

# World History

## Tap Out: Clean Drinking Water in a Township

Subject Area: World History      Grade Levels: 10

Date: August 5, 2013

### Lesson Overview

Students will learn about water sources and the complexities of providing enough clean water for a town to use.

### Materials Included in this Lesson

- (2) 1-gallon jugs of water
- (3) large (27 oz) Water bottles
- (1) 3-cup measuring cup
- 10 5 oz. disposable paper cups
- 1 large flat bottomed bowl for water bottles to sit in
- Small opaque pitcher (approx. 4-5 cups)
- Coffee Grounds or dirt
- 5 pound weight (This can really be any size. The intention of the weight is to remind students of the physical burden of carrying water.)
- Clock
- Marker (for labeling)
- Paper towels (just in case)

### Other Materials for this Lesson

- Facts about water handout
- Education, Poverty, Health and Hunger handouts
- Blank outline of Africa map
- Water treatment handouts- desalination, conventional, well and UV light
- Excerpts from the epa.gov/safewater
- Poster board
- Microsoft PowerPoint
- Microsoft Publisher (optional)
- 11"x14" paper
- Sewer King Video w/questions

### Skills the Student will Learn

- water sources (where their water comes from)
- methods in which clean water is obtained
- collaborate well with others
- complete a specific task as part of the whole group

### Student Deliverables

- original town drawing
- completed Africa map
- Treatment method PP, pamphlet, new town design

## Length of Lesson: 5 Block (90min) Days

### Activity Day One

**Build A Town:** Using only an 11"x14" sheet of paper and pencil, students will create an 18<sup>th</sup> century township. Students will build the town quickly. At the end of building the town, students will reflect on the process by answering questions on the back of their poster.

**Sewer King:** After you discuss with the class that there is no water treatment facility in their towns, show them the film *Sewer King*. Students should answer the video questions as the film plays.

## **Activity Day Two**

**Where's the Water?:** Students will participate in a three station hands-on demonstration lesson exploring the concepts of water abundance, and water scarcity. This lesson is accessible through the Water Project at [thewaterproject.org](http://thewaterproject.org). I adapted the lesson so the teacher and a few student volunteers would demonstrate the terms water abundance, physical scarcity and economic scarcity. Students will write a reflection after each station demonstrating their understanding of each term.

**Dirty Water Readings:** Students will read four handouts (Education, Poverty, Health and Hunger) about the potential effects of dirty water. Students will complete the outline of Africa map summarizing their understanding of the dangers of dirty water.

## **Activity Day Three**

**How do we get clean water:** Students will write a paragraph predicting how people can take dirty water and make it safe to use and drink? Class discussion of students' ideas will follow.

**TAP OUT:** Students will be introduced about four possible ways in which people treat water to make it drinkable: Desalination, Wells, Conventional Filtration Plant, and Ultraviolet Light. In groups of 4, students will further research one of the listed methods for treating water. Students will then decide which form of water treatment they will now use in their updated 21<sup>st</sup> century town. Students will decide which part of the project they will work on for the remaining two days: pamphlet, town drawing, poster board completion and presentation.

## **Activity Day Four**

**Product Production:** Students will continue to work on their portion of the project.

## **Activity Day Five**

**Presentations:** The student who was the presenter will use the PowerPoint presentation, pamphlet and town design to explain to the class their town and how their town provides safe water for its people to use.

## **Enrichment Suggestions**

Take the students on a field trip to a drinking water treatment facility and/or a waste water treatment plant. In addition, have students look at their home water statement and research where their city's water supply comes from. Also, inviting a treatment operator into your class as a guest speaker would be beneficial to the students.

## **Student Resources**

Students can go online to [thewaterproject.org](http://thewaterproject.org) to obtain more information about water scarcity, conservation and helping with the water project.

## Common Core Academic Standards

### **Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects – WHSST –(Standard Area, Grade Level, Standard #)**

11-12.2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. B1.0

11-12.7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

A5.0, A8.0

### **World History, Culture, and Geography – WH**

10.3.2. Examine how scientific and technological changes and new forms of energy brought about massive social, economic, and cultural change (e.g., the inventions and discoveries of James Watt, Eli Whitney, Henry Bessemer, Louis Pasteur, Thomas Edison). B1.0

## CTE Pathway Standards

### **Energy, Environment, and Utilities Sector Pathway Standards**

#### **A. Environmental Resources Pathway**

The Environmental Resources pathway prepares students for employment, postsecondary education, and/or training in a variety of environmental industries.

#### **A9.0 Research drinking-water sources, systems, treatment, and conservation.**

A9.1 Understand water reuse: issues, strategies, technologies, and applications.

A9.2 Analyze strategies for improving energy efficiencies in water collection and distribution.

A9.4 Understand the functions and operations of water storage, reservoirs, aqueducts, and dams.

#### **A10.0 Evaluate the impact and flow management of storm water, rivers, and groundwater.**

A10.1 Understand the designs and tools used in water flow management.

A10.6 Describe the concerns and strategies for catastrophic storm water events and management.

## Lesson Plan Relevance to Externship

While working at Bryte Bend Water Treatment Plant, I was reminded of the importance of water; especially the quality of water. This lesson will highlight to students the importance of water conservation and maintaining a clean water supply. In addition, this lesson will educate students about the variety of water sources and treatment methods throughout the world. Lastly, this lesson will serve as an opportunity for a class discussion about what the job responsibilities are for a water treatment plant operator are and how this occupation is vital for the sustainability of any town in any country.

# Building an Industrial Town

- o Give your town a name and write it on the top of your answer sheet
- o Draw your town limits

**[Name]**

[save space here to draw your city]

# Building an Industrial Town

- Draw a River. **This can be any size**
- **Since religion was a major factor during this time period,** draw a church
- Draw 3 houses (**your city's early inhabitants**)
- Draw one factory along the river
- **To accommodate the factory workers,** draw 5 houses

# ...the building continues

- **The workers need to eat and buy supplies, so draw a market**
- **Industrialization is taking hold!**  
Draw 2 more factories
- **Along with the factories, draw 10 more houses (5 for each factory)**
- **Is one market enough? How about some competition...draw another market!**

# ...and people keep coming!

- o **WOW!** One more factory!
- o **They too need a place to live,**  
draw 5 more houses
- o **Is your town getting crowded?**  
You may want to tear down  
some houses (erase them) and  
draw an apartment building,  
otherwise call “tenements” (3  
apartments for every 5 houses)

# ...what? More?!

- **Getting stressed?** Draw a building for some sort of entertainment (pub? Dancehall? Theatre?)
- **With all of these people getting together, there are going to be problems.** Draw a police station AND a hospital
- **Hey, your town is popular!** Draw another factory!

# ...still have space???

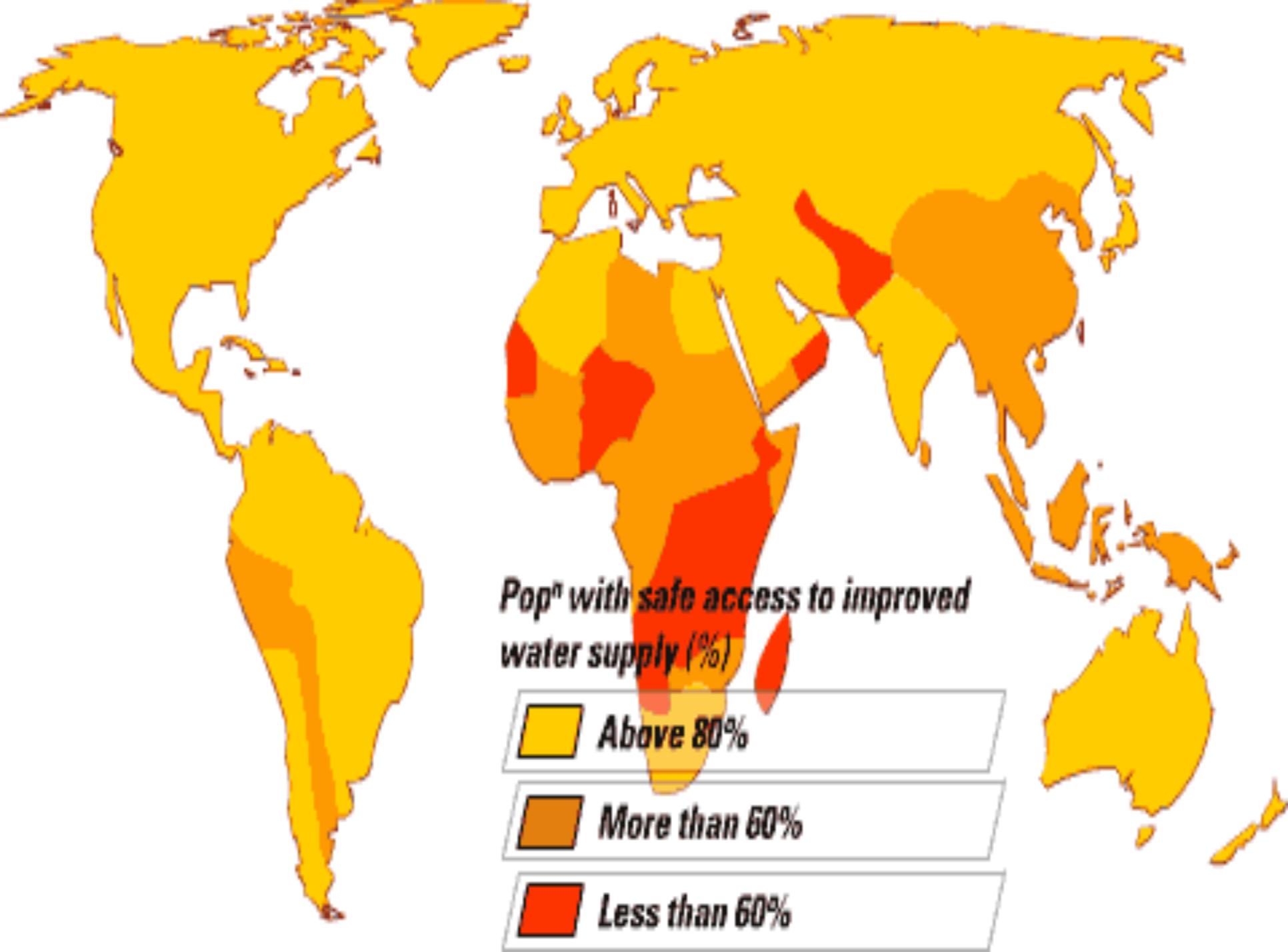
- **More people want to get in and out of the city.** Draw in a train station.
- **The factory owners in your city are getting rich.** Place a bank in your city
- **Whoa! They must really like your city.** Add another factory and 3 more apartments
- **Just in case...**build a fire station.

# Your City should have...

- A River
- A Church
- 33 houses or 12 tenements or a combo
  - 6 factories
  - 2 Markets
- A place for entertainment
  - A police station
    - A hospital
  - A train station
    - A bank
  - A fire station

# WOW. What a Process.

- On the back of your town, answer the following questions:
  1. On a scale from 1-10, rate how much you enjoyed the process of building a town. Explain your rating.
  2. What hardships/difficulties did you experience while building your town?
  3. Is your town complete? Is it missing anything?
  4. Would you live in your town? Explain.





Dirty Water- So What?

# Facts about Water

- Read the 18 facts about water handout
- Highlight/underline/circle three facts that surprised you the most about water
- Next to those surprising facts, explain why the fact surprised you

# Water affects all aspects of life

- You will now read four handouts (Education, Hunger, Poverty, and Health) explaining the manner in which water- or lack there of (scarcity)- affects peoples lives.
- You will have about 7 minutes per reading
- While reading the handout, mark the text in the following manner:
  - Highlight main ideas
  - Circle surprising facts
  - Write your thoughts about the reading in the margins

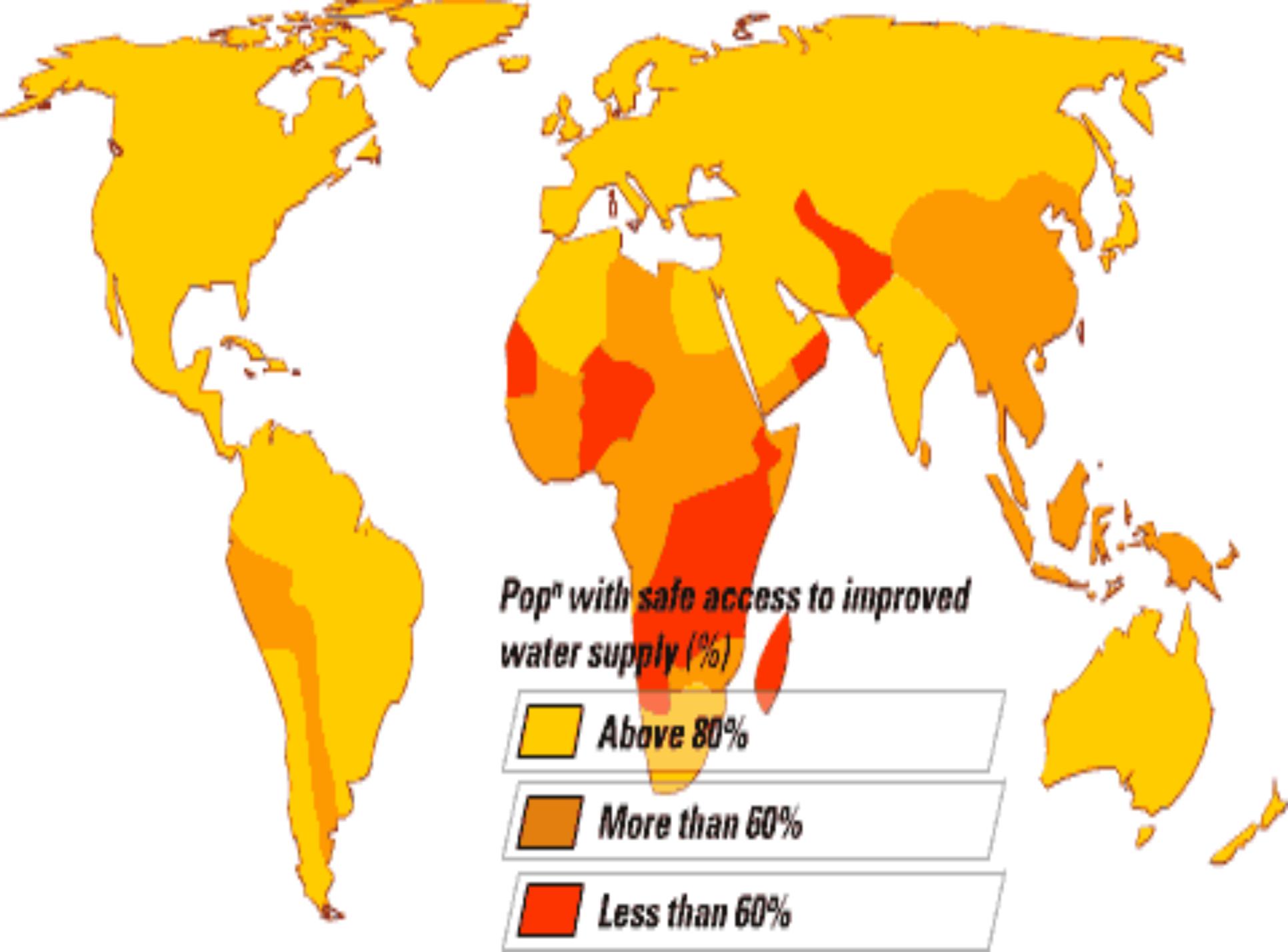
# Creating the Project

- Mrs. Hauck will give you a blank map of Africa (minus Madagascar)...sorry Madagascar
- Divide your map into 3 equal parts
  - (You will not write on one of the readings)
- For each part, you will have a title, one sentence summary of the article, one surprising fact from the article and a colored graphic
- Write each of the surprising facts from the “Facts about Water” article on your map
  - Write them where you have room.
  - They can be curved around the map, pictures, etc
- Cut out your Africa Map
  - Write your name on the back and turn into the basket



# Mapping your findings

- Once you have read all four handouts, you will organize your findings inside of the Africa map
- You will only place 3 of the topics inside your map
- You will write a 2-3 sentence summary explaining the main idea of the article.
- You will write down 1 surprising fact you read
- You will draw a colored image representing the main idea of the article





# *Water Quality Monitoring*

IN THE SACRAMENTO RIVER BASIN





population survey in Feather River tributary

## Background

Sacramento River Basin waterways historically were used as places to dispose of contaminants. The practice dates back at least to the gold rush era of the 1850s when miners dumped sediment and mercury into tributaries in their search for gold. The sediment clogged natural channels, sometimes making them too shallow for fish passage or navigation, and introduced contaminants such as metals, with mercury being particularly problematic.

After the gold rush, the Sacramento River Basin's rivers and creeks became dumping grounds for human and animal waste, often untreated. Cities and industries that dispose of wastes into the basin (known as point sources) follow much stricter standards since enactment of the federal Clean Water Act in 1971, and California's Porter-Cologne Act in 1969. Both laws set pollutant-specific standards for discharges of contaminants into federal and state waters.

In recent decades, treatment for municipal wastewater and industrial wastewater, and management of urban stormwater runoff, have increased and improved

greatly. Industries and municipalities now provide at least secondary treatment of wastewater; large and medium-size cities are implementing urban stormwater programs to reduce the impacts of urban runoff to adjacent waterways. In the past several years, agricultural runoff has come under regulation. Agricultural groups have formed coalitions to work together to meet the new requirements.

# How is our water treated in EG?



The Sacramento Regional Wastewater Treatment Plant employs reliable treatment processes that mirror nature's handling of wastewater, with an important advantage. What nature might take months to complete, the Plant accomplishes in about eight hours.

The following important steps take place during the wastewater treatment process:

- Incoming wastewater, or influent, is screened and flows through a primary sedimentation process. This allows most of the solid material to settle to the bottom of tanks and be removed.
- Next, oxygen is added to the wastewater to grow naturally occurring microscopic organisms. These organisms eat particles in the wastewater, thereby removing them from the solution.
- The wastewater then travels to secondary clarifiers where the organisms settle to the bottom and are removed, leaving cleaned water.
- Next, the water is chlorinated to remove any remaining harmful organisms. During this time, the wastewater travels through a two-mile "outfall" to the Sacramento River, near the town of Freeport, California.
- Before entering the river, sulfur dioxide is added to neutralize the chlorine making the water safe for the environment.

## Education Reading

Education is critical for breaking the cycle of poverty and yet over half of the world's schools lack access to safe water and sanitation facilities.

Lack of clean water has serious effects on student's academic performance and attendance rates. The lack of safe water can cause even the best students to lose momentum as they deal with stomach pains and diarrhea from disease and hunger.

Students miss class to go fetch water, or to care for sick parents or siblings. In many places HIV/AIDS has already caused a large percentage of children to become orphans, requiring students to drop out and find work to provide food and care for younger siblings. If teachers are sick, classes get cancelled for all students.

Schools cannot run programs if they cannot provide water to students, faculty and their families.

### **Lack of Water = Lack of Equality**

For girls, the situation is especially troublesome. If schools do not have proper toilets, girls drop out once they reach puberty. Further, it is typically the responsibility of the women to fetch water thus limiting their access to both education and business opportunities. Think about it: everyday, women and young girls carry more than 40 pounds of dirty water from sources over 4 miles away from their homes. This leaves little time for education which is critical to changing the long term prospects of developing nations.

With the many additional burdens that a lack of clean water brings, education simply becomes less of a priority. This sets up an unfortunate cycle of poverty and inequality as without a proper education, there is little chance of improving one's situation later in life. The Water Project is working to break this cycle. Sometimes the first public voice the women of a community ever have, comes from an individual woman who is part of a water committee.

# Facts about Water:

## Statistics of the Water Crisis

Why Water? ...the numbers (as of 8/17/2011)

- Nearly a billion, 884 million people do not have access to clean and safe water. 37% of those people live in Sub-Saharan Africa.<sup>2</sup>
- 1 in 8 people world wide do not have access to safe and clean drinking water.<sup>13</sup>
- 443 million school days are lost each year due to water-related diseases.<sup>4</sup>
- In developing countries, as much of 80% of illnesses are linked to poor water and sanitation conditions.<sup>5</sup>
- Half of the world's hospital beds are filled with people suffering from a water-related disease.<sup>8</sup>
- Girls under the age of 15 are twice as likely as boys their age to be the family member responsible for fetching water.<sup>2</sup>
- Over half of the developing world's primary schools do not have access to water and sanitation facilities. Without toilets, girls typically drop out of school at puberty.<sup>3</sup>
- Less than one in three people in Sub-Saharan Africa have access to a proper toilet.<sup>2</sup>
- 84% of the people who don't have access to improved water, live in rural areas, where they live principally through subsistence agriculture.<sup>2</sup>
- The average container for water collection in Africa, the jerry can weighs over 40 lbs when full.<sup>9</sup>
- Almost two-thirds, 64% of households rely on women to get the family's water when there is no water source in the home.<sup>2</sup>
- Globally we use 70% of our water sources for agriculture and irrigation, and only 10% on domestic uses.<sup>1</sup>
- Girls under the age of 15 are twice as likely as boys their age to be the family member responsible for fetching water.<sup>2</sup>
- Nearly 1 out of every 5 deaths under the age of 5 worldwide is due to a water-related disease.<sup>6</sup>
- The United Nations estimates that Sub-Saharan Africa alone loses 40 billion hours per year collecting water; the same as an entire year's labor in all of France!<sup>10</sup>
- Research has shown that for every 10% increase in women's literacy, a country's whole economy can grow by up to 0.3%.<sup>11</sup>
- According to the World Health Organization, for every \$1 invested in water and sanitation, there is an economic return of between \$3 and \$34!<sup>12</sup>
- By investing in clean water alone, young children around the world can gain more than 413 million days of health!<sup>7</sup>

## Citations

1. AQUASTAT. Food and Agriculture Organization of the United Nations. "Water Use." [http://www.fao.org/nr/water/aquastat/water\\_use/index.stm](http://www.fao.org/nr/water/aquastat/water_use/index.stm)
2. WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. "Progress on Sanitation and Drinking Water 2010." Available at [www.wssinfo.org/](http://www.wssinfo.org/)
3. UNICEF. "Water, Sanitation and Hygiene" Updated May 2010. [http://www.unicef.org/media/media\\_45481.html](http://www.unicef.org/media/media_45481.html)
4. United Nations Development Programme. "Human Development Report 2006: Beyond Scarcity: Power, Poverty and the Global Water Crisis." 2006. Available at <http://hdr.undp.org/en/reports/global/hdr2006/>
5. United Nations. Statement by Secretary General Kofi Annan. June 2003. <http://www.un.org/News/Press/docs/2003/sgsm8707.doc.htm>
6. WHO/UNICEF. "Diarrhoea: Why children are still dying and what can be done." 2009. available at [http://www.unicef.org/health/index\\_51412.html](http://www.unicef.org/health/index_51412.html).
7. World Health Organization. "Costs and benefits of water and sanitation improvements at the global level." [http://www.who.int/water\\_sanitation\\_health/wsh0404/en/](http://www.who.int/water_sanitation_health/wsh0404/en/)
8. United Nations Development Programme. "Human Development Report 2006: Beyond Scarcity: Power, Poverty and the Global Water Crisis." 2006. Available at <http://hdr.undp.org/en/reports/global/hdr2006/>
9. Jerry cans carry approx. 5 gallons of water so if a single gallon of water weighs 8.3 pounds, 5 gallons are 41.5 pounds.
10. United Nations Development Programme. "Resource Guide on Gender and Climate Change." 2009. Available at [http://www.undp.org/climatechange/library\\_gender.shtml](http://www.undp.org/climatechange/library_gender.shtml)
11. UNICEF. "Water, Sanitation and Hygiene" Updated May 2010. [http://www.unicef.org/media/media\\_45481.html](http://www.unicef.org/media/media_45481.html)
12. World Health Organization. Executive Summary of "Costs and benefits of water and sanitation improvements at the global level." [www.who.int/water\\_sanitation\\_health/wsh0404summary/en/](http://www.who.int/water_sanitation_health/wsh0404summary/en/)
13. Based on 87% of the global population using improved sources. Found in WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation. "Progress on Sanitation and Drinking Water 2010." Available at [www.wssinfo.org/](http://www.wssinfo.org/)

## Health Reading

Good health begins with access to clean water.

Did you know that half of the world's hospital beds are filled with people suffering from a water related disease? In developing countries, about 80% of illnesses are linked to poor water and sanitation conditions. 1 out of every 5 deaths under the age of 5 worldwide is due to a water-related disease. Clean and safe water is essential to healthy living.

Tiny worms and bacteria live in water naturally. Most of the bacteria are pretty harmless. But some of them can cause devastating disease in humans. And since they can't be seen, they can't be avoided. Every glass of dirty water is a potential killer.

Most of these waterborne diseases aren't found in developed countries because of the sophisticated water systems that filter and chlorinate water to eliminate all disease carrying organisms. But typhoid fever, cholera and many other diseases still run rampant in the developing parts of the world.

**Water and Young Children:** Infants and young children are especially susceptible to diseases because their immune systems are experiencing everything for the first time. Even in developed countries, lots of moms boil water before giving it to their children - just to be doubly safe. In poor countries, the fuel for the fire can be so expensive that mothers can't afford to boil water and cook food.

**Poor health leads to poor productivity:** The sickness caused by dirty water saps people's energy to do much of anything. If you've ever had food poisoning, you know how horrible it can be. Students who suffer from water borne illness can't stay in class. They miss out on the chance to learn and the cycle of poverty continues. That and when one person is sick, someone else has to take care of them, which means that the second person can't work either. If the sick person needs medicine, that money can't be used for other things, like food or school supplies.

Rural dwellers and the urban poor feel the lack of safe water and proper sanitation in the developing world the most. With few medical resources at their disposal, the poor are particularly vulnerable to chronic illnesses that hinder their productivity, making the escape from poverty even more difficult.

## Hunger Reading

Relieving hunger in Africa has to begin with access to clean water. It may seem simple, but we forget that without access to a reliable source of water, food is hard to grow and even more difficult to preserve and prepare. It takes huge amounts of water to grow food. Just think, globally we use 70% of our water sources for agriculture and irrigation, and only 10% on domestic uses.

Water is fundamental to relieving hunger in the developing world. 84% of people who don't have access to improved water, also live in rural areas, where they live principally through subsistence agriculture. Sometimes, areas that experience a lack of water suffer because of poor water management, but more often it is a relatively simple economic issue that can be addressed. This is the difference between physical and economic scarcity.

### **The Rural-Urban divide**

In Sub-Saharan Africa, people in urban areas are twice as likely as people in rural areas to have clean, safe water. Another way that we see the urban-rural divide is in sanitation. While rural areas often have less access to sanitation facilities, in Sub-Saharan Africa the situation is very poor. Only 24% of the rural population, and 44% of the urban population have access to sanitation facilities. This means that less than one in three people in Sub-Saharan Africa have access to a proper toilet.

### **There is hope**

A small investment in a clean, safe source of water can have a huge impact on both crop production and the nutrition of a community. In fact, one of the most encouraging things we find when we return to sites where wells have been installed is the many small gardens that have popped up all around.

When we ask communities what improvements they've seen as a result of clean water, many send us pictures of their crops - proud of the progress they've made.

Sometimes the technologies we fund specifically target increased crop production. For example, we fund weirs (sub-surface sand dams) in very dry places where seasonal water flows can be captured and stored. The dams trap rain water on the few rainy days of the year and over time, ground water levels rise.

People can then collect or store the water for drinking. The leftover water seeps into the ground and creates more fertile fields. Simple sustainable irrigation in these dry areas becomes possible.

**The water cost of food:** Consider the following foods we take for granted...

<b>Food</b>	<b>Water Needed to Produce (in liters)</b>
1 Glass of milk	200
Cup of Coffee	140
Bag of Chips	185
Slice of Bread	40
Egg	135
Apple	70
Hamburger	2,400 !!

## How can we use what we have-wisely!

You and your group will read about four ways in which water is treated in order to become drinkable. Your group will be required to decide which water treatment design you will implement into your new updated town. Yes, you and your group will recreate a town that includes the treatment of water (water facility). Within your group, you personally will perform one of four tasks within your group:

**Designer:** You will be given an 11"x14" sheet of paper in which to draw your new town. You get to decide what amenities (things to do) your town will have. Keep in mind, your town should have economic security, entertainment and most important of all, a good source of water. However, you must draw the way in which you will provide enough water for your town to sustain itself. If you want to draw the underground pipes on one paper and the above ground features on another, you may.

**Pamphlet:** You will create a pamphlet explaining the importance for safe drinking water, how your town is providing safe drinking water (the method your group decided to use), how the people in your town use water and what your town has to offer. You may want to include quick facts/statistics about water on one of the pages.

**Poster Creator:** You will be the finisher. You will compile the pamphlet, one of your original town drawings and the new town drawing all on a piece of poster board. You will also write a summary of the water treatment method your town uses.

**Presenter:** You will give a one to two minute presentation to the class explaining which water treatment method your town uses, what your town has to offer its citizens, and why safe drinking water is important to conserve. Your goal is to get your classmates to want to live in your town.

The class will go to the library on Thursday and Friday November 21-22 to work on this project.

Presentations will be on Friday.

This assignment is **40** project points. All members will receive the same grade.

You will also complete a survey using the link below to evaluate the lesson plan. If you do not complete the survey, you will not receive a grade.

<https://docs.google.com/spreadsheets/viewform?formkey=dHo5WIFZdXJEOE9sUldscS1BWVJqYUE6MA#gid=0>

## Poverty Reading

Poverty and Water are related.

There are a number of reasons why poverty has become an epidemic in Africa. Poverty can be the result of political instability, ethnic conflicts, climate change and other man-made causes.

But one of the greatest causes of poverty in Africa is also the most overlooked...the lack of access to clean drinking water.

Nearly one billion people do not have access to clean, safe water - that's the equivalent of 1 in 8 people on the planet!

For these people, poverty is a fact of life. The good news... This is a *solvable* problem.

### **Access to clean water**

The foundation of all development

The lack of water is an often insurmountable obstacle to helping oneself. You can't grow food, you can't build housing, you can't stay healthy, you can't stay in school and you can't keep working.

Without clean water, the possibility of breaking out of the cycle of poverty is incredibly slim.

With unclean water sources often miles from villages, many of the able bodied members of a community are forced to spend hours each day simply finding and transporting water. The typical container used for water collection in Africa, the jerry can, weighs over 40 pounds when it's completely full.

Imagine how demanding it would be to carry the equivalent of a 5-year old child for three hours every day. And some women carry even more, up to 70 pounds in a barrel carried on the back. That's like carrying a baby hippo.

### **Wasted Time**

The United Nations estimates that Sub-Saharan Africa alone loses 40 billion hours per year collecting water; that's the same as a whole year's worth of labor by France's entire workforce! This is incredibly valuable time.

With much of one's day already consumed by meeting basic needs, there isn't time for much else. The hours lost to gathering water are often the difference between time to do a trade and earn a living and not. Just think of all the things you would miss if you had to take three hours out each day to get water.

When a water solution is put into place, sustainable agriculture is possible. Children get back to school instead of collecting dirty water all day, or being sick from waterborne illnesses. Parents find more time to care for their families, expand minimal farming to sustainable levels, and even run small businesses.

The social and economic effects caused by a lack of clean water are often the highest priorities of African communities when they speak of their own development. The World Health Organization has shown this in economic terms: for every \$1 invested in water and sanitation, there is an economic return of between \$3 and \$34!

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

Instructions: Evaluate each group's town according to the following characteristics. You will use a 1, 2, 3 ranking scale and will write the number in the box under each characteristic. The ranking scale is as follows:

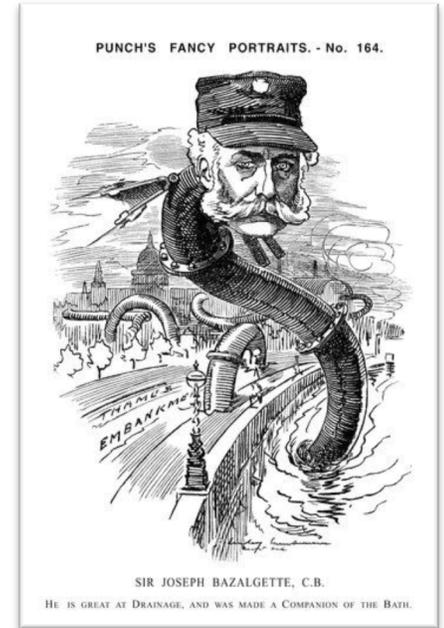
**1: fails to meet expectations**                      **2: meets expectations**                      and                      **3: exceeds expectations.**

Town Name and or Presenter's Name	Water Treatment Method Explained	Activities for people to enjoy	Water conservation importance	Poster Layout	Presentation	Total Score

**Additional Comments:**

# The Sewer King – Video Questions

*Instructions: Answer the following questions on a separate sheet of paper as you watch the video.*



1. In fifty years, how much did the population of London increase?
2. What was the disease that threatened London?
3. What were “water closets?”
4. Who suffered the most from the old, clogged sewer systems?
5. What was Bazalgette’s “obsession?”
6. What did Londoners believe was spreading the cholera?
7. What were the symptoms of cholera?
8. What are differences between Bazalgette’s home compared with those in inner-city London?
9. After observing the evidence from Broad Street, where did Dr. John Snow believe cholera was from?
10. Briefly describe Bazalgette’s grand sewer plan.
11. Why were the tidal flows of the Thames River so important?
12. What did the politicians do with Bazalgette’s grand plan?
13. What caused the politicians in Parliament to change their minds?
14. Describe at least **THREE** problems that occurred in building of the sewer system.
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
15. How did Bazalgette prove to the newspapers that his plan was working?
16. What was used to pump the sewage into the river?
17. How had cholera spread into the East End of London?
18. How did Bazalgette “accidentally” solve the cholera problem in London?
19. What tested the effectiveness of Bazalgette’s sewers on July 26, 1867?
20. What projects did Bazalgette work on after he finished the sewers?