Work Completed
This week was concentrated on beginning construction. The plastic box and mold well that were ordered last week arrived on Tuesday and Wednesday. Once these pieces had arrived we were able to make our appointment at the machine shop. We met with Rich at 9:30 am on Thursday morning. We began by showing Rich the new parts that had come in along with our updated design. We agreed that these new dimensions (as discussed in Week 4 paper) would work. Construction began by choosing a proper aluminum rod to be used as the shaft. The mold well has a diameter of 1.15 inches and the bore of the bearing block has a diameter of 1 inch. Due to this fact the original 1 inch diameter aluminum rod could not be used. A shaft with a diameter of 1.25 inches is to be used instead. The shaft could then be lathed to fit into each piece. The end to go into the bearing block was lathed to 1.003 inches. This is a very snug fit and will need to be press fitted into the bearing block in order to achieve a close fit. A close fit is desired as if it is too big it will wobble and not provide adequate support. The lock collar of the bearing block will also be used to make the fit as snug as possible (Fig. 1).

![Bearing Block and Shaft](image1.png)

Figure 1: Bearing Block and Shaft

After this was completed the end in which the shaft would attach to the mold well was lathed. This end was lathed to a diameter of 1.154 inches. Again this is an extremely snug fit in which it will need to be press fitted to go through the hole of the mold well. Once the shaft is all the way through the hole of the mold well it will be pinned together to provide extra support. Please see Fig. 2 for the attachment of the mold well to the shaft.
Next the wooden block was constructed. The original design was to have a solid wooden block with a height of 4 inches, length of 5 inches and a width of 2 inches. The middle of this block was to have a hole drilled in it in order for the shaft to go through the block without making contact. The motor was also to sit in the bottom of this block so it could be attached to the bottom of the shaft. After analyzing this further and looking at what wood the machine shop had to offer, we decide to construct the block instead. The block would have one piece of wood on the top and bottom and another piece of wood on the sides (Fig. 3).

The outer dimensions are 5.061” x 5.01” x 3.38”. The inner dimensions are 2.115” x 2.105” x 3.38”. The bearing block will then sit on top of the wooden block and be bolted in. Rich thought that our motor may be too weak and provide problems due to the fact that the rotating shaft is not in the middle of the motor. Thus a new motor will be looked into. We wish to find one with a centered shaft and possibly more power. This block has a large thickness and will provide the support needed. The block will be attached to the bottom of the base using flat head screws. When testing the game and we find that it
does not have adequate support we will attach extra boards running from the ends of the block to the sides of the box. This will surely provide the needed support.

After our work in the machine shop we returned back to the lab to overlook the design. Ways in which to insert the pie pieces into the mold well were considered. When looking at the mold well we realized that the bottom is already divided into fourteen pie pieces. We believe it might make construction much faster and easier if we use these pre-divided pie pieces. However we must make the game visually appealing. Please see Fig. 4 for the mold well.

![Figure 4: Bottom of Mold Well](image)

Future Work
The mold well will further be looked into. The mold well is made out of polypropylene. Thus we need to look into how easy it will be to paint the plastic or find another way of making the wheel more visually enhancing. If it seems to be difficult then the original idea of using the foamed PVC and making the wheel ourselves will be carried through. Construction will continue by securing the wooden block to the base of the game and drilling holes in the base for the shaft to fit through. A new motor will also be searched for.

Project Review
This week was very productive in the construction of the game. No large problems arose when starting the construction. We have new ideas in ways to make the process of building the game faster. Thus testing will be able to begin faster. The overall progress is looking very well.

Hours Worked
13 hours