First Grade Mini Unit on the Impact Humans have on Marine Life

Learning Target: Students will be able to explain and provide examples of how humans can harm ocean animals and plants. Students will be able to identify ways humans can protect marine life from these dangers.

NGSS Standard: K-ESS3-3- Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

5E Lesson Plan	**Measurable Objectives and Standards:** **Learning Target:** Students will be able to explain and provide examples of how humans can harm ocean animals and plants. Students will be able to identify ways humans can protect marine life from these dangers. **Standard: NGSS Standard: K-ESS3-3-** Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. **Science and Engineering Practices:** **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in K-2 builds on prior experiences and uses observations and texts to communicate new information. • Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific models. **Disciplinary Core Ideas** **ESS3.C: Human Impacts on Earth Systems** • Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. **ETS1.B: Developing Possible Solutions** • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (secondary) **Cause and Effect** • Events have causes that generate observable patterns.
Engage The purpose of the ENGAGE stage is to pique student interest and get them personally involved in the lesson, while pre-assessing prior understanding.	This mini-unit will focus on the impacts humans have on marine life. To get students engaged and interested, the teacher will model the effects of pollution using celery and food dye (lesson retrieved from: https://www.plt.org/educator-tips/science-projects-pollution/) Model dropping food dye into a jar. Every drop of food dye will be a different pollutant such as trash, oil, etc. The celery stick will be placed inside the container. The celery stick will represent plants that could be used for food in different habitats. Discuss what may happen with the celery as it sits in pollution. Over the next few days, observe and discuss what is occurring with the celery and pollution before the mini-unit continues. Take time to

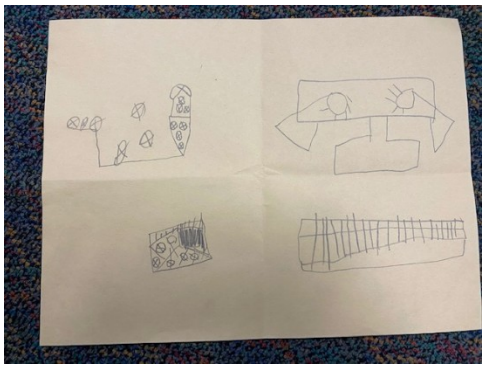
	compare what they thought would happen with what actually happens.
Explore The purpose of the EXPLORE stage is to get students involved in the topic providing them with a chance to build their own understanding.	After observing the celery for a few days and having a few quick discussions on what they notice, students will have the opportunity to work with their assigned teams to research marine life, pollution, and human impacts. The class will come back together and discuss/brainstorm the negative impact of humans on ocean life. Together we will make a list of their thoughts and research. Tell students we are going to look at four specific examples of how humans harm ocean animals and plants. The four mini lessons will include discussing runoff from streets into storm drains, impact of light pollution on sea turtles, dangers of boat propellers to manatees, and the impact of oil spills on marine life.
Explain The purpose of the EXPLAIN stage is to provide students with an opportunity to communicate what they have learned so far and figure out what it means.	Lesson 1: Runoff from streets into storm drains and where it goes (retrieved from: https://www.nationalgeographic.org/activity/how-people-affect-ocean-animals-and-plants/ .Show students the photo of a clear storm drain. Ask: *Have you ever seen a storm drain like this in the curbs of streets near you?* Tell them that what goes in storm drains eventually ends up in a lake or ocean. Now show students the photos of polluted storm drains. Explain that this is what happens when people throw trash and other materials on the street. When it rains, everything gets washed off the street and into the storm drains. As water flows through the drains, it washes this pollution all the way to the beach and the ocean. Ask: *How do you think the trash affects the animals?* Student teams will brainstorm ways to solve this issue and draw at least four different ideas. Come back together and share different ideas. Lesson 2- Light pollution and its effects on sea turtles (retrieved from: https://www.nationalgeographic.org/activity/how-people-affect-ocean-animals-and-plants/- Show students the photos of sea turtles. Explain to students that sea turtles swim around the world's warm oceans and nest on the beach. They face many dangers. Dangers include light from cities and towns along the coast. When baby sea turtles hatch, they move toward the brightest light. Scientists believe that turtles use the light from the moon to help them find the ocean. If they see a streetlight or a light from a car, they often head toward those lights. Ask: *What do you think happens to them?* Prompt students to answer that they never reach the sea and they can get run over by vehicles, eaten by other animals, or die of thirst. After this discussion students will work in their teams to research sea turtles, light pollution, and any other human impacts on their survival. Come back together to discuss findings. Lesson 3- (may take 2 days) Dangers of boat propellers to manatees (retrieved from: https://www.nationalgeographic.org/activity/how-people-affect-ocean-animals-and-plants/ - Show students pictures of manatees. Watch Pebble Go video on manatees. Show students photos of scarred manatees. Ask: *What do you think happened to hurt the manatees?* Explain to students that manatees are large, gentle animals that swim very slowly. Motorboats are a big problem for them—manatees are often injured or killed by boats' propellers because they can't swim out of the way fast enough. Teams will brainstorm how to help fisherman or people who own motorboats aware of this problem. They will write a letter, create a PowerPoint, make an advertisement, or choose another way to communicate the affects of boat propellers to manatees and upon completion will share with the rest of the first graders. Lesson 4- “Birds, Feathers, and Oil” lesson (retrieved from https://www.nationalgeographic.org/activity/birds-feathers-and-oil/)- Discuss the Gulf of Mexico oil spills but also refer to others. Using a globe show students the Gulf of Mexico and discuss how it is home to many species of plants and animals. Show students the Layers of Life diagram and discuss how an of the animals in the diagram were covered in oil and that many people helped get them clean. In teams, students will explore feathers and discuss what they feel like. Have teams imagine they are birds- fishing for food, diving for food,

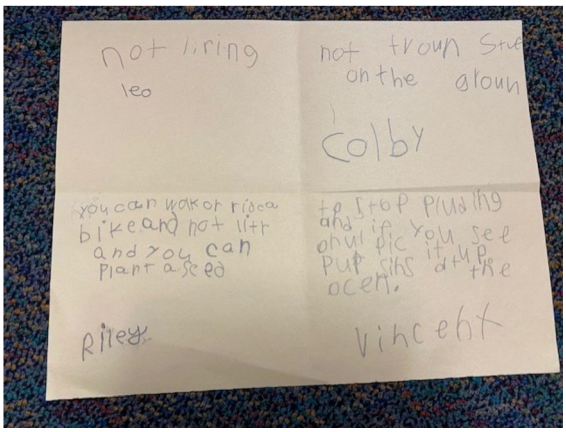
	walking around for food. Have students dip their feathers in water. Discuss what the feather feels like now and whether birds fly with wet feathers. Explain how most shore birds have special waterproofing oils in their feathers that let them fly when their feathers get wet. Teams will dip feathers into vegetable oil (to simulate oil from a spill) and together discuss what the feather feels like now and can birds fly with oil on their wings. Explain to students that, when birds have oil on their wings, the wings get too heavy and the birds can't fly. Students wash their feathers with dishwashing soap. Emphasize that this is how scientists and volunteers actually clean oiled birds. When students' feathers are clean, ask: *What does the feather feel like now? Does the feather feel the same as it did before it was oiled or washed?* Explain to students that the soap removed the bad oil and the natural waterproofing oils from the feather. Birds can fly after they have been washed, but they have a hard time flying after they get wet. When coated in oil from a spill, birds also have a hard time keeping warm, since their feathers are stuck to their bodies. Rescue workers wash, thoroughly dry, and warm birds before they are released back into the environment. Students will draw and label an illustration that answers the guiding question: How does oil affect feathers? Lesson 5- Identifying how people can help (retrieved from https://www.nationalgeographic.org/activity/how-people-affect-ocean-animals-and-plants/)- Ask students to describe things that people who live near or visit the ocean can do to keep the beach and water clean and to protect the animals that live there. Then discuss what people who do not live near the ocean can do to keep the beach and water clean and protect the animals that live there. Students will use their knowledge from the lessons to create a poster to inform other students and families about how to protect our ocean along with the animals and plants that live there.
Elaborate/Extend The purpose of the EXTEND stage is to allow students to use their new knowledge and continue to explore its implications.	Research storm drains in our community and where the runoff goes. Students can determine if the pollution in our storm drains could eventually make it to an ocean or other body of water. *Teacher will research to see if there are any programs that educate the public about how to keep the local waterways clean and see if we can have a guest speaker or virtual presentation.
Evaluate The purpose of the EVALUATION stage is for both students and teachers to determine how much learning and understanding has taken place	Students will present the poster they created on Seesaw for their families to see. If time allows, teams will present ways we can protect the ocean and animals even though we do not live in a coastal area.
Background Information and References The purpose this section is to provide adequate information such that another teacher could implement this lesson plan. This includes essential resources in APA format.	NGSS Lead States. (2013). Next Generation Science Standards: For States, By States. Washington, DC: The National Academies Press. Retrieved from: https://www.nextgenscience.org/search-standards Project Learning Tree. (2019). 10 Hands-On Science Projects to Teach About Pollution. Retrieved from https://www.plt.org/educator-tips/science-projects-pollution/ Friedman, N. (2015, August 7). National Geographic Society. How People Affect Ocean Animals and Plants. Retrieved from https://www.nationalgeographic.org/activity/how-people-affect-ocean-animals-and-plants/ Brown, J. (2015, August 7). Birds, Feathers, and Oil. National Geographic. Retrieved from https://www.nationalgeographic.org/activity/birds-feathers-and-oil/

Our first-grade students absolutely loved doing this mini unit. They were all very engaged and attentive during each lesson. To start, I used celery, water, and food dye to model the effects of pollution. I was quite concerned it would not work but the next day when we looked at the celery, we saw a noticeable difference. I had students share what they saw, and they noticed the celery had changed colors and shrunk at the top. Our

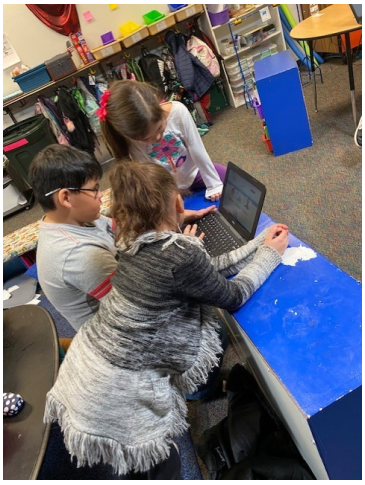
students were amazed at how the food dye had reached the top of the celery. I had them pass the celery around to observe a bit closer and they noticed at the bottom of the celery there were little holes. This led into a great discussion on pollution entering the stems of other plants and even the bodies of animals.

Lesson one was quite the hit and a couple of the students came up with some great ideas on how to solve the issue of trash going into storm drains. One example a student came up with was that every storm drain has a net in front of it to catch all the bad things, but the organic things would still flow through. Another thought about putting some sort of robot in the storm drain that collects trash before it goes all the way through. A third example a student came up with was to put posters or signs near the drains to remind people of the impact trash can have if it enters the storm drains. Most of the students were shocked that some of the trash from our storm drains could make it all the way to an ocean. When we complete these lessons next year, I would find a community member to come in and discuss in more detail the impact of trash in storm drains in Colorado and also find a way to show some of our storm drains and where trash may end up.



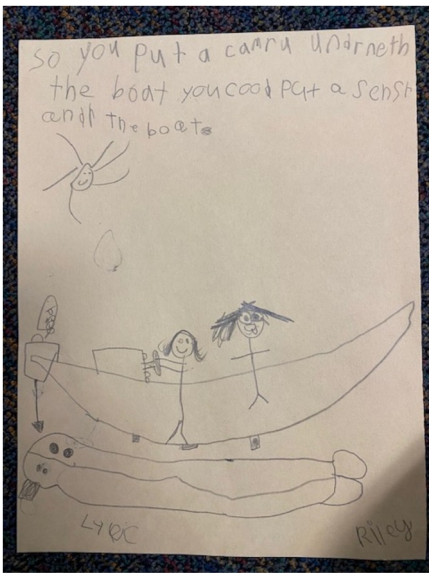


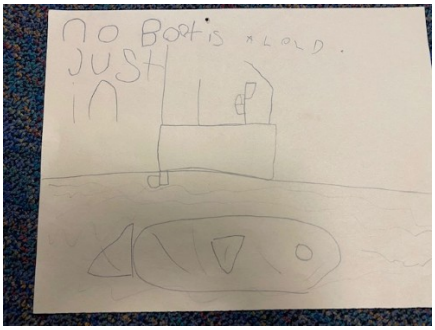
Lesson two had turtles so all the students were excited to hear more about how we are impacting them. Our discussion focused on how turtles usually follow the light of the moon, but now the lights of cities and towns have caused difficulty with baby sea turtles finding their way to the sea. It was a great day for lots of great discussion. Students took it further by discussing other ways we are impacting sea turtles with plastic and soda cans. It was very engaging, and students had a great collaborative discussion. I gave them time at the end to research and watch a couple of short videos discussing the impact humans have on sea turtles.



Lesson three discussed the dangers of boat propellers to manatees. This lesson was a bit more difficult since they did not have much background knowledge on manatees. My team and I asked students to create a poster to communicate the effects of boat propellers to manatees. Together we discussed what happened to hurt the manatees, but this question seemed to cause some confusion. We then asked how boaters and fishermen are going to know there are manatees in the water and this sparked a better conversation. Many students came up

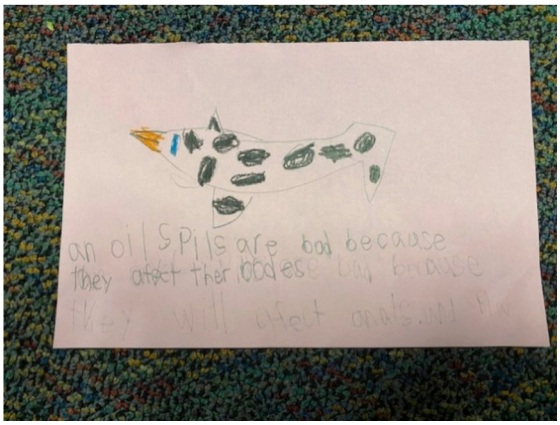
with the idea to have designated boating areas, signs up to let boaters and fishermen know manatees are in the area, some tried to think of how fishermen and boaters could not use propellers, and another thought using cameras under the boats could help them see the manatees. Even though some of these ideas are being used it was fun to see them come up with them with little knowledge on boat propellers or manatees. As I reflected on this lesson, I would give students time to gain background knowledge on manatees and boat propellers. Since we are not near an ocean some of these animals are new to them. This helped me realize we need to incorporate lessons about different marine life throughout our instruction.

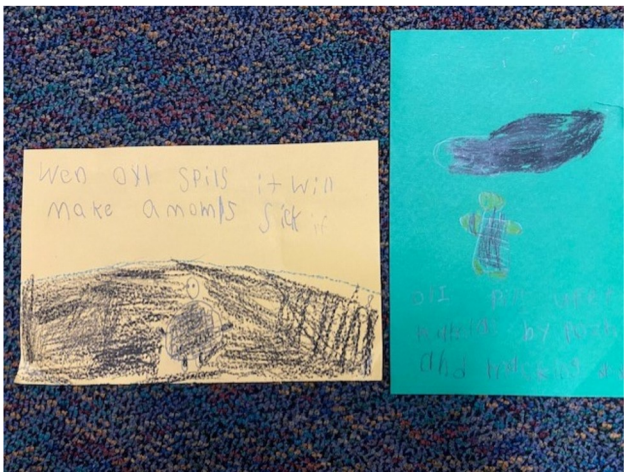


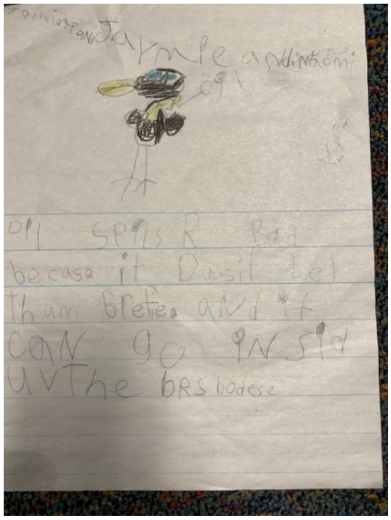


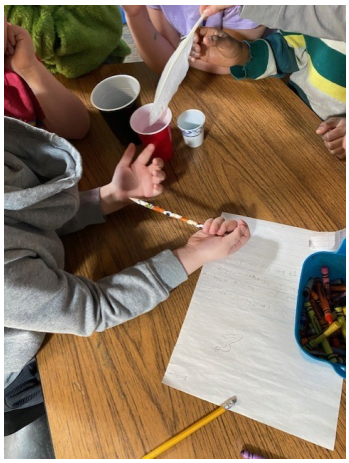
Lesson four was my favorite and the students loved being able to touch feathers and learn about oil spills. They enjoyed feeling the feathers dry, with water, with oil, and after the oil was washed off. The students could tell a difference between the feathers at the beginning to the feathers at the end. Many had never heard of scientists and volunteers clean oiled birds and animals. This lesson could be taken further where

students explore different oil spills around the world and the impact each one had on the habitat. Together they could compare the spills and come up with ways to prevent oil spills from occurring.



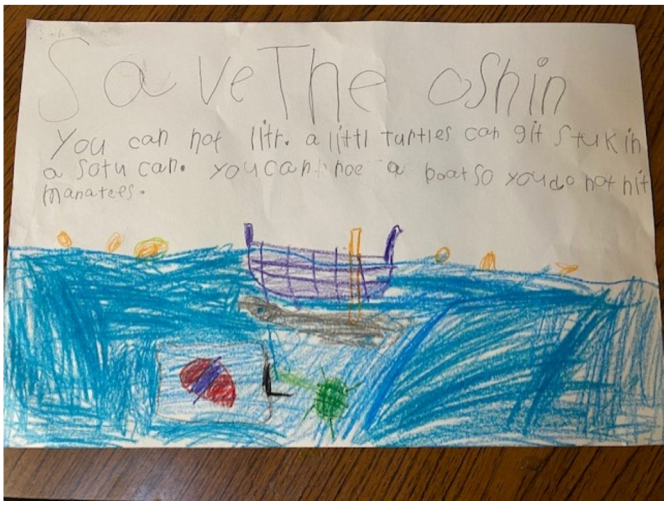


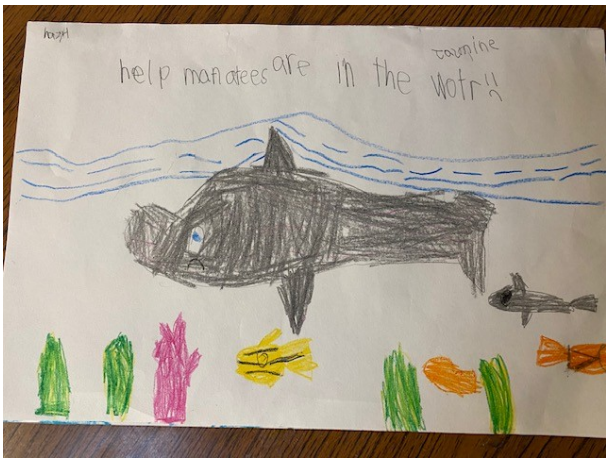


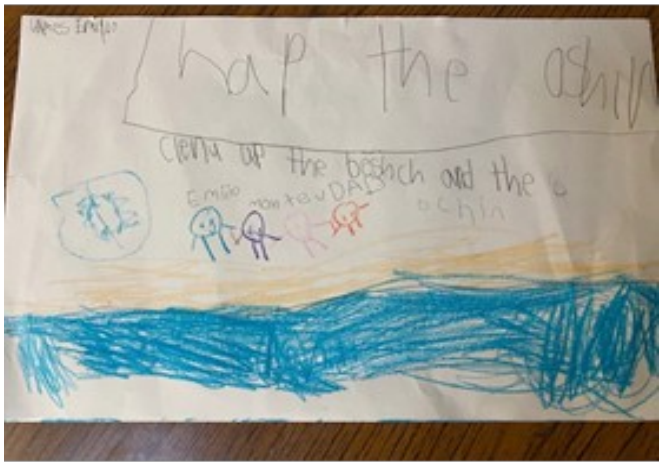


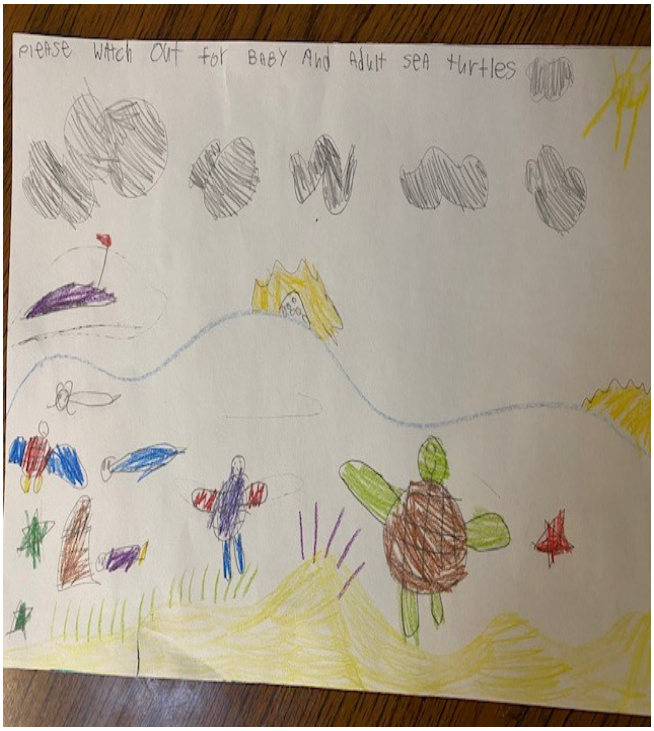
During the last lesson, students took all the information they had learned and used it to create a poster to inform other students and families about how to protect our ocean. Many created some great posters with their partner and collaborated well together. Their families enjoyed listening to the videos they created on Seesaw to

promote awareness. And we even had partners share their posters to different grade levels. During our technology time, I gave students the option to go to their favorite websites or to create a Board Builder about helping the ocean. Quite a few students chose this option. I have posted some photos below of their Board Builders. They included text, videos, and pictures.

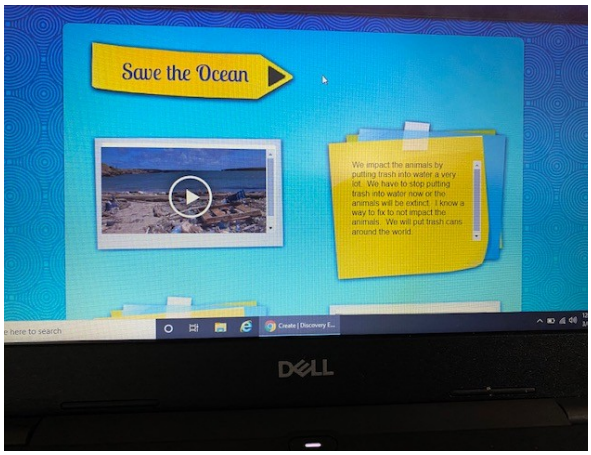




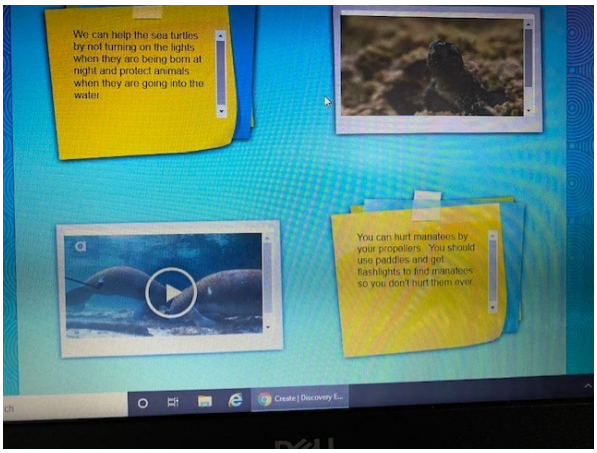




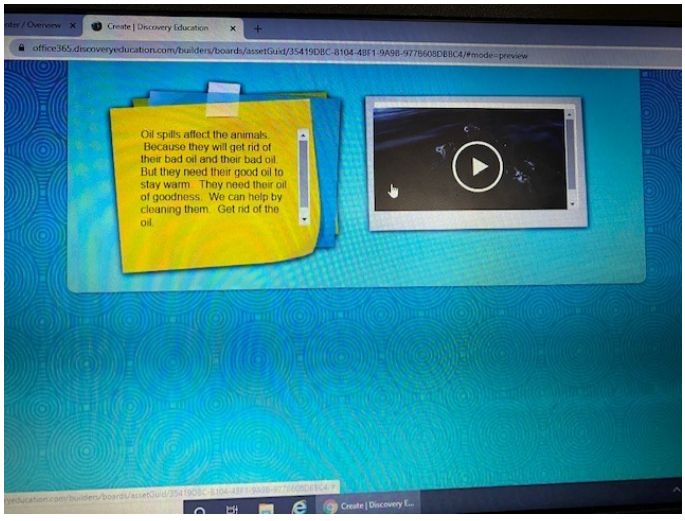
The best part about these two wanted to create a Board Builder is they never want to work together. It was great seeing the collaboration and how they were helping each other and taking turns.



First, they came up with a title “Save the Ocean” and then discussed pollution. “We impact the animals by putting trash into water a very lot. We have to stop putting trash into the water now or the animals will be extinct. I know a way to fix to not impact the animals. We will put trash cans around the world. They included a video showing pollution on our beaches.



These students wrote, “We can help the sea turtles by not turning on the lights when they are being born and night and protect the animals when they are going into the water. You can hurt manatees by your propellers. You should use paddles and get flashlights to find manatees so you don’t hurt them ever.” They included a picture of a



Then they discussed oil spills and wrote, “Oil spills affect the animals because they will get rid of their bad oil and their good oil. But they need their good oil to stay warm. We can help by cleaning them. Get rid of the oil.” They included video of that

As I reflected on these lessons, I realized our students did not all have the necessary background knowledge they may have needed to truly understand each lesson. In the future, I would take more time with each lesson to dig a bit deeper. Our first graders left with a little more than basic knowledge but next time I would like them to leave with a deeper understanding of the impact we have on marine life. Most students

focused on trash so I would like to provide more time for students to understand other ways we are impactful. But overall all the first graders were very engaged and my teammates enjoyed the lessons and loved how engaged the students were throughout this unit.