Unit 1: Understanding the Basics

Content Area: **Technology**
Course(s): **Robotics**
Time Period: **September**
Length: **3 weeks**
Status: **Published**

Enduring Understandings

Big Idea: Programming is Precise

- Computational thinking practices are critical for all students to learn.
- Robots are complex devices.
- Algorithms are capable of carrying out a series of instructions.
- Outputs drive the different ways in which a wheeled robot can move.

Essential Questions

- Why do software engineers develop computer programs to control technology systems?
- What are the major steps of the design process?
- How does the design process help to produce more successful technologies?
- What are some methods used to share design ideas?
- How are science, technology, engineering, and math interrelated?
- How do the constraints of a design challenge ultimately impact the final product?

Content

Skills

- Develop a sound understanding of technology concepts, systems and operations and use computers and other technologies for productivity, problem-solving, and learning across all content areas.
- Develop logical thinking and programming skills.

Articulate appropriate academic vocabulary for computers and associated materials:

Robot

off-Line programming

on-line programming

Autonomous

Software

Hardware

Download

Upload

Resources

Every student in every school should have the opportunity to learn computer science. Exposing the learner to multiple platforms for learning code facilitates a better understanding of the extensive resources available while creating a broad foundation of the basic concepts and principles behind computer science. The Robotics class will use the following platforms and resources:

(1) MAC Computers with OS X Yosemite version 10.10.5 with 8GB Memory

(2) Ideally, each pair of students will work together at one MAC computer, with one EV3 robot.

(3) Set up each workstation with: • LEGO® MINDSTORMS® Education EV3 Programming Software installed • Education version required*.

(4) EV3 Firmware V1.06H.bin or most current version

(5) Access to the Introduction to Programming LEGO® MINDSTORMS® EV3 curriculum software • This can be installed locally or on a local network server • This can be accessed remotely via internet, if our network infrastructure/firewall and policies allow*

(6) Two pairs of headphones with headphone splitters • One pair for each student to avoid using speakers, as multiple workstations in the same classroom will generate too much overlapping noise

(7) One 45544 LEGO® MINDSTORMS® Education Set per 2 students. Please NOTE: based on class size, additional Mindstorm Kits may need to be ordered.

(8) Additional LEGO® MINDSTORMS® parts may need to be ordered due to incomplete existing kits or loss.

Throughout this course the learners experience will be enhanced using the following:

- TED-Ed Originals; short, award-winning animated videos about ideas that spark the curiosity of learners everywhere.
- Ted Talks videos (Ted.com). TED Talks are influential videos from expert speakers on education, business, and computer science.

Standards

TECH.8.2.8.A.2	Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system.
TECH.8.2.8.C.2	Explain the need for optimization in a design process.
TECH.8.2.8.C.3	Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.
TECH.8.2.8.C.4	Identify the steps in the design process that would be used to solve a designated problem.
TECH.8.2.8.E.4	Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).