

Finley Elementary Design Challenges- Washington STEM Grant

SE LASER – GEMS Kit STEM Design Challenge developed for : Kindergarten, Sifting Through Science

STEM Design Challenge Project Title: Pollution at Two Rivers

Created by: Meghan Paeschke, Mickey Middleton, Karli Teagle

STEM Design Challenge Project Placement and Pacing

Placement: Final Project at conclusion of Sifting through Science Unit.

Pacing: 5-8 days

Common Core State Standards:

Math: K.MD.1; K.MD.2; K.MD.3; K.CC.4; K.CC.6

Writing: W.K.2; W.K.5; W.K.7; W.K.8

Overview: Students will determine the best method of removing pollutants from Two Rivers Park.

Note: This was designed for the Finley Kindergarteners. Teacher may choose to change location to suit his/her locale.

Objectives:

- Student will be able to identify different pollutants in the sample.
- Students will be able to use correctly the following tools: tongs, magnets, screen, and a spoon
- Students will discuss and determine the appropriate tool to remove various pollutants.
- Students will be able to accurately graph their findings.

STEM Design Challenge Problem:

Students will read a memo from the fictitious Finley Fish and Wildlife Department stating that a local park is polluted and at risk of being closed down. *(Note: Teacher may change location and name of department to better suit students' environment/locale).* With summer on the way, we need your help. We are contacting you from the Finley Fish and Wildlife Department regarding a problem in your community. We have recently discovered a polluted beach problem at the local Two Rivers Park. It is now unsafe for wildlife and people to use this area. We are contacting you to help us identify what the pollutants are and for a process to remove these pollutants. We have heard you are the experts in sifting, magnetism, floating and sinking. It is because of these skills we are hoping you can suggest ways to clean up the local beach so that the park does not get shut down. Please be very careful with the beach samples. The pollutants are unknown and may be dangerous. **Do not touch with your hands.** Please report back to the fictitious Finley Fish and Wildlife Department with your data in one week.

Materials List:

- pieces of Styrofoam cup (15-20 per class)
- fishing bobbers (15-20 per class)
- bobby pins (15-20 per class)
- pop can tabs (15-20 per class)
- bottle caps (15-20 per class)
- dirty sand (5 lb bag)
- plastic quart size wide mouth jar (1 per group)
- water (approximately 1 cup per jar)
- tongs (1 per group)
- magnet (1 per group)
- screen (1 per group)
- spoon (1 per group)
- colored sticky dots (5 dots per group with different color)
- Polluted Sand Data Chart (1 per group)
- 5 Pollutant Graphs (per group) (one each for Styrofoam cup, fishing bobber, bobby pins, pop can tabs, bottle caps)

Instructional Plan:

1. Create identical beach samples with the same pollutants. *(Note: Ideal group size is 4-5 students. Number of samples created will change depending on class size.)*
2. Each beach sample will contain the following:
 - pieces of Styrofoam cup
 - fishing bobbers
 - bobby pins
 - pop can tabs
 - bottle caps

Depending on students' ability level the teacher will determine the appropriate number of each pollutant.

(Note: The pollutants listed above will be placed in plastic wide mouth jar with the dirty sand.)

3. Each group will have a beach sample on their tables.
4. Post procedures in classroom for student review.

Procedure:

1. As a class, view a sample of polluted beach sand. Discuss what can be physically seen in the polluted sand.
2. Start removing items. Remember do not use HANDS.
3. Record with a drawing or words how each item was removed on your data table.
4. As a class, graph the best removal tool for each item.

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Instructional Plan: (continued)

5. The students will be performing the activity while the teacher models each step.
6. After each pollutant is removed have each group state what tool was used.
7. Record results on Polluted Sand Data Chart. (Each group does this individually.)
8. Graph student findings on appropriate chart using group's dot color.
9. Repeat steps 6-7 until all pollutants have been removed.

Resources: (Websites, videos, books, recipes, memos, etc....)

1. GEMS Kits: Sifting Through Science
2. Various books available through school library

Evidence:

- Pollutant graphs for each of following: pieces of Styrofoam cup, fishing bobber, bobby pins, pop can tabs, bottle caps
- Teacher directed, student generated concluding letter to Finley Fish and Wildlife Department.
- Extension Project (if time allows) Student created poster promoting "Keeping Our Parks Clean."

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Dear Finley Kindergarten Scientists,

Help! Two Rivers Park is at risk of being closed down. With summer on the way, we need your help. We are contacting you from the Finley Fish and Wildlife Department regarding a problem in your community. We have recently discovered a polluted beach problem at your local Two Rivers Park. It is now unsafe for wildlife and people to use this area. We are contacting you to help us identify what the pollutants are and for a way to remove these pollutants. We have heard you guys are the experts in sifting, magnetism, floating and sinking. Because of these skills we are hoping you can suggest ways to clean up your local beach so that the park does not get shut down. Please be very careful with the beach samples. The pollutants are unknown and may be dangerous. **Do not touch with your hands.** Please report back to us with your data in 1 week.

Sincerely,

Finley Fish and Wildlife Department



Questions:

- What is polluting Two Rivers Park?
- How can we safely help clean it up?

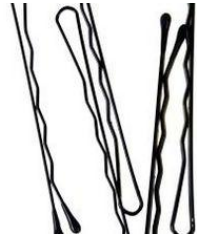
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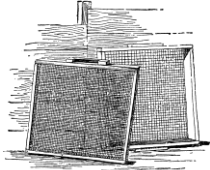
Name _____

Polluted Sand Data Chart

The Object	How did you remove it?	How many?
		
		
		
		
		





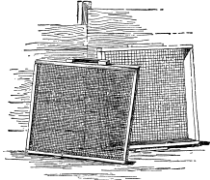
Bobby pins



spoon 	tongs 	water 	magnet 	screen 


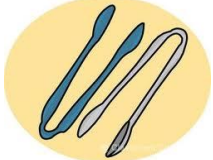


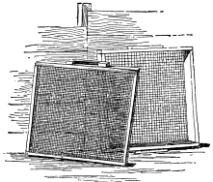
Bobber



spoon 	tongs 	water 	magnet 	screen 





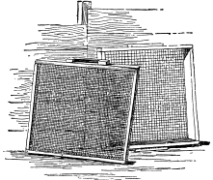
Styrofoam Cup



spoon 	tongs 	water 	magnet 	screen 


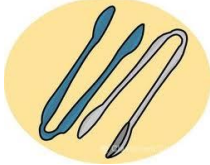


Bottle cap



spoon 	tongs 	water 	magnet 	screen 

Pop can tabs



spoon 	tongs 	water 	magnet 	screen 