



E-WEEK CHALLENGE 2K18



WATER POLLUTION CLEANUP ACTIVITY PACKET



**Chemical & Petroleum Industries
Division**



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WATER POLLUTION CLEANUP ACTIVITY

DESIGN CHALLENGE:

Design a process to treat water contaminated with acid and oil.

ONCE ACTIVITY IS COMPLETE:

Send the entry form and pictures into the google form for a chance to win prizes



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MATERIALS NEEDED:

Supplies and Equipment:

- 1 gallon jug with lid
 - Water
 - Markers

Consumables:

- 1 bottle vegetable oil
- 1 bottle distilled white vinegar or lemon juice
 - pH paper test strips (several)
 - Plastic cups (2 per team)
 - 1 large box baking soda
 - 1 large bag cotton balls
 - 1 package coffee filters
 - 1 bottle dishwashing soap
 - Plastic spoons (several)
- Dirt, cocoa, loose leaf tea (optional)





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PREPARATION:

Prepare polluted water by mixing water, vinegar, and vegetable oil in a gallon jug. The exact proportions are not important, but the mixture should be slightly acidic and contain some oil (when poured into individual plastic cups.) You may choose to add dirt, cocoa, or loose leaf tea to make the water look dirty. Neatly arrange the baking soda, cotton balls, coffee filters, plastic spoons, and dishwashing soap on a table for easy access.





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INSTRUCTIONS:

Today we have some contaminated water. **You will come up with a plan to remove the pollutants.** You'll have to weigh the pros and cons of each method to come up with the best plan, just like a real engineer. Once you have a plan, you can try it out for yourself.

Each treatment plan will use **no more than two treatment methods.**

The goal is to clean the water so that it may be put back into nature. **The pH should be neutral and no oil should be present.**





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TREATMENT OPTIONS:

Treatment Name	Description	Cost	Time
Chemical removal (Baking soda)	Use a chemical to react with the contaminant and make it less toxic.	\$\$\$	Fast
Absorption (Cotton balls)	Use an absorbent barrier or material to treat the spill.	\$	Moderate
Filtration (Coffee filters)	Use filter media to separate contaminant from water.	\$\$\$\$\$	Moderate
Collection (Plastic spoons)	Physically remove contaminant using a method of collection.	\$	Slow
Surfactant (Dishwashing soap)	Use soap or a chemical to break down oils in water.	\$\$\$	Fast





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CONTINUED INSTRUCTIONS:

1. Adults or children pour contaminated water into a plastic cup for each child participating. Mark the water level with a marker.
2. Next examine the water and figure out what the contaminants are. Use a visual observation for oil and pH paper to test acidity.
3. Each should consider the pros and cons of each treatment method before selecting not more than two for the treatment plan.
4. Allow up to 10 minutes to carry out the treatment plan.
5. Take a picture of the water to evaluate the success (by conducting a visual inspection for oil) and then testing with pH paper (water should be close to neutral pH)
6. Take a picture of the pH paper and a picture of you doing the activity.
- 7. Fill out google form.**

