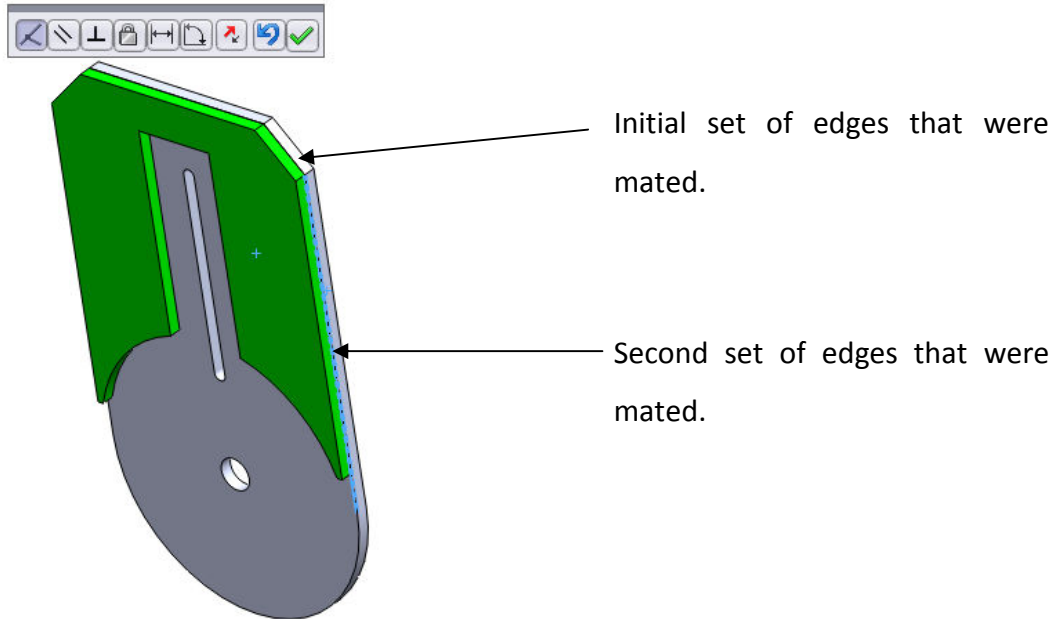
Select the mate icon and then select the surfaces/edges/planes that we wish to mate together. There has to be two faces in order for a mate to take effect.

- We'll mate two edges together first.
The two edges selected are the inclined edges which are side by side.

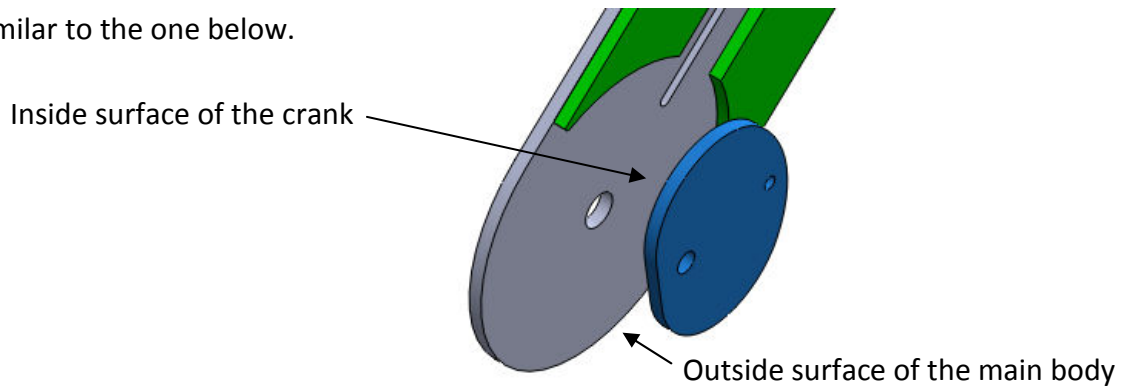
- Select the green tick for the mate to take effect.



- If we were to select a second set of edges, these two bodies would be completely mated together.

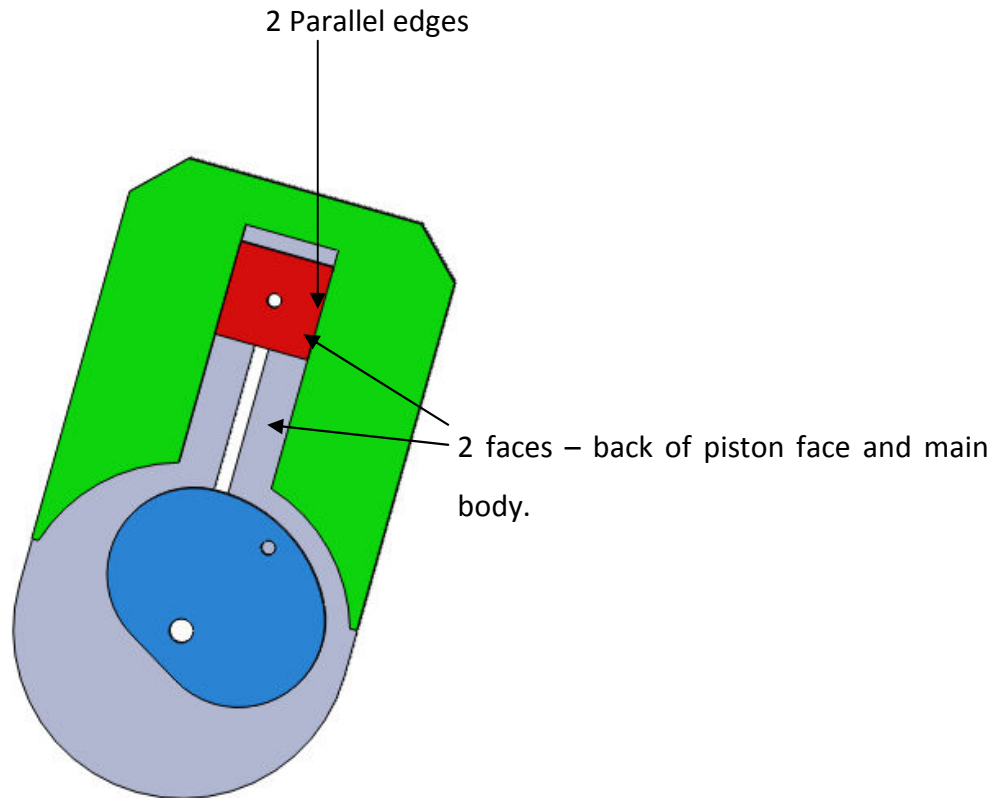


- Next we can mate the crank to this body with two simple mates. Select the edge of both centre circles to mate together and select the green tick. Your assembly should appear similar to the one below.



- If we selected the inside surface of the crank and the outside surface of the main body to mate together. The crank would become part of the main body.

- The piston slides up and down along the slot on the front body. If we mated two faces and two parallel surfaces, the piston would be fully defined.



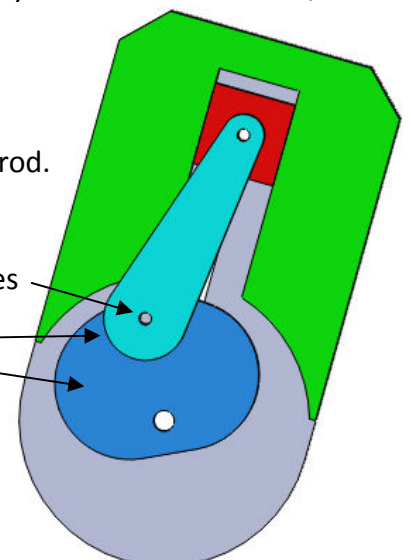
- Occasionally our mates are back-to-front. This can be altered by selecting the reverse icon which is hi-lighted.



- The next step is to mate the con rod to the piston and the crank. This is done by selecting a concentric mate which is used to align circles. Firstly select the mate icon, and then select the hole on the crank and the corresponding hole on either the piston or the crank. Then mate both faces to create a fully defined mate. Do this for both ends on the con rod.

Concentric mate with both holes

Surface mate (underside of the con rod)

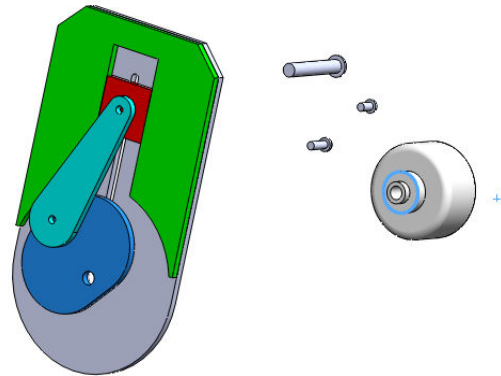


- The next step is to put in the bolts which realistically allow the project to function.

- Insert the remainder of the components.

- The next step is to mate the small bolt

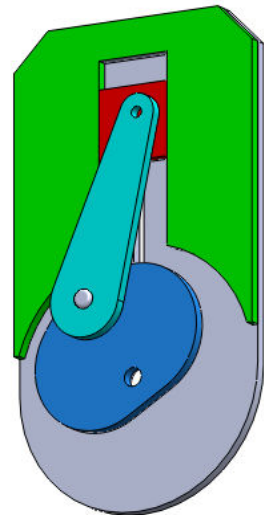
Along with the crank and con rod.



- Firstly mate the end of the bolt with the underside of the crank and then mate the underside of the bolt head with the edge of the hole on the crank.

- The exact same procedure must be done for the piston.

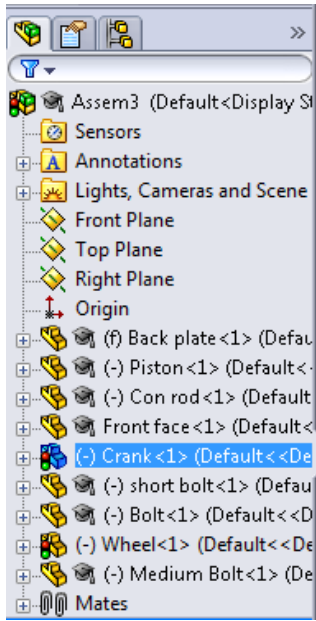
- A mate relation must be made with each surface that the bolt passes through.



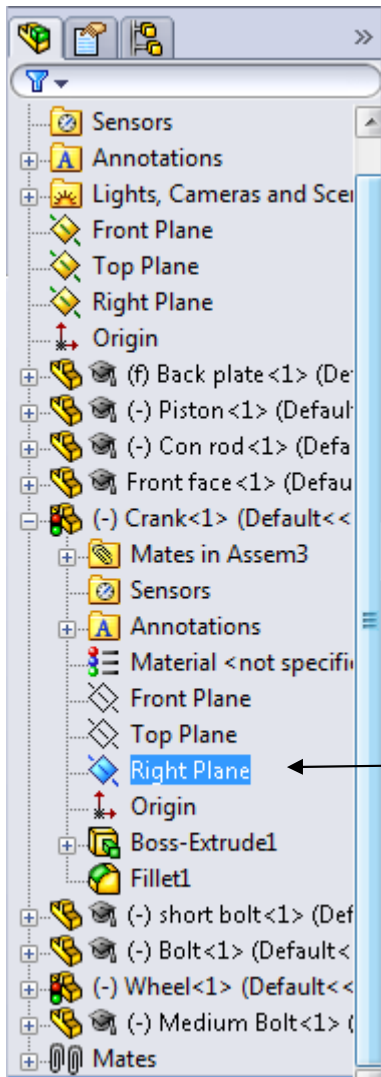
- The next step is to mate the wheel to the back of the crank so as when we rotate the wheel, the piston will move up and down. Mate the wheel as normal, select the end face and mate it to the back of the crank. Also mating the edge of the hole on the main body to the wheel would fully define the wheel.

- The next step is to create a relation between the wheel and the crank so as they both rotate together as one unit. This can be done by going into the design tree of both objects and selecting the same planes to mate.

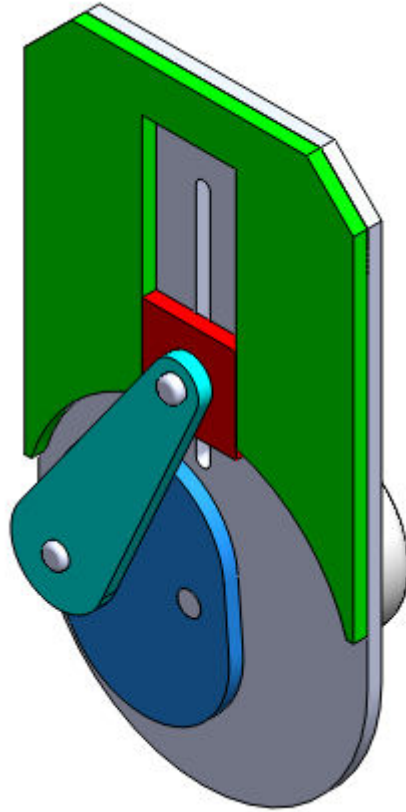
Transition Year DCG Module



← Design Tree



← Right plane of the crank which is mated with the right plane of the wheel.



- Click on the wheel and drag it around in a circle and see the piston slide up and down.

ASSEMBLY COMPLETED