<table>
<tr>
<td>Lesson Title:
ACES Lesson 3 Migrations at Sea</td>
<td>Author(s):
ACES Lesson 3 adding an activity from teachengineering.org found here: https://www.teachengineering.org/curricularunits/view/duk_bycatchunit_musc_unit</td>
<td>Note: We used this as an in class discussion on human impacts. We used our books as a source as we had already discussed some of these animals and seen a few on our field trip. Since we went fishing this was a great time to talk about human impacts of fishing. There are also a lot of large ports that we saw as we approached the beach. Students could then see how big the ships are for shipping large goods across the ocean. Students were really taken back by the large amount of plastic trash that was on an uninhabited island and were concerned for the wild horse that we saw there.</td>
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<td>Date:</td>
<td>Time required: 1 class period</td>
<td>Mentor Teacher:N/A</td>
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<td>Number of Students:125</td>
<td>Class (Grade/Course): 7th Grade Life Science</td>
<td>Safety Considerations:N/A</td>
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<td>Standards:NGSS
LS2.B: Cycle of Matter and Energy Transfer in Ecosystems (MS-LS2-3)
LS2.C: Ecosystem Dynamics, Functioning, and Resilience
・Ecosystems are dynamic in nature; their characteristics can vary
over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)
・Biodiversity describes the variety of species found in Earth’s terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem’s biodiversity is often used as a measure of its health. (MS-LS2-5)

Ocean Literacy Standards:
4 The ocean made Earth habitable.
6 The ocean and humans are inextricably interconnected</td>
<td>Objective(s):
To investigate migratory routes of marine animals.
To reinforce mapping/plotting skills with sample data.
To consider the environmental needs of marine animals.
To identify human impacts to marine life like bycatch and injuries due to shipping</td>
<td>Materials:
Each group needs:
larger bucket/container
smaller container
blindfold
"fishing net" (provide an assortment, such as cups, mesh bags, sandwich bags or aquarium fishing nets)
an assortment of many marbles and other balls of different colors and sizes, placed in a bowl to prevent them from rolling around; cheaper materials can be used, such as rocks; while numbers/colors/types of balls (fish) are flexible, here is an example assortment: 5 large red rubber balls (like the type for playing jacks), 10 glass marbles of color A, 10 glass marbles of color B, 3 golf balls, 4 pairs of dice, 10 very small pebbles (much smaller than the marbles)
water</td>
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		• paper and pencils, for recording data
ENGAGEMENT	Time in Min: 5	Outcome/Artifact: Students get a basic understanding of what impacts fishing can have on marine life.
What the **Student** does (indicate *individual, group, class* work)	What the **Teacher** does (include instructional strategies)	What **probing questions** will you ask? What answers will students give?
Student will watch and identify different types of fishing that lead to bycatch.	Hook: Show this video to explain what bycatch is: https://www.youtube.com/watch?v=NklxOhr2faI	How do humans affect marine life?
EXPLORATION	Time in Min: 20 min	Outcome/Artifact: Oral questioning what might bycatch be? How would it affect marine life? Accept all answers at this point.
What the **Student** does (indicate *individual, group, class* work)	What the **Teacher** does (include instructional strategies)	What **probing questions** will you ask? What answers will students give?
Divide the class into groups of four students each. Direct each student in every team to complete the following procedure: 1. Choose a type of fishing net to use. 2. Have your group members add the remaining marbles and balls to the water. 3. Have your teammates blindfold you. 4. Attempt to fish for the "target fish." Use the net to make two sweeps (make sure everyone is consistent), emptying your net into the group's smaller container. 5. Remove the blindfold. 6. Make a table to record your data: Initial number of total balls in the bucket and Number of balls removed during fishing. Within the number of balls removed, tally the exact number of each type of ball removed (for example, 5 small red balls, 2 large purple balls). After each student in the class completes this activity, each group of	The teacher will guide and facilitate the activity Ask a few of the "investigating questions" https://www.teachengineering.org/activities/view/duk_bycatchunit_musc_act Use this activity so students can act out or experience first hand what bycatch is.	Found in the "Investigating Questions" portion of this lesson. • Do you think bycatching affects your life? Do you think it is an important issue? • Did you find it easy or hard to just catch the "target species"? Why or why not? • Which types of gathering devices worked the best, and why? • What types of results did you get, in reference to your calculations? Were you surprised by your results? Did your teammates get similar or different results? Why? • Can you think of ways of designing a net that could be more effective? Are there any other materials you wish you could have tried? What are they and why do you think they would work better? • Are there any other methods you think would be successful in reducing bycatch besides modifications in fishing gear

four will have four tables of numbers. 7. Then, each group combines its members' data in order to calculate different percentages, which might include: 1) percentage of "target fish" in the initial full bucket (number of total "target fish" divided by number of total fish) versus the percentage of "target fish" that comprised the total number of fished balls (number of target fish obtained in the net divided by the total number of balls obtained fishing) or 2) percentage of "target fish" caught (number of "target fish" caught divided by the total number of "target fish") versus the percentage of other fish that were caught.		design?
EXPLANATION	Time in Min:15	Outcome/Artifact: Students get a better sense of how fishing/humans impact the ocean.
What the **Student** does (indicate *individual, group, class* work)	What the **Teacher** does (include instructional strategies)	What **probing questions** will you ask? What answers will students give?
Students will take written notes to learn about the different types of	https://www.teachengineering.org/lessons/view/duk_bycatchunit_musc_less Use the illustrations to explain what each of these types of fishing are that can potentially harm marine life.	• Do you think bycatching affects your life? • Do you think it is an important issue?
ELABORATION	Time in Min: 10	Outcome/Artifact:
What the **Student** does (indicate *individual, group, class* work)	What the **Teacher** does (include instructional strategies)	What **probing questions** will you ask? What answers will students give?
Think/Pair/Share Think about the animals. Pair up and discuss ways that fishing lines could be modified to reduce bycatch Share with another pair your ideas.	Teacher should circulate and ask questions.	• Can you think of ways of designing a net that could be more effective? Are there any other materials you wish you could have tried? What are they and why do you think they would work better? • Are there any other methods you think

		would be successful in reducing bycatch
EVALUATION	Time in Min: 15	Outcome/Artifact:
What the **Student** does (indicate *individual, group, class* work)	What the **Teacher** does (include instructional strategies)	What **probing questions** will you ask? What answers will students give?
Watch the following videos: https://www.youtube.com/watch?v=3BdtOvoLU6A https://www.youtube.com/watch?v=AWd52fx-UwY https://www.youtube.com/watch?v=sTuB88KaIpQ&t=25s Complete a 3-2-1: What 3 things did you learn? What 2 things did you find interesting? What is 1 question you still have?	Formative assessment 3 Things you learned 3 Thing you found interesting 1 questions you still have	• Can you think of ways of designing a net that could be more effective? Are there any other materials you wish you could have tried? What are they and why do you think they would work better? • Are there any other methods you think would be successful in reducing bycatch besides modifications in fishing gear design?