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| **Name of Challenge** | **Description** | **Criteria** | **Difficulty Rating** |
| [Mobile Robot Chassis](http://www-education.rec.ri.cmu.edu/multimedia/mobilechas.shtml) | Become familiar with the Lego components by building a simple mobile robot chassis | May not be the same design as our taskbot | http://www-education.rec.ri.cmu.edu/multimedia/dif1.jpg |
| [Moving at a Precise Speed](http://www-education.rec.ri.cmu.edu/multimedia/move.shtml) | Add gears to your mobile robot to have it move at a precise speed. | Your robot must move at a speed between 8.5 cm/sec and 9.5 cm/sec | http://www-education.rec.ri.cmu.edu/multimedia/dif2.jpg |
| [Mobile Robots and Strength](http://www-education.rec.ri.cmu.edu/multimedia/mobilestrength.shtml) | Design and build a mobile robot that can push as many full cans of soda as possible. | Your robot should have a blade on the front, like a bulldozer, to push the soda cans. | http://www-education.rec.ri.cmu.edu/multimedia/dif2.jpg |
| [Touch Sensor](http://www-education.rec.ri.cmu.edu/multimedia/touchactivity.shtml) | Add a touch sensor bumper to your mobile robot and have it react to contact. You robot will have to be able to get around a variety of obstacles that you set up. | The robot will move forward until it senses contact with the touch sensor. When this happens, it will back up, turn slightly, and continue to move forward. | http://www-education.rec.ri.cmu.edu/multimedia/dif1.jpg |
| [Rotational Sensors and Distance](http://www-education.rec.ri.cmu.edu/multimedia/rotactivity.shtml) | Add a rotational sensor to your mobile robot and have it move a precise distance. | Your robot must move a distance of precisely 1.20 meters.• You must do this for two different sized wheels. | http://www-education.rec.ri.cmu.edu/multimedia/dif1.jpg |
| [Rotational Sensors and Orientation](http://www-education.rec.ri.cmu.edu/multimedia/rotorient.shtml) | Use rotational sensors to control how much the mobile robot turns. You will then program the robot to navigate through a maze. | Your robot must spin exactly 90, 180, and 360 degrees.  | http://www-education.rec.ri.cmu.edu/multimedia/dif3.jpg |
| [Firefly - Light bulb Finder](http://www-education.rec.ri.cmu.edu/multimedia/firefly.shtml) | Design a mobile robot that can seek out a light bulb. | The robot will begin in a random place away from the light bulb. The robot should find the light bulb, touch it, play a victory sound, and stop the program. | http://www-education.rec.ri.cmu.edu/multimedia/dif4.jpg |
| [Remote Control Car](http://www-education.rec.ri.cmu.edu/multimedia/remote.shtml) | Use touch sensors and a light sensor to remotely control a mobile robot. | The mobile robot should be able to move forward, backward, and turn. | http://www-education.rec.ri.cmu.edu/multimedia/dif4.jpg |
| [Lego Clock](http://www-education.rec.ri.cmu.edu/multimedia/legoclock.shtml) | Design and build a clock with a minute hand and a second hand. | Every second, the motor controlling the second hand must make one complete revolution. The second hand should advance 1 second. | http://www-education.rec.ri.cmu.edu/multimedia/dif5.jpg |
| [Catapult](http://www-education.rec.ri.cmu.edu/multimedia/catapult.shtml) | Design a catapult that can launch a ping pong ball the farthest distance. | The basket of the catapult must contain a light sensor to sense when the ball is there. When it senses the ball, it must give a 5 second countdown and then launch. | http://www-education.rec.ri.cmu.edu/multimedia/dif5.jpg |
| [Four-Legged Walker](http://www-education.rec.ri.cmu.edu/multimedia/four.shtml) | Design a robot that walks with 4 legs. | Only needs to be able to walk forward. | http://www-education.rec.ri.cmu.edu/multimedia/dif5.jpg |
| [Table Edge Detector](http://www-education.rec.ri.cmu.edu/multimedia/tableedge.shtml) | Design and build a mobile robot that can sense the edge of a table but not fall off. | The robot must move forward until it senses the edge of the table. At this point, it should back up, turn in a random direction, and proceed to move forward. | http://www-education.rec.ri.cmu.edu/multimedia/dif5.jpg |
| [Sensing Gravity](http://www-education.rec.ri.cmu.edu/multimedia/sensegrav.shtml) | Design and build a mobile robot that can drive either rightside-up or upside-down. It should sense which is which. | The robot must move forward when it is rightside-up and backward when it is upside-down. | http://www-education.rec.ri.cmu.edu/multimedia/dif5.jpg |