



Robotics - Beginners

Overview: This unit will introduce students to the fascinating world of Lego Mindstorms Robotics. Students will work in pairs or groups, depending on the number of available kits, working, collaborating and sharing responsibilities in the building of the Basic EV3 Educational Robot. Problem-solving, collaboration, precision, and following instructions are key to this unit. It is important to be patient and learn all of the introductory skills and information before moving on to the Advanced Robotics Unit.

Goal: Students will be introduced to robotics and design

Unit duration: 5 weeks

By the end of this unit, students will be able to:

- Identify individual technic pieces - learn how to use bricks, rods, beams, and sensors
- Realize the importance of organization, location, and placement of parts in the kits
- Follow detailed design plans
- Build a Lego Mindstorm Basic EV3 Educational Robot
- Engage in problem solving activities
- Work collaboratively to solve problems and reach conclusions

Materials

- EV3 Mindstorm Robotics Kit
- Instruction manual
- Power point – showing pieces
- Tape measure
- Needle nose pliers

Resources

- <https://www.teacherspayteachers.com/Product/EV3-Lego-Mindstorm-Video-Lesson-Tutorials-2865727>
- <https://le-www-live-s.legocdn.com/sc/media/files/ev3-introduction-to-robotics/introduction-to-robotics-desktop-enus-ac953ea57400c23957e06f93f38bd99b.pdf>
- Resources provided with the EV3 Kits
- Videos found on YouTube

Activity Overview

Week	Activity	Activity outline	Guiding questions
1	Introduction	<ul style="list-style-type: none"> • Observe video before beginning unit • Identify parts in the kit, with help from the power point presentation • Become familiar with all parts and their location in the kit • Stress the importance of putting everything back where it came from – organization is key! • Do a few exercises of naming parts and have students locate each part • Make sure students are familiar with the names and functions each element of the brick kit • Be sure to have the EV3 Software installed on the laptop computers • Be sure to have all bricks fully charged 	<p>What do you know about robotics?</p> <p>Where do we find robotics? How could we make a robot?</p>
2	Design Plans	<ul style="list-style-type: none"> • During this session, students will learn how to read design plans. There are no words – just pictures • Go through the book, step by step • Make note of sizes, different views • Perhaps use an overhead projector to familiarize students with the design plans 	<p>Why is it so important to keep all of the parts organized?</p> <p>What are some ways we could keep things organized?</p>
3	Build a model	<ul style="list-style-type: none"> • Begin building the Basic EV3 Educational Robot • Precision is key – follow directions carefully • Stress to students that it has to be exact or it won't work – you will need to go back and start again. 	<p>Why is it so important to follow directions – precisely?</p> <p>How can we be sure we haven't missed any steps?</p>
4	Build a model	<ul style="list-style-type: none"> • Continue working on the model • If it doesn't work, go back and have students use their problem-solving skills to find a solution • If they are finished, help other club members to complete their robot model 	<p>What are some ways we could improve our robot?</p> <p>How could we help our fellow club members?</p>
5	Demonstration	<ul style="list-style-type: none"> • Compete robots • Time for the demonstration • Robots have been preprogrammed • Have each student present their robot • If it doesn't complete its task, work collaboratively to figure out how it can be fixed • If time, work on Tutorial #1 about programming the robots 	<p>What have we learned from this unit?</p> <p>What is the next step?</p> <p>Can you think of other places you see robots every day, now that you know more about them?</p>

Judging Criteria

Category	Criteria	Scale	Score
Design	Meets the design criteria (List criteria)	4-5 – Excellent 2-3 – Satisfactory 1 – Unsatisfactory 0 - Missing	
Methodology	Demonstrates intended design (List criteria)	4-5 – Excellent 2-3 – Satisfactory 1 – Unsatisfactory 0 - Missing	
Construction	Craftsmanship Adherence to design (List criteria)	4-5 – Excellent 2-3 – Satisfactory 1 – Unsatisfactory 0 - Missing	
Creativity	Shows creativity and innovation (List criteria)	4-5 – Excellent 2-3 – Satisfactory 1 – Unsatisfactory 0 - Missing	
Presentation	Clear and professional Thoughtful responses to questions Poster – clarity and aesthetics (List criteria)	4-5 – Excellent 2-3 – Satisfactory 1 – Unsatisfactory 0 – Missing	
		Total	