

# WATER TREATMENT LAB

## Purpose

Yikes! The town of Ramosville is in need of a new wastewater treatment plant. Your job is twofold: 1) to create a wastewater treatment plant. Some factors to keep in mind when constructing your treatment plant are the cost, the amount of time it takes to clean the water, and the cleanliness of the water. 2) to evaluate all the wastewater treatment plants that are built by the class and see which facility plan you would recommend for the town of Ramosville.

**Procedure & Materials:** You can only proceed to secondary treatment.

Teams will be graded on: blueprint, cost effectiveness, effectiveness in purifying polluted water, amount of time required for filtering, and a written analysis of all the water treatment plants and recommendation for the town of Ramosville.

## Pricing of Materials:

Plastic Bottle	\$1000
Scoop of sand	\$100
Scoop of gravel	\$100
Coffee filters	\$50/filter
Screen – large mesh	\$100/mesh
Screen – medium mesh	\$200/mesh
Screen – fine mesh	\$300/mesh
Charcoal	\$200/scoop
White paper	\$40/sheet
Cloth	\$50/sheet
Rubber bands	\$25/each
Clear plastic tubing	\$50/10cm
Duct tape	\$50 per 10cm
Funnel	\$100
Small Cup/beaker	\$200
Large Cup/beaker	\$400
Aluminum	\$100/sheet
String	\$25/ft
Hot plate	\$1000
Large Pipette	\$150
Small Pipette	\$50

## Group Data:

- 1) Blueprint - Labeled
- 2) Breakdown of costs
- 3) Clarity of effluent - ppt

## Class Data:

For each treatment plant, compare the cost, clarity, and time required

## Data Analysis:

Which treatment plant was most cost-effective?

Which treatment plant attained the highest clarity?

Which treatment plant cleaned the water in the least amount of time (1:10, 1:100)?

**Conclusion:**

- 1) How did your group approach this task? Was it from a time perspective? An economical perspective? A quality in product perspective? A blend of two or three of these approaches? Why?
- 2) Which wastewater treatment plant would you recommend for the town of Ramosville? Why?
- 3) What is wastewater?
- 4) What occurs at each level of wastewater treatment?
- 5) If water is a renewable resource, why are we so concerned about a lack of water for drinking and agriculture?
- 6) What is reclaimed water? What are some possible uses?
- 7) Describe the controversy of toilet to tap: list pros and cons. Do you support toilet to tap? Why or why not?
- 8) What legislation protects water quality?
- 9) Describe 4 different factors that are measured to test water quality and the implications if each factor supercedes the range of tolerance for a particular ecosystem.
- 10) How is water treatment funded? In other words, where does the money come from to treat the water?
- 11) What could be improved on your part/team's part for next time?
- 12) What could be improved with this activity?

<b>WATER TREATMENT LAB GRADING SHEET</b>		
Names:		
<b>ITEM</b>	<b>POINTS POSSIBLE</b>	<b>POINTS EARNED</b>
Clarity	10	
Cost-Effective	10	
Time	10	
Data	5	
Data Analysis	5	
Conclusion	10	
<b>Total</b>	<b>50</b>	

Comments:

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## WATER TREATMENT POINT SCALE

### **COST EFFECTIVE**

\$0-1200	10
\$1201-1300	9
\$1301-1400	8
\$1401-1500	7
\$1501-1600	6
\$1601-1700	5
\$1701-1800	4
\$1801-1900	3
\$1901-2000	2
\$2001-2100	1
\$2101-and beyond	0

### **TIME**

0-5 min	10
6-10	9
11-15	8
16-20	7
21-25	6
26-30	5
30+	4

### **PURIFICATION**

1:1	0
1:10	5
1:100	10
1:1000	Extra Credit
1:10000	Extra Credit!
1:10000+	Extra Credit!!!!