**Unit 1: Water Quality Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Notes*  **Date: 10.24.16**

Water Pollution

**What is water pollution?** **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of water that have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by human activities, and are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!**

Water pollution can be classified into two main categories: **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Point sources**

* Where \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are released from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ locations

Ex. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, ditches, or sewer outfalls. Factories, power plants, sewage treatment plants, underground \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and oil wells are major producers of point source water pollution.

**Non-point sources**

* When water pollution is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, having no particular location where it goes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a body of water.

Ex. runoff from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, golf courses, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, construction sites, parking lots etc.

**Types of Water pollution**

**1. Disease causing agents:**

**Source: Untreated human and animal wastes**

It is thought that \_\_\_\_\_\_\_\_\_\_\_% of diseases in developing countries are caused by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and that it kills 10 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ people annually

* In more **developed** countries, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plants have reduced or eliminated the worst sources of water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* But in **less-developed** countries, it is estimated that at least 2.5 billion people lack adequate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ these people have access to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ drinking water.

**2. Acids**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are released as a by-product of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ processes. The burning of coal and oil releases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and nitric acid into the air. This returns to the water in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Organic Water Pollution

Exposure to even very \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, genetic disorders, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* The two main sources of toxic organic chemicals are industrial and household \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of pesticides from farms, golf courses, and roadsides

**4.** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or suspended matter:

Sources: **Soil \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ releasing sediment and solids**

They \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ water and reduce photosynthesis, which disrupts the aquatic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Excess sediment can also destroy coral reefs and shoals near shore.
* Sediment flow can be beneficial, mud carried by rivers nourished floodplains around the world. It also creates valuable deltas and islands.

**Unit 4: Water Quality Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Classwork*  **Date: 10.24.16**

*Today we will perform an experiment that will help us understand how pollution spreads. We will also learn what we can do to reduce the damage caused by harmful chemicals to humans and to the environment.*

Here are some examples of pollution. Put a star next to the ones you think are examples of point-source pollution.

|  |  |
| --- | --- |
| **Source of Pollution** | **Point-Source** |
| A pipe from a factory dumps toxic waste into a river. |  |
| Runoff from fields carries pesticides into the local water supply. |  |
| A person empties a container of bleach into a brain in his house. |  |
| Radioactive waste cans in a disposal site leak. |  |
| Acid rain damages the trees and plants throughout a large forest. |  |
| A company illegally buries barrels containing toxic waste in an abandoned field. |  |
| The exhaust from millions of cars enters the Earth’s atmosphere, producing smog. |  |
| Air pollution from a power plant smokestack. |  |

**Mini Lab**

Imagine that someone dumps bleach in their backyard or throws some old batteries into the woods. Imagine a pipe from a factory empties toxic chemicals onto the ground in an abandoned field.

Who cares? It’s not like it is going anywhere, right?

**Our Question:** How does point-source pollution spread from one place to many others?

**Challenge Questions**

1. Can scientists determine if water is healthy with a single test? **Why or why not?**
2. How would you describe the water in a healthy fish tank?
3. Why does most commercial (business) fishing take place in places with cooler climates like Alaska and Maine? \*\* Hint think about what happens to water when temperatures get too high.
4. If a lake has a really high level of turbidity, is it more like the neritic zone or the deep oceanic zone? **Explain.**
5. How are bio-indicators like “aquatic smoke alarms”?

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*Classwork*  **Date: 10.24.16**

**Mini Lab Questions:**

1. What did the point in the center of your filter represent?
2. What did the other points you drew on the filter represent?
3. Why did we use a single drop of food coloring to represent point-source pollution?
4. How many of the drinking sources on your filter were contaminated by the pollution?
5. Based on the experiment, why is it important that people and companies don’t just dump toxic chemicals on the ground or down the drain? Why do we need to dispose of them in other ways?
6. What are four sources of point-source pollution you can think of in the Gaston/Weldon/Roanoke Rapids area?

**Directions:**

1. Take a filter and draw a point in the center with a permanent marker. This point represents the location of some point-source pollution.
2. Draw 5 other points on your filter. These points represent sources of drinking water in the area.
3. Place your filter on a plate.
4. Raise your hand. Mrs. Moody will come and spray your filter with water. Now, your filter represents the ground (the ground we walk on has water in it, just like your filter does now).
5. Drop **one** drop of food coloring into the center of your filter. This represents the pollution coming from the source of point-source pollution.