Washington Township School District			
STEM/Makerspace Curriculum			
Grade:	6	**Unit/Project Title:**	Blue Bot – Line-following, Obstacle-avoiding Robot
Timeframe:	3-4 classes per activity	**Extension of Science Unit:**	Forces and Motion Types of Interactions: Cause & Effect; Gravity, Magnet; Electrical
NJ Learning Standard(s):	***TECH.8.1.8.A.1*** *- [Cumulative Progress Indicator] - Demonstrate knowledge of a real world problem using digital tools.* ***TECH.8.1.8.F*** *- [Strand] - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.* ***TECH.8.2.8*** *- [Standard] - All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.* ***6-8.MS-ETS1-1.1.1*** *- [Practice] - Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.* ***6-8.MS-ETS1-2.7.1*** *- [Practice] - Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.* ***6-8.MS-ETS1-2.ETS1.B.1*** *- [Disciplinary Core Idea] - There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.* ***6-8.MS-ETS1-3.ETS1.C.1*** *- [Disciplinary Core Idea] - Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design.* ***6-8.MS-ETS1-4.ETS1.B.2*** *- [Disciplinary Core Idea] - Models of all kinds are important for testing solutions.*		
Objective:	SWBAT: • Construct a light-tracking robot and make adjustments to improve the robot's performance • Investigate how light sensors be used to steer a robot • Experiment with adjusting the robot's sensitivity to light to affect its steering • Test the aim of the light sensors to affect the robot's steering • Investigate how a voltage divider works • Investigate how a MOSFET works • Investigate how the robot's circuit works		

Brief description of the experiences: (How does it look and feel?)	Students will build up to four different robots, one at a time, with radically different behaviors. • *Guard Bot*—a robot that springs into action when an intruder arrives. • *Light-tracking Robot*—a robot that follows a flashlight the way a cat might stalk a moving light. • *Line-following Robot*—a robot that can follow a black line path. • *Obstacle-avoiding Robot*—a robot that can find its way through a crowded room.
What will students "know" and "be able to do" as a result of having experienced the unit/project? (How is the student's knowledge transformed?)	Students will know how to assemble a model robot and be able to troubleshoot and adjust parts to make it work and sense its surroundings.
What is possible now that wasn't before? (i.e. NJSLS and NJMLS practices exemplified)	Students will: • Conduct many trials and errors to achieve objective • Analyze failures and successes • Identify factors impacting overall achievement • Design a simple robot, using recycled parts • Identify characteristics of successful designs
Supplies Needed:	• Blue Bot Kit and Breadboard
Resources to Support Unit:	These websites have background and procedures you can print for your students, as well as video tutorials: https://www.sciencebuddies.org/science-fair-projects/project-ideas/Robotics_p022/robotics/light-following-robot#summary https://www.sciencebuddies.org/science-fair-projects/references/how-to-use-a-breadboard