

**Course challenge: Introduction to 3D modeling**

**Course challenge:** Modify an existing design using parametric modeling workflows. Provide documentation including a technical drawing and a render of the final design.

**Criteria:** Using direct modeling workflows, an out-of-date design can be recycled into a refreshed version. Refer to the supplied dataset **Saw Assembly.f3d** for this course challenge. A customer has provided an assembly of an old reciprocating saw that they would like to redesign. You have been tasked to create an updated model that reduces the overall mass of the part by a combined adjustment to the physical material and the venting geometry. The customer would also like to create a more ergonomic grip on the inside portion of the handle. The overall domain of the part must remain the same as the connection points have not changed. Finally, the customer has included a sub-assembly within the file which they would like to see properly linked with joints.

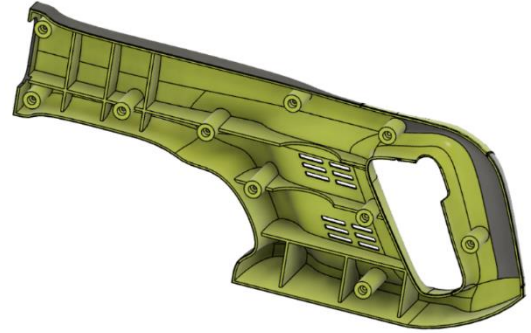
You will need to use tools in Fusion 360 to directly modify the geometry without a parametric modeling history and reassign the physical material of the part. Delete the existing venting and provide different design options. Document material/venting configurations using the Comment functionality. Create technical drawings to detail the dimensions and positioning for all venting geometries. For the ergonomic grip design, use the Form toolset to create a new freeform component for just the gripping region. Use Joints to define degrees of freedom between components. Finally, render and export an image of the entire assembly using In-Canvas Render.

The following steps are required:

- **Direct Modeling** – Delete the original venting geometry
- **Physical Material** – Change to reduce mass (suggest at least 3 material options)
- **Venting Geometry** – Change to reduce mass (suggest at least 3 design options)
- **Comments** – Document mass of original and each new configuration (use screenshots)

- **Technical Drawings** – Create drawings with a detail view for each of the vent designs
- **Form Toolset** – Create an ergonomic grip design by using a new freeform component
- **Motion** – Define degrees of freedom between components using Joints
- **Render** – Create a render of the full assembly using In-Canvas Render

NOTE: Ensure that the modified venting designs do not inhibit the ability to house the included subassembly of the Saw Mechanism.



*Figure 1: Provided model*