Work Completed:

Upon working with our purchased motor, we realized that this specific motor was not desirable for our project. This motor is configured for an AC power source. We had originally purchased the motor since its description had described the motor that as an AC/DC motor, capable of both power sources. We later found that the only way to make this motor DC was to purchase converters. These converters are extremely expensive and would cost us another hundred dollars. Our budget cannot afford this. We decided that we should return this motor and purchase a different motor that was specific to our needs.

This motor also required an immense amount of amperage and voltage. This high amperage requirement would require that the arm be powered by a wall outlet. This would greatly limit our client’s mobility and restrict him to only areas with a power supply.

In senior design class on Friday, Megan, Asma, and I took a trip to the post office to return this motor. We packaged the motor up in its original box that we had saved. Asma had spoken to Dayton Motors, the manufacturer of the motor, and they had told her that also long as we did not alter the motor in any way that we could return it back to the distributor, Electric Motor Warehouse. Dayton Motors had told asked us to include the original purchase order in the box along with our return address. I obtained the original purchase orders from Jen in the Biomedical Engineering Office. I made copies of these purchase orders for our own records incase the box were to become lost upon shipping. We also surrounded the motor with bubble wrap to ensure the motor is safe. We sealed the box with the motor, our return address, and the original purchase orders and placed shipping labels on the box that Lisa made for us. We then went to the post office and had the motor shipped priority mail so that the motor would arrive back at the distributor before the end of the week. That way our budget would be credited in time for us to purchase our new motor. We also chose to have tracking on the motor.

After the post office, we all went to ITEB to see Dr. Fox. Dr. Fox had made a revolving lazy susan with a motor that we wanted to observe and mimic for the base of our arm. Dr. Fox had simply purchased a metal plate from Mansfield supply and propped it up in wooden pillars that were attached to another circular plate. The top plate was then mounted to a motor that caused the top plate to revolve. The shaft of the motor was lined with a tennis racket hand grip that acted as a friction catalyst for the revolution of this plate. We had decided this was how we wanted to create out revolving base for our arm.

Once we expressed this interest to Dr. Fox, he was nice enough to explain and demonstrate the design for us. He also gave us a motor to use for this design. The specific motor is Globe #409A582 DC Gearhead Motor. This greatly saved us much money from
out budget. We also were given switches to use in the circuitry. A picture of this motor can be seen in Figure 1.

![Figure 1: DC Gear motor given to us by Dr. Fox](image)

Monday, Megan and I went to Home Depot and Mansfield supply to try to create a revolving base unit. Upon looking at Mansfield Supply, we noticed that much of the hardware was very expensive. Megan had purchased a metal lazy susan over the weekend and were need to find a connector piece that would mount the arm to this mechanism. When we went to Home Depot we found materials to do this. We know that the connector piece had to be small enough to fit inside the three inch diameter PVC pipe that we had chosen for the lower arm. If this connector were to be larger, the arm would not be able to bend forward. We also found a half of an inch PVC pipes to use for the legs that will heighten the lazy susan.

The lazy susan had an inner circumference that was empty. In order to fix this, we cut an aluminum circle from the sheet we had previously purchased and riveted it to the lazy susan. We did cut the circle out by using a hand shear and pliers. Unfortunately I placed the rivets in upside down which made it quite difficult to place the connector on top of the base. To fix this problem, I had to file down all the rivets with a hand file. Once this was done, we then attached the connector to the revolving lazy susan. This was done via the drill press. We made screw holes in the aluminum to attach this. Once this was done, we put the entire base together.

We then tested the base with the motor from Dr. Fox. The base did revolve when the motor was connected to a voltage supply but did not move fluidly. TO fix this problem, I went to Olympia Sports to purchase tennis racket grip. We placed this on the motor. This caused much better cohesion. The base spun better. We then tried lining the base and motor with the tennis grip and it did not spin at all. We tested it also with just the base being covered and this did not spin at all.
Figure 2: The Connector portion of the base for the lower arm

Figure 3: The lazy susan
Figure 4: The lazy susan with the aluminum sheet cover

Figure 5: The complete base connection
**Project Review:**

This week our project slightly changed as we have to reconfigure how we were going to implement the motors. By Friday we will have purchased a new motor that will run the entire base unit. The project has changed since we created a revolving base that was different than we had previously planned. This base rotates freely and allows the arm to rotate as desired.

**Future Direction:**

Today we will be taking a trip to Hampton Elementary School to remeasure the arm. We found that the arm is slightly longer than needed and may extend out beyond our client’s mouth. We will also continue to finish researching motors and batteries and will purchase both of these by the end of the week. Once this is done we will construct a box for the base to house all the components.

**Total Hours Worked:** 14 Hours