Exploring Robotics: Spring 2015 Unit Plan
Urban Search & Rescue Challenge

Standard 1: STCO.07.03 Understand the engineer's role in the design process.
Standard 2: STCO.06.03.a Demonstrate the design process by defining a problem, brainstorming, researching and generating ideas, identifying criteria and specifying constraints, and exploring possibilities.
Standard 3: STCO.07.03.b Demonstrate the ability to collaborate and work effectively with others.
Standard 4: ITPR.01 Identify and analyze customer software needs and requirements to guide programming and software development.

Knowledge (what do you want them to be able to KNOW at the end of the unit):

Engineering Design:
• Students will understand the importance of the engineering design process and documentation of designs.

Building:
• Students will know how to wire a Tetrix robot.

Programming:
• Students will be able to design, test and refine a software program to control a robot that meets the challenge requirements.

Skills (what do you want them to BE ABLE TO DO at the end of the unit):

Engineering Design:
• Students will be able to work as a team to create and document an engineering design of their robot.

Building:
• Students will be able to use basic tools to construct a Tetrix robot.
• Students will be able to wire a Tetrix robot.

Programming:
• Students will be able to design, test and refine a software program to control a robot that meets the challenge requirements.

Essential Question(s):
What is the Engineering Design Process?
How do you make a robot move autonomously?

Key words/vocab:
autonomous vehicle: a vehicle that operates independently of continual input from the user
block diagram: a part of the LabVIEW for LEGO MINDSTORMS program where code is written by wiring together graphical representations of functions and VIs
code: a series of commands that tells the robot what to do
compile: translate the code into a language that the processor can understand
direct mode: a programming mode in which the NXT Brick is connected to the computer via USB or Bluetooth®, and the program executes on the computer
download: load the compiled program onto the NXT Brick
engineering design process: a guideline that engineers follow to ensure that their product is designed efficiently and effectively

front panel: the part of the LabVIEW for LEGO MINDSTORMS program where a user interface can be placed
prototype: a model of a design on which tests can be performed to evaluate whether the design should be used for the final product
remote mode: a programming mode in which the NXT Brick does not need to be connected to the computer, and the downloaded program executes on the NXT Brick
Virtual Instrument (VI): a LabVIEW for LEGO MINDSTORMS program

WICOR Strategy:
Collaboration - Students will work in small, collaborative groups to complete all the tasks
Inquiry - Students will identify, brainstorm, and solve a problem

Unit Performance Assessment:	**Formative Assessments (daily/weekly):**
1. Engineering notebook **2. Group technical presentation of programming solution and final robot build** **3. Robotic challenge competitions**	**1. Engineering notebook** **2. Team Google Doc with daily plans** **3. Writing prompts/discussions** **4. Exit tickets**

Urban Search & Rescue Challenge: Explosive Ordnance Disposal (EOD). Students will create a mobile robot like those employed by emergency service personnel (fire, police, military). The robot will be designed to secure an area by locating, neutralizing, moving, and disposing of explosive materials.