

Team Assignment #2

Team: Power Train Team

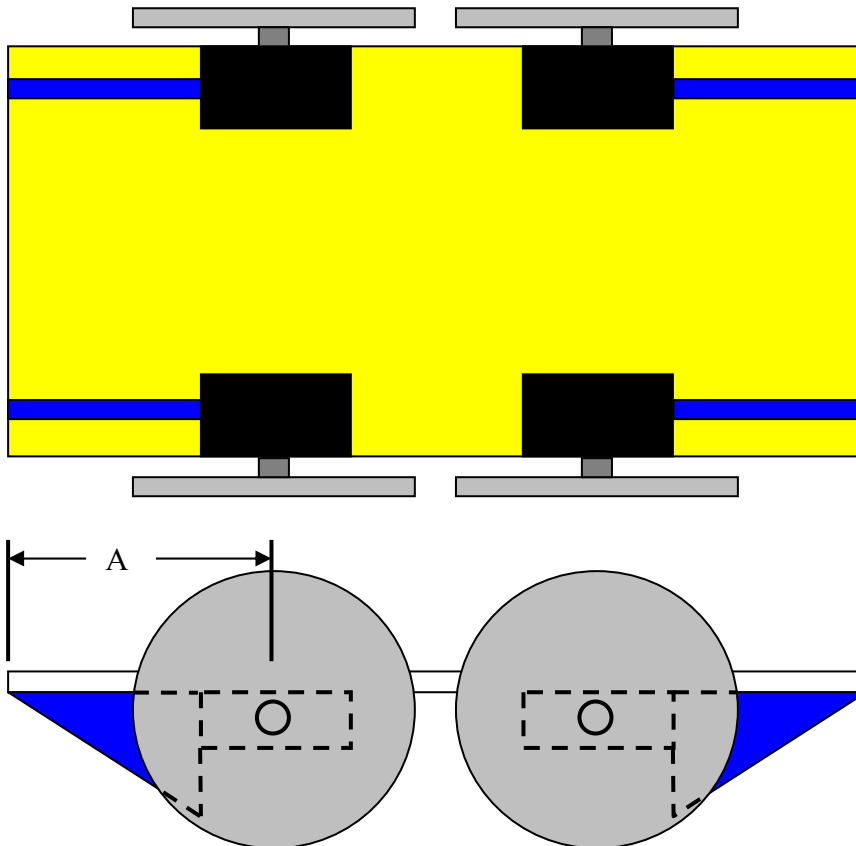
Team Members: James Darnell, Donald Lamb, Phil Harrison, Iam Seamans

Assignment:

1. Use Inventor to investigate several wheel sizes, wheel locations, and ramp sizes in order to determine your team's final recommendation for each.

Some general guidelines are provided below:

- Create a simple chassis part.
- Create a simple ramp (extruded right triangle).
- Create an assembly including the chassis (base part), 4 ramps, and 4 subassemblies consisting of a servo and wheel (as created in Team Assignment #1).
 - Note that the servos could be mounted to the top or to the bottom of the chassis.
 - The bottom of the chassis must be at least 1.75" above the track surface.
 - Be sure that the overall width and overall length of the vehicle do not exceed 11".
 - Offset wheels could be used, but this will reduce the space needed by the ball pickup team.
 - A center "ramp" could be added between the wheels if the team feels that it would be beneficial.
 - Our servos have a max velocity of about 50 rpm. The distance traveled for each revolution is the circumference of the wheel. Larger wheels result in a faster vehicle and generally a smoother transition over the barriers, so try to use larger wheels if possible.
- A rough possible sketch is provided below.



(Power Train Team specifications – continued)

2. Team recommendations required:

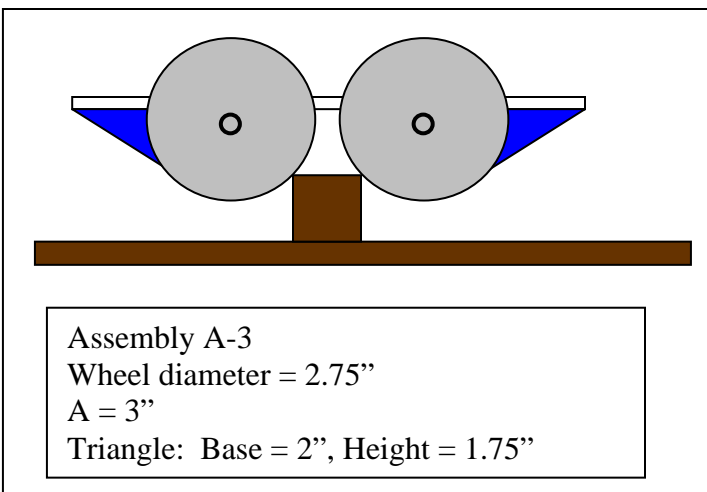
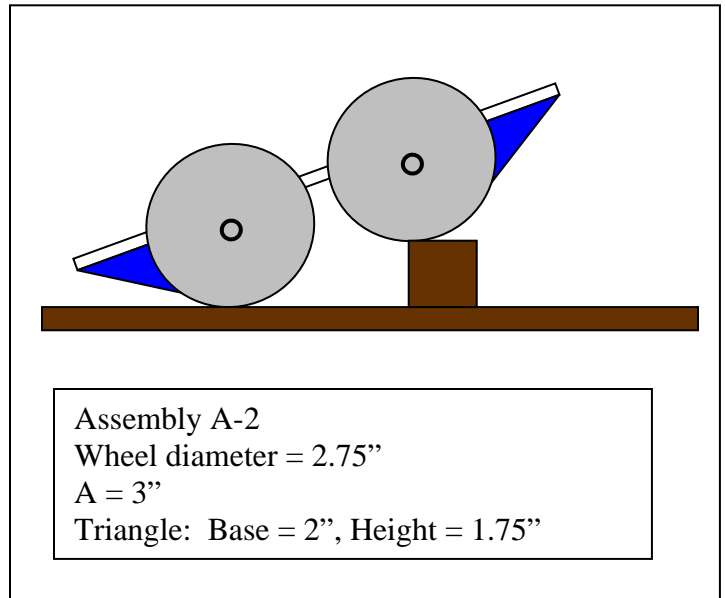
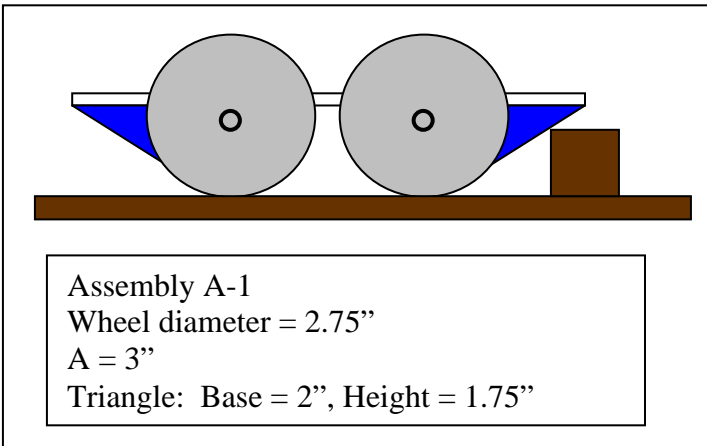
- Diameter of wheels
- Size of triangle
- Location of wheels (dimension A in the sketch on the previous page)
- The clearance from the bottom of the chassis to the track.

3. Determine the recommendations listed above as follows:

- Create a simple portion of track, consisting of a board a barrier.
- Create a new assembly consisting of a small portion of track (base part), a 1.5" x 1.5" barrier, and your vehicle assembly. Use constraints to make your wheels or ramps tangent (or mated) to the track/barrier in various locations. Print a drawing of the assembly in various positions. Be sure to list the wheel size, ramp size, and wheel location in the title block. See the example below.
- Repeat the step above for various wheel sizes, wheel locations, and ramp locations.
- Using the drawings above, form your recommendations.

4. Turn in the following items:

- Several assembly drawings as noted above showing various configurations and locations on the track. An example for one configuration (Assembly A) is shown below.
- An assembly drawing marked **FINAL RECOMMENDATION** with your team's recommendations clearly specified (including the clearance under the vehicle).
- Detail drawings for the chassis part and the ramp part.



Team Assignment #2

Team: Ball Collection Team

Team Members: John Monahan, Chris Johnson, Joe Cofer, Joe Lewis

Assignment:

Complete the design of the ball collection device, including the intake, ball storage portion, dumping mechanism, etc.

Meet with the Power Train team to discuss the available space for the ball collection mechanism. Note that the mechanism must fit between the servos (perhaps 7", as illustrated below) in the lower portion of the vehicle, but could be wider above the servos. However, keep in mind that **smaller is better!** We also need room for battery packs, sensors, the Board of Education, switches, etc. Also note that a taller vehicle may not be as stable when climbing over barriers.

Produce and turn in the following:

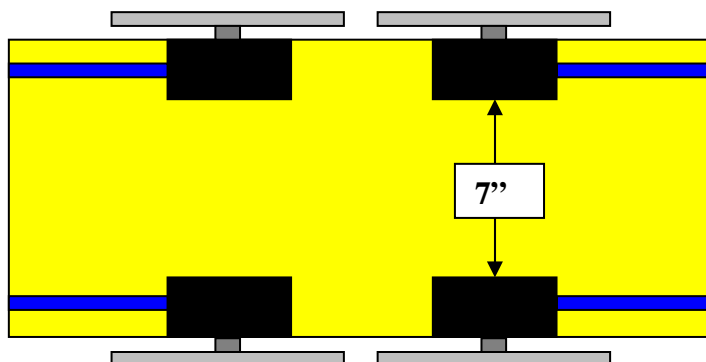
- Detail drawing for each part of the ball collection mechanism. In general, use a different part for each item to be produced in lab. For example, if you need to cut 12 pieces of PVC in lab, use 12 parts. In this manner we will have exact dimensions for each part and can cut them according to your drawings. Consider how
- Assembly Drawing consisting of each of the new parts above as well as the fan assembly produced earlier.

Notes on Detail Drawings:

- Measure each part by hand as accurately as possible.
- Look for measurements online from the manufacturer.
- Ask the instructor if you need help on measuring a feature or specifying dimensions.
- Use good dimensioning practices in dimensioning each part.
- Pick appropriate colors (to match the actual appearance if possible).
- Include a top, front, side, and isometric view for each part.
- Each team member should author at least one part (clearly specified in title block).
- Title block should include part name, team name, author name, course number, and scale.
- Use appropriate part names.

Notes on Assembly Drawings:

- The assembly drawing should consist of only an isometric, a parts list and balloons identifying each part.
- Title block should include assembly name, team name, author name, and course number.
- No dimensions or scale are required for assembly drawings.



Team Assignment #2

Team: Chassis Team

Team Members: Beau Hoyt, Eric Porter, Xay Alderman, Imran Aziz

Assignment: Produce and turn in the following:

- Detail drawing for a 1" long 4-40 female/female offset. (4 of these offsets will be used to mount the Board of Education). Use bitmap threads.
- Detail drawing for a 4-40 screw (0.5" length of threaded area). Use bitmap threads.
- Detail drawing for a 9V battery. External labels are optional.
- Detail drawing for a simple chassis consisting of a 10" x 11" x 3mm piece of PVC. Put four 4mm holes in the chassis with correct spacing to mount the Board of Education on the chassis. Pick some convenient dimensions (that can be modified later) showing how far the mounting holes are from the edges of the chassis.
- Assembly Drawing consisting of the chassis (base part), 4 offsets, 8 bolts, and a 9V battery.

Notes on Detail Drawings:

- Measure each part by hand as accurately as possible.
- Look for measurements online from the manufacturer.
- Ask the instructor if you need help on measuring a feature or specifying dimensions.
- Use good dimensioning practices in dimensioning each part.
- Pick appropriate colors (to match the actual appearance if possible).
- Include a top, front, side, and isometric view for each part.
- Each team member should author at least one part (clearly specified in title block).
- Title block should include part name, team name, author name, course number, and scale.
- Use appropriate part names.

Notes on Assembly Drawings:

- The assembly drawing should consist of only an isometric, a parts list and balloons identifying each part.
- Title block should include assembly name, team name, author name, and course number.
- No dimensions or scale are required for assembly drawings.

Team Assignment #2

Team: Accessories Team (formerly Steering Team)

Team Members: Chris Bellmore, Stephan Villemil, Johathan Amory, Khoa Nguyen

Assignment: Produce and turn in the following:

- Detail drawing for the Sharp GP2D120 Distance Sensor (see web site for dimensions)
- Detail drawing for a mounting bracket for the sensor to attach the vehicle to the bottom of the chassis. A rough sketch is shown below. The material should be 3mm thick PVC. All holes should be 4mm in diameter. You pick the other dimensions (check the size of the sensor)! The oblong holes are for adjusting the sensor height and position during testing of the vehicle. The triangular portions of the bracket are to strengthen it as the PVC will be glued.
- Detail drawing for a 4-40 screw (0.5" length of threaded area). Use bitmap threads.
- Detail drawing for a 4-40 nut. Use bitmap threads.
- Detail drawing for a JST connector for the sensor (with only 1/4" wires).
- Assembly Drawing consisting of the GP2D120, JST connector, mounting bracket, two screws, and two nuts.

Notes on Detail Drawings:

- Measure each part by hand as accurately as possible.
- Look for measurements online from the manufacturer.
- Ask the instructor if you need help on measuring a feature or specifying dimensions.
- Use good dimensioning practices in dimensioning each part.
- Pick appropriate colors (to match the actual appearance if possible).
- Include a top, front, side, and isometric view for each part.
- Each team member should author at least one part (clearly specified in title block).
- Title block should include part name, team name, author name, course number, and scale.
- Use appropriate part names.

Notes on Assembly Drawings:

- The assembly drawing should consist of only an isometric, a parts list and balloons identifying each part.
- Title block should include assembly name, team name, author name, and course number.
- No dimensions or scale are required for assembly drawings.

