1. Starting with a sheet of foam board (32"x40" with 3/16" thickness), carefully draw two large circles with diameter 18". It may be easiest to do this using a large compass or a 9" string with a marker on the end. Also, be sure to mark the center of the circle.
2. On one of the large circles, draw a smaller circle with diameter 6", using the same center as the large circle. This will be the top part of the brim
3. On the other circle, draw an ellipse (oval) with small diameter 6" and long diameter 8-9", using the same center as the large circle. This will be the bottom part of the brim. This is where the student's head will go into the hat, so you can adjust as needed.
4. Cut out the two large circles, as well as the small circle and oval from the center of each. You'll want to connect the top and bottom pieces of the brim but leave a gap where students can "hide" the Arduino and wires.
5. To connect the top and bottom brims, you can use spacers, small popsicle sticks, wedged into small slits in the boards, or golf tees. Be sure to glue the spacers in place.
6. Lastly, you may want to add a raised top. Some students choose to use a paper bowl to give their hat a gentle slope in the middle, while others cut 8" diameter circles and connected the raised top to the brim with additional popsicle sticks or golf tees.
7. Once the hat is constructed, students can decorate with fabric, paper, duct tape, and other crafts to make their hat aesthetically pleasing while including the Arduino and Servos to make it robotic. Remind students that they will need to power their hat, so they need to be able to easily access the Arduino to connect a battery pack or USB cable.
8. To see the construction of a robotic hat base, visit https://vimeo.com/278198853
9. For videos of our summer caps featuring robotic hats, visit https://vimeo.com/218852898, https://vimeo.com/218852867, https://vimeo.com/216874740, or https://vimeo.com/223165806