

How to get started in SumoBots

A guide to preparing for the SumoBots event in Science Olympiad

Getting started in SumoBots depends on a number of circumstances:

1. How much experience/expertise do the students who are competing in the event have with radio controlled cars?
2. Do the students have any resources that can help them (a coach or parent familiar with radio controlled cars, a school robot club that can provide help, etc.)?
3. How much money is available for this event?

If the students have experience with radio controlled cars or if they have someone with that experience who can help them, then you can build the bot without a great deal of expense. The steps are:

1. Obtain a transmitter/receiver pair that meets the rules with as little expense for additional crystals as possible. There is a 2.4 GHz transmitter/receiver pair available from Robot Marketplace for \$42.00 (2.4 GHZ automatically changes frequency to an unused band, so no crystals are required).
2. Now you need something to make the frame for your robot. If you have ever seen the VEX robot kit, the material they use for their frame is simply a heavy gauge form of an erector set. While the individual pieces from an erector set may not be sturdy enough for use, there is nothing preventing you from doubling up (or even tripling up) on the pieces to increase their strength.
3. Next you need motors. Check with your technology department (or even some parents) to see if they have any electric screw drivers that no longer work that they are going to discard. Nine times out of ten the problem with these screw drivers is the battery has died - the motors still work fine. If you can get two discarded screw drivers where the motors still work, you have the motors for driving two different wheels, and you've saved the expense of designing and building a steering system.
4. Wheels - if you can't afford to purchase wheels, take a look at old skateboard wheels or inline skate wheels. Rough up the surface with sand paper and you improve their traction.
5. You have to decide whether you want your robot to be able to gradually accelerate or go from standing still to full speed. If you want to be able to control the speed of the bot, then you will need an Electronic Speed Controller (ESC) for each motor. If you are OK with the bot having one speed (full speed), then the ESCs are not necessary (if the motors you use turn the wheels too quickly, you can use gears to slow things down to a speed you can control).
6. Finally, you need some sheet metal for the shell, something to make a plow-like device to push with (check out the wallpaper trim tool available at Lowes for \$3.78), and batteries to power your screw driver motors. You can get a 7.2 rechargeable battery pack from batteryspace.com for \$7.00.

Many of the items mentioned can be obtained for free just by having team members, parents, coaches, and teachers look through old items that they would be willing to donate (old erector sets, dead electric

screw drivers, small pieces of sheet metal, etc.). If your team has ever participated in any robot event in the past (robot ramble, robo cross, robo billiards, robot maze) then many of these parts are probably sitting in your storage area.

If your students have a limited knowledge of radio controlled cars and no one to help them, then you can look at robot kits, such as those made by VEX. You can even find kits designed for Sumo Bots, but be careful. Many of those kits contain parts that you don't need that allow the bots to operate autonomously. Check to see if you can purchase a kit at a reduced price if you don't buy the control board and the sensors that allow the bot to operate on its own. All that you would need to add to such a kit would be a transmitter and receiver – you can also check with students, parents, coaches, and other teachers to see if anyone has a transmitter/receiver that allows you to change frequencies that they would be willing to loan you for the competition. And don't forget to look on web sites where people offer items for sale (like Craig's List and EBay) for kits and transmitters being sold cheaper than the stores sell them.

Finally, if your students have little or no experience with radio control cars and no one to help them, you can purchase an r/c car (just make sure it has a transmitter that allows you to change frequencies), then put a sheet metal shell with a plow over the top. Again, look online for individuals who are selling r/c cars at discounted prices.

As for practicing for the event once the bot has been built, you don't need to make a second bot to practice with or even find another team to work out with. All you need for practice is some masking tape and 6 tennis balls. Mark out a starting box on the floor with the masking tape and mark six spots randomly arranged on the floor with the masking tape. Number the tennis balls with a magic marker, then place them on the spots. The students should then practice hitting each one of the tennis balls in order until they can do so without stopping the bot or backing up. The best preparation for the event is acquiring the ability to control the bot without having to think about it. This type of practice, repeated often enough, will allow the students to react to situations they find themselves in without even thinking.