

UC Berkeley  
● Environmental  
Competition Team

First Meeting – February 2, 2009

5:00-6:00 pm 544 Davis Hall

# Water Treatment from Your Kitchen... and Beyond!



# 2008 Scenario

- Stormwater drainage installation
- Natural and unnatural constituents
- Sustainable, durable, economical

# Mixture Recipe

**Table 2: Mixture Recipe**

<b>CONSTITUENT</b>	<b>QUANTITY</b>
Fast Food Wrappers and Cigarette butts (Garbage Simulation)	Five cigarette butts and the equivalent to one McDonald's Meal of food wrappers
Leaves and Shrubbery Debris	Equivalent to shoe box (7" x 7" x 4") Loose
Red Wine Vinegar	2 cups
Potting Soil	1 ½ cups
Kaolinite Clay	1 cup
Fine Sand	1 cup
Vegetable Oil (substituting for motor oil)	¼ cup
Detergent (Non-Liquid without Bleach)	¼ cup
Lead Tire Weight	1; Regular (.50 oz)
Epsom Salt	2 Tbs

# Treatment System

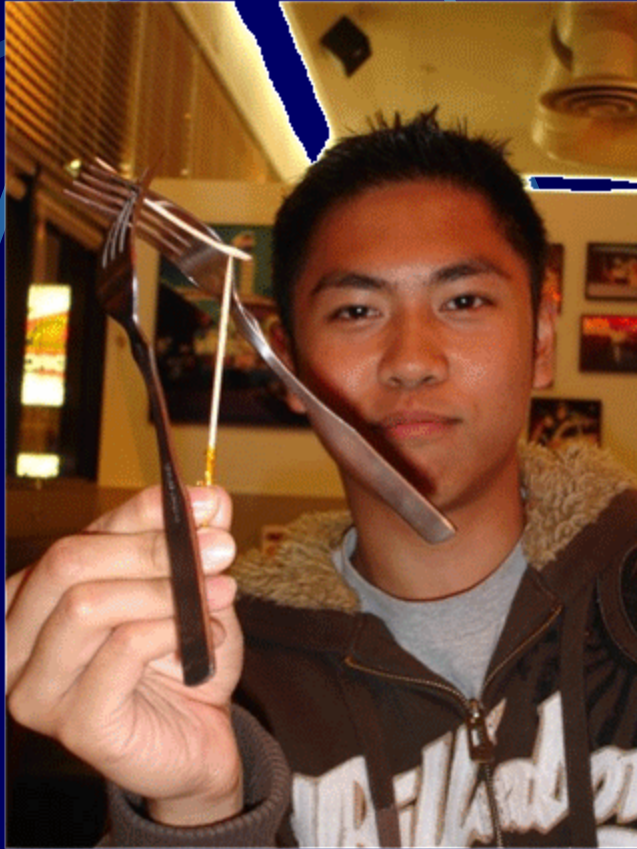
- Filing Cabinet: Recycled structural support
- Filtration through wire mesh and t-shirts
- Primary Treatment: sand filter
- Tertiary Treatment: Activated Carbon filter







# The day before the competition



# At the competition...





We took 1<sup>st</sup> place!

# 2009 Scenario



A major earthquake has just occurred in California's Bay Area, affecting San Francisco, Oakland, Berkeley, and other nearby cities. The Bay Area contains an extensive wastewater pipeline system that has failed during the earthquake due to a degrading infrastructure and a lack of flexible joints. Many pipes have broken releasing wastewater all over the cities.

# Constraints

- Cost and Sustainability
- Simplicity
- No restrictions on materials
- Limited electricity
- Limited to 10x10 sq. ft

Table 1: Contaminant Constituents

<b>Contaminants</b>	<b>Amount per 10 gallons</b>
Creamed Corn	8.75 oz can of corn
Kaolinite Clay	4 oz
Leaves	6 oz
Canola Oil	4 oz
Ground Beef	0.5 lbs
Pre-made Jell-O	2 packs
Lemon Juice	4 oz
Soil	0.5 lbs
Rusted Chicken Wire	$\leq 5 \text{ in}^2$

Notes: Pre-made Jell-O will be two packets of Jell-O made according to the instructions on the Jell-O packet, then once fully congealed will be added to the ten gallons of water. Rusted chicken wire will be multiple pieces of chicken wire cut so they are no greater than  $5 \text{ in}^2$ , buried in wet unsaturated soil for one week, unearthed, and added to the untreated water.

Table 2: Judging Criteria

<b>Criteria</b>	<b>Points</b>
Design	50
Cost	Lowest 45
Total Volume Recovered	20
First to Recover Two Liters	Shortest Time 10
Electrical Conductivity	Lowest 15
pH	Most neutral (pH=7) 15
Turbidity	Lowest 15
Dissolved Organic Carbon	Lowest 15
Dissolved Oxygen	Highest 15
Interaction Deduction	-10 for non-electrical, -5 for electrical
Presentation	20
Total	220

# Plan of Action

- Analyze scenario
- Research constituents
- Conceptualize design
- Build system
- Prepare presentation and animation
- Performance testing
- Compete and win

# Mid-Pacific Regional Conference 2009



April 16<sup>th</sup>-18<sup>th</sup>, 2009  
University of Nevada, Reno

# JOIN!

- The Environmental Team!  
AND/OR
- The Decal Class
  - 1-2 Units
  - Mondays, 5-6 pm, 544 Davis
  - Lab/Build times: TBA
  - CCN: See Blackboard!



# Questions?

If you are interested in continuing with us, please be sure to indicate that you signed in and put a “Yep” under “Receive Updates?”

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