

Water Pollution Graphing

NR/WQ/2005-07

GRADE LEVEL:
2-8

SUBJECT AREAS:
Science

DURATION:
20-30 minutes

SETTING:
Classroom

**LINK TO THE UTAH
CORE
CURRICULUM:**
Science –
3rd Grade
Standard 2
(Indirect)

4th Grade
Standard 1
(Indirect)
Standard 3

Math –
4th Grade
Standard 5

PURPOSE: To describe and identify the link between land use activities within a watershed and water quality.

SUMMARY: Students will evaluate the quality of a “water sample” (a bag of skittles), graph their results, and form a hypothesis about the land use near the location their “water sample” was collected.

BACKGROUND: A watershed is an area of land from which all the water drains to the same location such as a stream, pond, lake, river, wetland or estuary. A watershed can be large, like the Colorado River drainage basin, or very small, such as all the water that drains to a small farm pond. Large watersheds are often called basins and contain many small watersheds.

Watersheds can transport non-point source pollution. Non-point source pollution is associated with rainfall and snowmelt runoff moving over and through the ground, carrying natural and human made pollutants into water sources. Examples of non-point source pollutants are fertilizers, pesticides, sediment and gas and oil. Pollutants accumulate in watersheds as a result of various human and natural events. These pollutants, while sometimes inevitable, drastically alter the state of the ecosystem. If we can determine the type of pollutant and its cause, then we can classify the source of the pollutant and take preventative measures to reduce any further contamination.

Below are some examples of land uses and their potential problems:

<u>LAND USE</u>	<u>ACTIVITIES</u>	<u>POLLUTION PROBLEMS</u>
Agriculture	tillage, cultivation, pest control, fertilization, animal waste	sediment, nitrate, ammonia phosphate, pesticides, bacteria
Construction	land clearing and grading	sediment
Forestry	timber harvesting, road construction, fire control, weed control	sediment, pesticides
Land Disposal	septic systems	bacteria, nitrate, phosphate
Surface Mining	dirt, gravel, mineral excavation	sediment, heavy metals, acid drainage, nutrient
Urban Storm	automobile maintenance, lawn and garden care, painting	oil, gas, antifreeze, nutrients, pesticides, paints

MATERIALS:

- Candy (skittles)
- Plastic sandwich bags
- Graph paper
- Colored pencils
- Copies of Student Page
- Copies of Visual Aids



Water is Life: Quality Matters

PROCEDURE:

1. Divide the candy into the sandwich bags (you may want to manipulate the bags so that the assortment of candy represents a particular land use area by adding more of a certain type of pollutant, rather than relying on a random mix). You may either have one bag per student, or one bag per group of students. You should have about 30 pieces of candy per bag. Each bag represents a water sample from a watershed.

2. Ask the class to define the word pollutant. Tell them that each color of skittles represents a different kind of pollutant. You can use the visual aids provided at the end of this activity to hang up in the classroom.

PURPLE = Sediment
RED = Pesticides
GREEN = Fertilizers
YELLOW = Oil and Gas
ORANGE = Toxic Waste

Discuss each of these pollutants with the students. Ask them where they come from, what they are used for, how they can be beneficial, and how they may be harmful. Refer to the Land Use Chart on the first page for more information. Discuss what land-use means, and what kind of land use may cause the different kinds of pollution.

3. Distribute the graph paper to each student or group. Tell the students that they will be drawing a bar graph to show the number of pollutants found in their "water sample." Show them the sample graph provided. Have the students label the x-axis with the pollutant types and the y-axis with the amount of pollutants.

4. Give each group a "water sample." Tell the students to separate and count the number of each pollutant and graph them on the paper. Remind the students that they cannot eat the skittles until they are finished with their graph!

5. Ask the students to try and determine what land use activities are occurring in their watershed according to the "water sample." For example, a water sample from an area with a lot of agriculture use may have more sediment, fertilizer and pesticides. Refer to the Land Use Chart on the first page for more information.

WRAP-UP: Discuss how each water sample is different. While some samples might contain an abundance of one type of pollution, almost all types of pollutants can be found (even if they are small amounts). Discuss strategies to reduce pollution. How can the students do this on a large scale (in their community) or small scale (in their own home)?

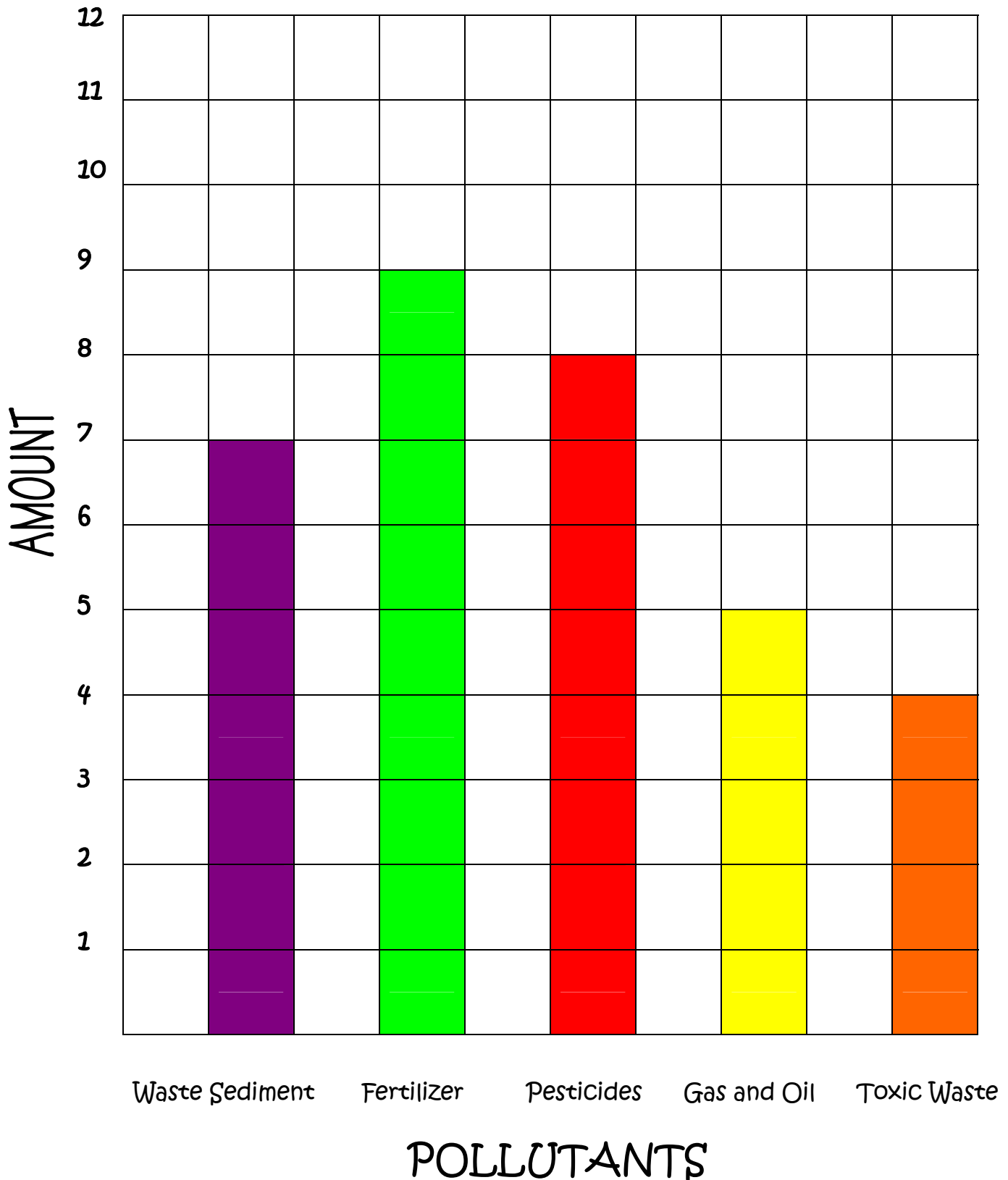
NOTE: Be sure the students understand that the factors (materials) we consider non-point source pollutants only become a problem when they are used incorrectly. For example, oil and gas become a problem when they are leaking onto the ground and washing into a waterbody. Fertilizers and pesticides become a problem when too many are applied and they run off into a waterbody.

Adapted from
activity S-2 Use Your
Head, Protect Your
Watershed in the
manual Water
Conservation and
Non-point Source
Pollution by



WATER POLLUTION GRAPHING ACTIVITY - VISUAL AID


NAME: _____



WATER POLLUTION GRAPHING ACTIVITY - VISUAL AIDS

SEDIMENT

WATER POLLUTION GRAPHING ACTIVITY - VISUAL AIDS



PESTICIDES

WATER POLLUTION GRAPHING ACTIVITY - VISUAL AIDS

FERTILIZERS

WATER POLLUTION GRAPHING ACTIVITY - VISUAL AIDS

OIL AND GAS

WATER POLLUTION GRAPHING ACTIVITY - VISUAL AIDS

TOXIC WASTE