

Activity Guide for Pollution Detective

1. What are we trying to teach the students in this activity? **Humans modify and change ecosystems, which are based upon energy, water, oxygen and nutrients.** It is important to understand how biodiversity is affected by changes we make. See the Project Overview to see Standards and Benchmarks

2. How can we tie this activity to our goal of teaching:

Our Goals	Where we can relate our goals to this activity
We live in desert (9 inches rain/yr)	Explain how the atmosphere, biosphere, lithosphere, hydrosphere (water cycle) work together. Understand that in getting water, we modify and change our ecosystem.
Where does our water come from?	The aquifer and the river depend upon our 9 inches of rain we get each year. The amount of water available to us can fluctuates based upon rates of use, rates of replenishment, surface changes, and changes in temperature.
How can we conserve water? AND/OR How can we protect water?	Discuss the concept of a limited resource and how we have already tapped the two sources of water available to us, ground and surface. It is our responsibility to keep the river wet and to keep water in the aquifer. We must conserve water.

3. What is effective in this activity?

4. What is not working with this activity or makes it difficult to teach?

5. How should this activity be organized?

I. Intro – 10 minutes

1. Warm Up: Write questions on the board (see pre- and post- questions below).
2. Explain aquifer and San Juan/Chama and how it protects the aquifer (hand out the pamphlets)

II. Activity – 35 minutes

1. Explain how we use water testing to insure our water is not contaminated. Discuss Nonpoint Source Pollution vs Point Source Pollution. We are going to study Point Source Pollution. If you discover that your water is polluted, what should you do? (Find the source! You need to know where it is and exactly what kind of pollution it is if you're going to fix it.) How will you find the source? (5 minutes)
3. Explain what pH is and how we are using it to represent any water quality test. Describe how pH measures acidity/alkalinity on a scale 1 (acid) – 14 (base). Water is neutral at about 7, as is blood. Stomach acid is very acidic at about 2 or 3. When we get too much stomach acid we take Milk of Magnesia (a base) with a pH at about 10. (3 minutes)
4. Show and explain the drill (straw), sanitation station (cup of water), the sand bed (with Kool-Aid already hidden in it), the spray bottle (rain), the pH paper (water quality test). Ask for questions. (5 minutes)
5. Hand out supplies. Ask students to start raining right away while you talk. Hand out one lab sheet per group (Pinpointing Point Source Pollution).
 - What do they already know?
 - What do they expect to see?
 - Hypothesis – What is the best way to find the pollution?
 - Procedure - remember that analytical tests are expensive and they have limited numbers of tests available.

- How can they gather their data in a table form?
- How can they gather their data in a visual form?
- Analysis – How would they do it differently next time? Are they sure there isn't a secondary source? Why or why not?
- Conclusion – Where is the pollution and how will you clean it up?

Give clean up directions for them to do as soon as they finish gathering their data. Let them do the experiment and write up while you set up for next class. (Until there are only about 5 minutes left. (15 minutes)

III. Wrap Up – 1 minute

Hand out the “Protect Our Water” handout and go over it quickly with them.

6. Pre and post questions

What are some problems that are created or exacerbated by salt cedar?

Economic:

- Agriculture can be impacted since the salt cedar can outcompete agriculture and is difficult to eradicate (see newsclip),
- salt cedar makes river less attractive for tourism and could lower water in river,
- increased fires can cause loss of property

Resource:

- Water is used up by salt cedar that makes land unusable for us
- Soil is made salty and not good for growing other plants

Quality of Life:

- It could cause loss of bird habitat that will impact hawk and predator population causing increased rabbit and rat populations,
- Loss of species like monarch butterflies that rely on native plants
- Loss of birds since their food sources (seeds, crickets, etc) are diminished
- Loss of small mammals like porcupine and beaver who rely on leaves or bark

Since the river is so important to our city, how can we conserve water to make sure there is plenty of water for the ecosystems around the Rio Grande?