TECHNOLOGY-9

SELECTIVE UNIT 3 (S03)

(Robotics)
(July 2017)

Unit Statement: The student will have the opportunity to think creatively, reason systematically, and work collaboratively through the medium of simple programming and lego-based robotics. Through the use of Lego Wedo kits, the student will learn how to create construct and control a variety of simple robotic devices, with a focus on using motors for locomotion, tilt sensors to detect direction, and motion sensors to detect movement.

This unit requires no previous knowledge of robotics or programming, although experience in these areas will enable students to attempt more complicated constructs and programming. Additionally, the use of the Lego brand Wedo kit is not strictly necessary, as the concepts and programming taught herein are transferable to many other similar products, like Makeblock and Scratch.

Essential Outcomes: (must be assessed for mastery)

1. **The Student Will** create a working model.

2. **TSW** explain how a model works using topic specific vocabulary.

3. **TSW** establish links between cause and effect.

4. **TSW** follow 2D drawings to build a 3D model.

5. **TSW** produce a program exhibiting a specific behaviour.

Introduced & Practiced Outcomes:

1. **The Student Will** make systematic observations and measurements.

2. **TSW** reflect on how to find answers and imagine new possibilities.

3. **TSW** display and communicate data using tables.

Suggested Materials/Software:

If using the Lego Wedo kit, it comes with built in curriculum and activity documents that are highly recommended for both teachers and students. There are separate documents that tie into mathematics and the sciences.

Mathematics and Machines

Science and Engineering

If using Makeblock, additional instructional resources are available on their commercial website.

Makeblock

Ranger Course

Kids Maker Robots

Other kits may become available as time goes on. So long as they provide a foundation of robotics tied with a graphical programming interface they should be equally applicable to this unit.

Suggested Websites:

Destiny Webpath Express (found on QSI schools Library site) use this search engine to find age-appropriate websites that align with this unit.

Makeblock

Lego Education

Suggested Activities, Assessment Tools, & Strategies:

If using the Lego Wedo kit, there are 20 provided lessons on general topics ranging from gears, tilt sensors, pulleys and belts, levels, and repetition. Additionally, there are specific activities that can be used to challenge and motivate students, such as creating dancing birds, drumming monkeys, or a sailboat storm. Any or all of these activities would be appropriate for exploring the TSW's in this unit.

Additionally, a glossary of terms is provided to assist the student and the teacher with the specific vocabulary related to this unit.

ASSESSMENT RUBRIC FOUND ON FOLLOWING PAGE.................

Assessment Rubric - S03 - Robotics

Student Name:_____**Date:** _____**To receive a 'B' the student must show 'B' level mastery on ALL Essential Outcomes. (TSW's)**
To receive an 'A', the student must show 'A' level mastery on 3 of 5 available and 'B' level mastery on all remaining TSW's.

TSW	'A' Level Mastery	'B' Level Mastery	'P' Comments
1. **The Student Will** create a working model.		The student has constructed a robot that performs as expected.	
2. **TSW** explain how a model works using topic specific vocabulary.	The student can predict how a model works using topic specific vocabulary.	The student can utilize vocabulary related to robotics and programming to explain how a model works.	
3. **TSW** establish links between cause and effect.	The student can explain how the parts of someone else's program will affect a robot.	The student can explain how the parts of their program affect their robot.	
4. **TSW** follow 2D drawings to build a 3D model.		The student can create a model by following instructions.	
5. **TSW** produce a program exhibiting a specific behavior.		The student can produce a program exhibiting a specific behavior.	