Title: Our Plastic Oceans 5th Grade Science Problem-Based Learning	
21st Century Skills Objectives:	• Environmental Literacy • Critical thinking and problem solving • Communication • Collaboration • ICT Literacy • Productivity and Accountability • Leadership and Responsibility
Course of Study Standards:	AL-ALEX-SC-2015.5.EHA.16- Collect and organize scientific ideas that individuals and communities can use to protect Earth's natural resources and its environment.
Materials:	Large plastic tubs (5), water, plastic ocean animals, seashells, 5 toy boats, cocoa powder, vegetable oil, plastic bags, coffee grounds, sponges, cotton balls, plastic tweezers, small plastic bottles with lids, coffee filters, iPads
Grouping Information:	20 students are grouped into 5 groups of 4. The students are grouped according to mixed skill levels. It looks random but high-functioning students are grouped with low-functioning students.
Pre-class Video/Materials: (Present)	Plastic Pollution in the Ocean Video How We Can Keep Plastic Out of Our Oceans Video Students will watch these videos at home before the lesson. If students do not have Internet access or if they need accommodation, this will be their morning work the day of the lesson. Students may write down any questions they have after watching the videos.
Anticipatory Set/ Introduction: (Present)	I will have three jars of water in front of the class. One jar represents clean water, one represents polluted water, and one

	represents filtered water. I will ask the students, “Of the three jars of water you see here, which one would you rather drink? Which one would you rather shower in? Which one would you rather live in if you were a marine animal?” We will discuss answers and compare the three jars of water.
Guiding Questions/Scenario: (Present)	I will then allow students to hold discussion with their table group members. I will prompt them to discuss what they saw in the videos they were to watch at home. I will ask, “As plastics production evolves, what are some of the threats to the health of our environment?” As students discuss I will walk from table to table listening in as they discuss. I will ask more questions throughout the lesson such as the following: 1. What are some of the hidden costs of us not addressing the problem of plastic pollution in our oceans? 2. How does plastics pollution affect sea life and the industry built around it, both short and long term? 3. Do you believe plastics pollution is the threat we can conquer in the next decade? Why or why not? 4. What do you feel it will take to get plastics out of our oceans from a personal/community/global standpoint? 5. What do you feel might be some innovative ways we can stop plastics build-up from choking our oceans and the life within them?
Student Activities: (Apply)	Each group will be creating their own representation of a polluted ocean. This is a hands-on activity that will allow students to see the effects of pollution and how hard it is to clean up pollutants in oceans. Students will be discovering that a proactive solution is

	desperately needed. Students will fill the tub with water about halfway. They will take a sample of the clean water by filling a small bottle and setting it aside. Then, add plastic ocean animals, seashells and a plastic toy boat to the water. Now, students have a nice, pretty polluted-free ocean. But wait… here comes the oil spill. Students will now mix a bit of cocoa powder and vegetable oil in a bowl. Then, drizzle the oil into the water, on the boat, and on the animals. I will allow students to observe what happened to the water. I will ask, “What do you think happens when oil spills into our oceans?” I will now give students coffee grounds and shredded plastic bags. I will have students place these items in the water. We will discuss what the water looks like now. Students will tell me that the animals are dirty and the plastic is surrounding them. I will prompt students with questions such as, “What if the sea animals mistake the plastic bags for food?” The representations of polluted oceans are now complete. I will say, “Now that you have finished your polluted oceans, I want you to get out your iPads. As a group, I want you to conduct research and answer the following two questions: What percentage of our oceans is polluted with plastics? How many animals die from water pollution every year?” I will write these questions on the board. Students will work with their group members to communicate, collaborate, and discuss findings and answers. Each student will go to this link at Poll Everywhere to submit an answer to me for each question: https://www.PollEv.com/megandaly428 Now it is time to clean up our oceans. During this portion of the lesson, students will discover how difficult it is to clean up the ocean. Before cleaning, students will take a sample of the polluted ocean water. Then, students will be given the following supplies

	and will work with their group to try and clean up their oceans: tweezers, cotton balls, sponges. I will be walking around to serve as a guide and support. I will be using guiding questions and comments such as, “It’s hard to clean, right? Think about how large our oceans are. Would it be easier to clean the oceans, or stop pollution from continuing to enter our oceans? How can we stop this problem? What can you do as an individual?” After students clean their oceans, they will collect a filtered water sample by using a coffee filter.
Student Presentation: **(Apply)**	To apply what students have learned, they will be creating a commercial with their group members. The commercial should be based on plastic pollution prevention. Students may use their three water samples in their commercial. The commercials should identify the causes and effects of ocean pollution, how we can work together to solve the problem of ocean pollution, and other “fun facts” related to ocean pollution. The commercial should be at least 3 minutes long, but no longer than 6 minutes. I will show examples of commercials to the students.
Debriefing/Discussion: **(Review)**	After the commercials are completed (it may take a few days) we will watch everyone’s commercials and conduct peer reviews of the commercials. Students must write down two things they liked and at least one suggestion for improvement OR one question for each commercial besides their own. Students with special needs may be provided with a modification here. They should be able to speak about the things they liked about the commercial. As a class, we will discuss the commercials and the reviews. We will also discuss how we can use these commercials to end ocean pollution. We may use social media to spread the word by sharing the commercials or create posters to hang around the school and community.

Assessment:	The students will be posting a blog entry when the lesson is over. Students will be given a rubric prior to completing the blog entry. The blog entry will allow students to write about what they have learned, causes and effects of ocean pollution, the information they gathered, the ideas they presented in their commercials, and conceptual understanding that this is a real-world problem that needs solving. Here is the rubric. Students with special needs or IEPs may be provided with accommodations or modifications for the assessment portion. If students are unable to write a blog entry, they may be provided with the opportunity to talk about what they learned from this learning segment.
Resources:	(2015, November 29). Plastic pollution in the ocean. Retrieved November 20, 2019, from https://www.youtube.com/watch?v=aFUHLtaTazQ&feature=youtu.be. (2016, September 16). How we can keep plastics out of our ocean. Retrieved November 20, 2019, from https://www.youtube.com/watch?v=HQTUWK7CM-Y&feature=youtu.be. ALEX: A Perfect Fit 4 Deeper Learning. (2017). Retrieved November 20, 2019, from https://alex.state.al.us/. Battelle for Kids. (2019). P21 Frameworks & Resources. Retrieved November 20, 2019, from http://www.battelleforkids.org/networks/p21/frameworks-resources. Thomason, S. (2018, July 19). Ocean Pollution For Kids: A Hands On Activity To Teach Children. Retrieved November 20, 2019, from

	https://www.simpleeverydaymom.com/ocean-pollution-for-kids/?utm_medium=social&utm_source=pinterest&utm_campaign=tailwind_tribes&utm_content=tribes&utm_term=393931548_13057308_105037. Watanabe-Crockett, L. (2019, April 18). 8 Exceptional Inquiry-Based Learning Activities Students Will Love. Retrieved November 20, 2019, from https://www.wabisabilearning.com/blog/inquiry-based-learning-activities.