Clarinet Design in SolidWorks

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When thinking about what I was going to model in SolidWorks, I thought about my interests. Due to my love of music, I chose to create a clarinet, the instrument that I play. I have been involved in music for eleven years, as I started playing piano when I was eight. I decided to make a clarinet because I currently play it the most in concert and pep bands. I referenced my own clarinet for dimensions and occasionally used the images and used images such as the figure seen below for quick reference.

![Figure 1](image)

In order to complete this part, I first started with the mouthpiece, as seen in Figure 2. I boss-extruded a cylinder, for the cork piece to start. From that part, I boss-extruded another, larger diameter cylinder. Then, I created a plane on the surface of the cylinder, and created two sketches to cut-extrude sections off of the piece. I then used the shell tool to create a shell of the part.

![Figure 2](image)

After the mouthpiece, I worked on the barrel, and revolved a sketch to create the unequal cylinder shape. During this process, I made sure that the different parts fit inside one another (the cork part on the mouthpiece fit inside of the hold in the barrel). Working downwards, I created the first part of the body of the clarinet (Figure 3) and boss-extruded three different cylinders, in order to create two cork parts and one plastic body. I then cut-extruded the holes where they should be. I used the same process for the second body piece.
(Figure 4), but the holes differed as they had rings around them, so two separate cut-extrudes were used to create the effect.

![Figure 3](image1.jpg)  ![Figure 4](image2.jpg)

After the two body pieces were complete, I used the rotate tool to create the bell of the clarinet. Once these items were completed, I started to work on the metal parts of the keys (Figure 5). I used the sweep tool to create a bar that the keys would be connected to. I then designed the keys and boss-extruded them in the same plane. After that, I created a sketch in the plane that went through the sweep, and boss-extruded the circles I made in the sketch up to the surface of the circles previously created. After this, I worked on the reed (Figure 6). I boss-extruded the first, what would be solid, part of it and then created a separate plane from this extrusion and used the convert entities tool to quickly recreate the sketch I had originally drawn. I then boss-extruded that sketch. After that, I used the draft tool to create the tapered effect the reed has.

![Figure 5](image3.jpg)  ![Figure 6](image4.jpg)
Finally, I was able to put all of the pieces together in an assembly (Figure 7), fitting each hole inside the next, and making the metal keys tangent to the surface of the body. Once the assembly was complete, I created an assembly drawing to show the overall dimensions and the placement of the holes (Figure 8).
The hardest part to complete was the metal keys because many of the features I tried to use were not functioning correctly. Although I did not use new features in this part, I learned how to use the draft tool when making the reed. This was very helpful in order to create the taper that a reed must have.

In the SolidWorks portion of the class, I learned various techniques for solid modeling. I worked with AutoDesk Inventor in high school, so I had a slight background in solid modeling on the computer. I learned many more techniques to create items and features in the program itself by completing the tutorials and projects. I am excited to be able to apply my new knowledge to upper level classes and my future career.
References

http://aberdeenmusicservice.org.uk/MusicService/index.php/clarinet