

New Mexico Boosting Engineering, Science and Technology NM BEST

BEST is an event that inspires and motivates students towards careers in engineering, science, and technology through participation in a sports-like technology contest. The BEST (Boosting Engineering, Science & Technology) competition motivates students by challenging them to build a remotely controlled robot that accomplishes a defined task within a competitive setting. A school coach guides a student team through the engineering process. Using only the materials provided (a box of construction parts – wood, plastic, metal, nuts, bolts, screws, duct tape, etc; and electronics: motors, radio transmitter/receiver, speed controllers, etc.), students have six weeks to design, develop, and test a robot that can outperform their competitors. During this time, the students experience the same problems, challenges, and breakthroughs that an engineering team encounters when it takes a product to market. In both cases, there are team dynamics, time constraints, material constraints, and pressure from other teams who are trying to solve the same problem. Placed in a real situation, with real problems, the students provide real (and surprisingly ingenious) solutions.

The weeks of hard work culminate in a thrilling daylong competition that names one team the "BEST." The inspiring event combines the excitement of a high school football game with the strategy of a chess match and the intellectual challenge of a science fair.

The heart of BEST is the experience of solving a seemingly overwhelming task using simple engineering methods and old-fashioned teamwork. Thanks to this experience, students who participate in BEST are better prepared to meet the challenges of the Technology Age.

The same technology that is used in BEST is the basic technology behind much of the Aerospace technology. Through BEST, students learn about teamwork and science principles that govern machines. The games that vary each year help students to learn about application areas for robots and the technology they're using.

Goals and Objectives

The BEST vision is to improve the quality of life and opportunities for young people through engineering, science, and technology. The mission of BEST is to inspire and interest students in engineering, science, and technology through participation in an exciting sports-like technology contest.

The goals of BEST include the following:

- ◆ Help students understand technical concepts and principles.
- ◆ Provide students with a real-world engineering challenge that includes limited time and resource constraints.
- ◆ Offer students an academic experience that encourages abstract thought, self-directed learning, and decision-making.
- ◆ Provide team-building experiences for students.
- ◆ Promote good sportsmanship and ethical conduct within a competitive environment.

What is BEST? It is a robot competition. The students build a robot to do specific tasks for that year's game. It's best to have students work in teams - with each team working on a certain aspect of the robot - but sharing what they find. Teams can work on the notebook - documenting the work, building the robot body, working on the electronics, being the drivers and working on strategy to win the game. There are many ways students with various talents can participate.

The way the program works is:

Kickoff (first part of September):

Teams receive their materials (wood, pipe, connectors, tape, glue, string, plastic, metal, nuts, bolts, screws, etc, electronic components, and a notebook) at NMSU. Each team gets the same parts. The teacher of record usually comes. Students are encouraged to come, but the entire team doesn't have to come. The notebook contains the game explanation and rules, information about awards, and technical information. We go over the game, and answer questions. At this point your students may begin work on the robot.

From experience, the teams that do the best have students work in teams.

Possible groups/teams:

Students can work on the notebook (which describes all that your team does - documenting your work, and process).

Another group can work on the electronics - they'd be in charge of the electronic parts, learning how they work, how to connect them, and doing the connections - including soldering.

Another group could work on any special apparatus that would be needed for the game. This would include wheels, arms, pulleys etc and could be broken up into several groups.

Another group can work on strategy - organizing the drivers and spotters for the robot.

You can work together to brainstorm about what you want to do.

Making the robot parts and putting it together is the work of the students. So, having access to a shop is a must. If your school does not have one, then parents may be needed to offer help with shop equipment, or perhaps a local company has a shop that would show the students how to cut the pieces. It is possible that NMSU students could assist and use a machine shop on campus. Students need to think about what will work using research and trial and error. They may even run some experiments to see what would work best.

After 5 weeks (and it goes by quickly), the students have an opportunity to come to Las Cruces for a practice day. Teams will sign up for time slots of an hour and come and try out their robot on the game field.

At the end of 6 weeks, we have the competition. Teams arrive early for check in (we do a safety check of the robot, weigh and measure the robot, collect team notebooks, and take team pictures, set up their pit area and display). Teams also have about 15 minutes of warm up time on the game field before we start. During the game, students can be interviewed by judges. A subgroup of your team will give a presentation to a group of judges. By the end of the day, the notebooks have been judged, the presentations are complete, and the game competition is over. We have awards for the teams, and make special awards (for T-shirts, websites, most robust robot, most elegant, and the overall winners - first, second, third, and maybe fourth this year).

Teams that don't move on to the regional, then turn in their tub of electronic parts (or check them out for longer if they need them), and return home. Each participating team gets some recognition.

The program is FREE! The teams do need to be able to pick up their supplies, and come to game day and have to furnish their transportation – we may offer some travel allowance but teams would need to apply for it, and it is subject to available funds.