

Project Lesson Plan: Garage Robotics

If this is a NEW squad, complete Lessons 1-9. If this is a continuing squad, you may skip lessons 1-9.

Based on a 50 minute class

Lesson Order	Module Name	Required/Optional	Activity	Preparation	Class Periods	Internet Required?	Type of Activity
1	Official Squad Member	Optional	What is MOUSE Squad?	Down load the Video ahead.	7 minutes	Y	Video
2	Official Squad Member	Required	Get on MOUSE Squad: Create Account	Follow activity directions.	1	Y	Computer or tablet
3	Official Squad Member	Required	Create Profile	Follow activity directions.	1	Y	Computer or tablet
4	Official Squad Member	Required	Create MOUSE Squad Avatar	Follow activity directions.	1	Y	Computer or tablet
5	Official Squad Member	Optional	Blog about Avatar	Follow activity directions.	1	Y	Computer or tablet
6	Official Squad Member	Optional	Leading the Way- A Space Quest Game	Post-it notes, Markers, 1 large 4 signs, each with a different leadership style name written on it (Pilot, Explorer, Thinker, Collaborator) poster of leadership wheel or handout. Follow activity directions.	1 or 2	N	Hands On

7	Official Squad Member	Optional	What is a Team?	A whiteboard, chart paper, or digital presentation tool. You may choose to print and cut out each of the quotes on the Quotes About Teams page so you can distribute the quotes to different students. Otherwise, you might just assign them a number. Teamwork 101 contains some helpful background information if you are new to team building. Follow activity directions.	1	Optional	Hands On
8	Official Squad Member	Optional	Great Teams	Follow activity directions.	1	N	Hands On
9	Official Squad Member	Optional	Teamwork Game: Make some noise	Choose one game card set: Animals, Household or Vehicles. Print out copies of the cards . Cut it up into individual slips of paper. There are 6 different cards, 2 of each per sheet. If you have less than 12 students, keep the numbers in each animal group consistent when you distribute the slips to each student. If you have more than 12 students involved in a training, copy extra sheets, each sheet has 12 cards total. Make sure to print out at least 2 of each card that you use so that no one has a card without a match in the room. Follow activity directions	1	N	Hands On

10	Garage Robotics		Level 1 – Circuitry: Understanding Circuits	<p>Mission 1: Steps 1-14. Gather the gear needed on the “Background” tab under “Gear”. Instructors may want to complete the activity before their students attempt it and keep an example of the completed project on hand for Squad Members to review. It may be helpful to provide a short 5 to 10 minute demonstration of the tools before students begin. Depending on the resources available for the activity, students can work individually or in small groups. Follow activity directions. If you would like more in-depth information about circuits, spend a few minutes reading the How Stuff Works overview in the link provided in the activity directions.</p>	1 –2	Y	Computer & Hands On
11	Garage Robotics		Level 1 – Circuitry: Light Dimmers & Intelligent Sensors	<p>Mission 2: Steps 1-12. Gather the gear needed on the “Background” tab under “Gear” and you will need the circuitry from the previous activity. Ohm’s Law teaches the fundamental relationship between Resistance, Current, and Voltage. In this lesson, we use Ohm’s Law to determine how changes in resistance affect the flow of electricity. You may find it helpful to review steps 3-5 before getting started. We give an introduction to Ohm’s Law with a traffic analogy: Voltage is represented by the amount of cars traveling down a road at once, Current is the speed of the cars, and Resistance are things that slow traffic, like</p>	1 – 2	Y	Computer & Hands On

12	Garage Robotics		Level 1 – Circuitry: Building a Nightlight With Transistors	Mission 3: Steps 1-9. Gather the gear needed on the “Background” tab under “Gear” and you will need the circuitry from the previous activity. For a deeper understanding of transistors, please explore the links provided on the “Background” tab. Follow activity directions.	1 – 2	Y	Computer & Hands On
14	Garage Robotics		Level 2 – Programming: Hello World! Introduction to the Arduino Microcontroller	Mission 4: Steps 1-11. Gather the gear needed on the “Background” tab under “Gear”. In this activity, each student will need to download and install the free Arduino programming software from the arduino website. If students do not have proper administrative privileges on their computers, you will need to pre-install the software on their computers. The download is approximately 70MB and free. Use the links in the “Background” tab. After Downloading & installing the Arduino Software, run through the tutorial located at http://arduino.cc/en/Guide/Windows or http://arduino.cc/en/Guide/MacOSX . Review the activities from topic one.	1 – 2	Y	Computer & Hands On
15	Garage Robotics		Level 2 – Programming: LED Light Chaser	Mission 5: Steps 1-13. Gather the gear needed on the “Background” tab under “Gear”. Review introduction to what Open-Source is and what that means for Arduino code. Follow activity directions.	1 – 2	Y	Computer & Hands On
16	Garage Robotics		Level 2 – Programming: Alarms & Switches	Mission 6: Steps 1-13. Gather the gear needed on the “Background” tab under “Gear”. Read the “Getting Started” text. Follow activity directions.	1 – 2	Y	Computer & Hands On

17	Garage Robotics		Level 2 – Programming: Return of the Nightlight! Digital Vs Analog Programming	Mission 7: Steps 1-10. Gather the gear needed on the “Background” tab under “Gear”. This activity is the final guided project of this Specialist Module. Building upon previous experiences with digital switches and "If/Else" statements, the Nightlight will introduce analog signals and ask students to measure a range of data collected by a photocell. Read the introduction to analog sensors, and review previous night light lesson from activity three if needed. Follow activity directions.	1 – 2	Y	Computer & Hands On
18	Garage Robotics		Level 3 – Prototyping: Researching Your Final Project	Mission 8: Steps 1-8. For this activity, you'll need only these materials: A computer with Internet access, Paper, pen/markers to design a blueprint. Read “Getting Started” Follow activity directions.	1 – 3	Y	Computer, video & Hands On
20	Garage Robotics		Level 3 – Prototyping: Building Your Final Project	Mission 9: Steps 1-6. In this final activity, students will build several iterations, or drafts, of the final prototype of their invention, and document the process along the way. More gear may or may not be required depending on what students want to do.	2 –?	Y	Computer & Hands On