

MS 890

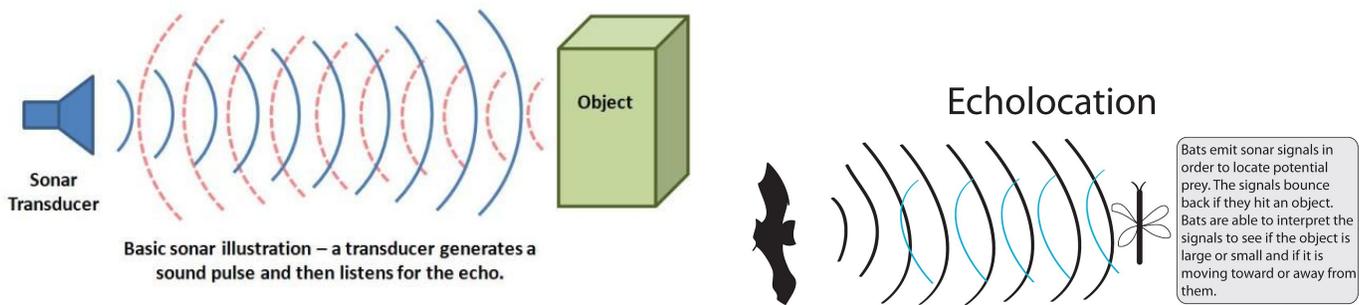
21 Hinkley St., Brooklyn, New York 11218

Educator: Ms. Ahmed

Unit: Ecosystems

ESSENTIAL QUESTION : Why does the earth never run out of energy?	Agenda	Est. Time
Materials Needed <ul style="list-style-type: none"> - Ev3 robots with ultrasonic sensors attached (8) - Measuring tape - Timer - Graphing paper - Laptops with ev3 program - Textbooks - Echolocation handouts 	1) <i>Entry Assignment</i>	5
	2) <i>Mini-Lesson</i>	15-20
	3) <i>Guide/Group</i>	30
	4) <i>Closing</i>	5-8
<p>LEARNING OBJECTIVE I will be able to model how animals use echolocation using the ultrasonic sensor and the ev3 robot.</p> <p>Standards</p> <p>-Changes in biodiversity can influence humans’ resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)</p> <p>-Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS2-3)</p> <p>-Analyze and interpret data to provide evidence for phenomena. (MS-LS2-1)</p>		
<p>WARM UP _____ <i>5-8 min</i></p>	<ul style="list-style-type: none"> - Students will write the definition and discuss an example of biomimicry. - Students will share out their answers randomly - Teacher will explain the true definition and address any misconceptions about biomimicry. 	<ul style="list-style-type: none"> • Brainstorm • Formative assessment
<p>TEACHER DIRECTED LESSON</p> <ul style="list-style-type: none"> • Teach • Model • Demonstrate <p>_____ <i>15 min</i></p>	<ul style="list-style-type: none"> - Teacher will tell students to go on the science study resources and look over the biomimicry example for their table. - Students will write about their examples on the handout - Students will share out what they learned. - Teacher will then go into how echolocation is a process scientists looked at for biomimicry. - Teacher will review how robots can use ultrasonic sensors to respond to objects similar to echolocation. 	<ul style="list-style-type: none"> • Modeling • Demonstration • Graphic Organizer

	<ul style="list-style-type: none"> - Teacher will model how to setup the system. - Teacher will ask one student to repeat how to conduct the modelling activity then distribute the materials. 	
<p>GROUP WORK</p> <ul style="list-style-type: none"> • Group <p>___30__ min</p>	<ul style="list-style-type: none"> - Students will use the lego ev3 robot with the ultrasonic sensor attached to see the response time of the robot to a prey based on different sonar power levels. - Students will do each echolocation program and time how long it takes to respond to the stimuli and record the time. - Teacher will ask the following questions while checking in with groups: <ul style="list-style-type: none"> - <i>“How is this system a model for how animals use echolocation?”</i> - <i>“How is this a model of “biomimicry”?</i> - <i>“What is the main purpose of the ultrasonic sensor in this system?”</i> - <i>“If you wanted to make the sensor power stronger to have the robot respond to stimuli faster, how would you do it”</i> - After students complete the data collection, they will turn off their robots and answer the analysis questions. - Then they will discuss the challenge 2 options with their groups and choose one to work on, where they will be modifying the system to result in a faster response time for the ultrasonic sensor. - For challenge 2 students will be asked to modify the system in order to reduce the reaction time for the robot. They will have the option of <ul style="list-style-type: none"> a. Modifying the experimental setup (possibly move book) b. Modify the robot (possibly change the location of the sensor) c. <i>Higher Level Challenge: Modify the code of the robot (modify the ultrasonic threshold value for each code)</i> 	
<p>CLOSING</p> <p>___8__ min</p>	<ul style="list-style-type: none"> - Teacher will give an exit ticket on Nearpod asking the following question: How did the system today model biomimicry? Explain your answer. 	<ul style="list-style-type: none"> • Share Out • Reflection • Exit ticket
<p>DIFFERENTIATION AND STUDENT NOTES</p> <p>The second part of the investigation will allow students to reflect on their strengths and choose an investigation to modify the experimental setup and improve the reaction time. The PowerPoint will have rich visuals and simplified language. The checklist will help students stay on track and complete all tasks, and this is a support we discussed from our horizontal team meetings. Students will also have a choice for challenge 2, where they can modify the robot, the setup, or the code to reduce the reaction time for the ultrasonic sensor. Higher level students who mastered the first challenge will be encouraged to try challenge C, which is to modify the code by changing the ultrasonic threshold value. Based on assessments, certain tables will have an echolocation scaffold such as the following to understand the concept of echolocation :</p>		



601: students with IEPs will receive small group instruction from Mr. Cummings and Ms. Cox. They will have a vocabulary scaffold which they can refer to while conducting the lab and answering the analysis questions. The vocabulary list has definitions in simple terms and has images to aid in understanding. Students will be seated according to mixed ability grouping based on the nearpod assessments and their recent ecosystem assessment grades.

602: students who are English Language Learners

(Jean Missaila – Expanding ,Karim Abdul – Expanding ,Mercado Marcos – Expanding ,Morales David – Expanding Richardo Martinez Sheila – Expanding ,Torres Mariano – Expanding ,Oleksander, Kurtianyk – Former ELL) will receive small group instruction by the teacher for additional support. They will have a vocabulary scaffold which they can refer to while conducting the lab and answering the analysis questions. The vocabulary list has definitions in simple terms and has images to aid in understanding. They will also have access to the ipads to confirm the pronunciation of key scientific terms.

603: Students in groups 1 and 2 receive small group instruction by the teacher for additional support as based on the teachers reflection from the grades on the formative assessment. Proben Shill is a former ELL student who will benefit from a vocabulary list with the definitions for key words to aid in the responses for the analysis questions.

604: Students in groups 1, 2, and 7 will receive small group instruction and/or frequent check ins for understanding by the teacher for additional support as based on the teachers reflection from the nearpod and ecosystem formative assessments. Students in this group will also receive the biomimicry article examples which are easier to understand. All students are seated based on mixed ability (high, medium, and low) grouping based on a combination of their formative assessment grades from Nearpod and Chapter 1 assessment. However, based on in class assessments, I may switch some students to move to tables 1 or 2 based on how much supports they need.

ASSESSMENT (*Evidence of Mastery*)

- Teacher will ask:
- **“How is this system a model for how animals use echolocation?”**
- **“How is this a model of “biomimicry”?”**
- **“what is the main purpose of the ultrasonic sensor?”**
- **“If you wanted to make the sensor power stronger to have the robot respond to stimuli faster, how would you do it”**
- *Teacher will have a midpoint check in to analyze the results so far and discuss trends based on the design of the robot.*
- *There will be a exit ticket which will ask “how did the system with the ultrasonic sensor and the book model echolocation in nature?”*

