



General Guidelines for Mentors

Mentors should try to ensure that the student teams approach the design and construction in an orderly and methodical manner. The goal is to construct a robust machine that has the following design characteristics:

- Simple and understandable
- Reliable
- Changeable
- Producing and easily maintained
- Strategic
- Fool-proof

Several steps to consider in this process include:

- Identify major sub-systems or critical components
 - Chassis and wheels
 - Power and controls
 - Lift/reach arm and gripper assembly (“end effector”)
 - Radio interface
- Form sub-teams to concentrate on specific tasks in each sub-system
- Identify critical tasks each must define
- Identify solutions or design concepts that can be modified for a particular problem
- Brainstorm and evaluate ideas for handling design problems
- Oversee detailed prototype drawings and/or mock-up design process
- Integrate the major sub-systems and components
- Test the design concepts through field trials and game simulations
- Evaluate and critique machine performance
- Evaluate opponents’ design and construction (at Mall Day)
- Redesign, rebuild, and retest as needed

Past experience dictates...

- Inventory all parts at Kick Off Day
- Concentrate on driving as much as design – half of a team’s success is great driving skills
- Build the base ASAP so team can be driving and practicing maneuvering
- Set a hard-and-fast timeline for sub-system unit completion
- K.I.S.S. (Keep It Simple, Silly)
- Trim waste and excess
- Focus should be on “end effector”
- Few quality decisions are made by students working without adult presence
- Very limited progress can be made without mentors present

A mentor should:

- Set an example (be on-time, ready to work, know when to play and when to work)
- **Provide an understanding of the engineering process**
 - *Refer to the Teacher-Mentor Workshop appendix for “An Overview of the Engineering Process”*
- Explain the importance of schedules and budgets
- Describe the organizational process
- Provide technical guidance
- Ensure that students consider all phases of the contest
- Explain brainstorming techniques
- Discuss methods for evaluating design concepts
- Describe prototyping methods
- Relay any rules questions to the hub’s technical coordinator
- Distribute answers to all questions
- Ensure all rules are followed
- Assess skill levels of students and utilize accordingly
- Demonstrate sponsor appreciation
- **Resist temptation to improve students’ designs and executions**