# **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:

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.

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).