



7th Grade

SCIENCE BASIC: Hitting the Mark - The students will distinguish between accuracy and precision, investigate the relationship between accuracy and precision as it relates to water quality data collection, write clear procedures, and recognize the limitations of those procedures. Students work in small groups to create a structure and/or method to make the clay ball hit the target. Then they write the procedure out step by step. The groups then rotate and have to use the other group's procedure to get the same results. This is a fun hands-on interactive way to teach accuracy and precision!

Enviroscape –The flexibility of the Enviroscape makes it possible to address human impact issues such as erosion, litter, animal waste, fertilizers, pesticides, pharmaceuticals, and other non-point source pollutants or the process involved with bringing clean water to the home and the removal of it safely back into the environment. This interactive model is a strong visual lesson that does an excellent job of portraying somewhat abstract concepts in an easy-to-understand format. **Standards: S7L4 c**

Benthic Bugs and Bioassessment... This is another activity where students focus on benthic macroinvertebrates. In this activity, they will learn about sampling techniques using a net. Three separate streams will be set up in tubs with objects representing different macroinvertebrates. Students will sample their stream, and separate, identify, and count the macroinvertebrates in their sample. Then they will calculate percentages and figure out the EPT/Midge ratio. This is a great science and math combination activity. **Standards: S7L1**

There is no Point to this Pollution: This exercise allows students to analyze data to solve a mystery, interpret a topographic map, and analyze and compare water quality data to learn about the cumulative impacts of nonpoint source pollution. Students will identify point and nonpoint sources of pollution, demonstrate the cumulative impact of nonpoint source pollution, learn to read and interpret a contour map while identifying important map clues about watersheds and water quality, graph, analyze, and interpret data sets to draw conclusions about pollution sources, compare local household and community nonpoint sources of pollution to surface water quality standards, and list ways to reduce or eliminate nonpoint source pollution. **Standards: S7L4 c**

All the Way to the Ocean and the Fatal Food game.

The students act out as a play of the book “All the Way to the Ocean” The book explains how important it is to not put trash in storm drains because the trash goes all the way to the ocean. Then the students play a game called “Fatal Food” where they are an animal looking for “good” food like a fish, algae, or a jellyfish. They may get good food or they may get “fatal” food such as fishing wire, a plastic bag, balloons, or get stuck in a bottle or 6-pack holder. We explain the dangers of plastic pollution on the environment. *We will need an open space (larger than the classroom) inside or outside to play fatal food. **Standards: S7L4 c**

Poison Pump- This lesson does an excellent job of incorporating history into a science lesson. Based on the real-life epidemic that plagued London in 1854, students are given a series of clues to discover the source of the disease named Cholera. Students are asked to label information on a map provided in the clues to form a supported hypothesis as to the origin of the outbreak. This lesson provides an excellent introduction to water quality, human impacts, and even epidemiology. **Standards: S7L4 c**

Macroinvertebrate Mayhem- This lesson is excellent for the kinetic learners in the group to interactively experience the ramifications of environmental stressors on macroinvertebrates (organisms that lack an internal skeleton and are large enough to be seen with the naked eye). These organisms are an integral part of the food web in any stream or creek and their presence or absence tells us a lot about the health of that stream. Each species of macroinvertebrates has a varying degree of tolerance to environmental stressors, so the more diverse the population the healthier the stream. This activity is a scientific version of the tag with specific modifications in place to account for the effects of environmental stressors. Certain organisms that are more sensitive to pollution are restricted in their movement across the field. * We will need an open space (larger than the classroom) inside or outside. **Standards: S7L4 a**

F.O.G. Relay – Students learn about fats, oils, and grease and how they affect wastewater pipes which can result in a “spill” (sewage in our streams, rivers, and lakes). Students learn about the importance of crapping the food and grease off the plate into the trash and put the plate in the sink. In a relay style, students race to the trash can and kitchen sink to scrape the plate clean and race back. It is a fun way to learn about F.O.G. There needs to be a big open space inside or outside. **Standards: S7L4 c**

JUST PIPE UP! – In this activity, students will learn where their water source comes from and the path it takes through the water treatment and wastewater treatment process. When the proper order is established, the students hold labeled tubes representing the locations along the way. Marbles and bouncy balls are then added at the water source (beginning) and students have to negotiate them through the system using elevation changes. There are discussions about water and wastewater line breaks and the consequences. It is a fun, hands-on approach to learning about the water and wastewater process. (Similar to Water/Wastewater Process Enviroscope but more hands-on) **Standards: S7L4 c**

Water Quality - Students will learn about some water quality measures such as temperature, pH, turbidity, conductivity, alkalinity, and dissolved oxygen. The students will work together with field kits to test a water sample. Students will get an understanding of what background levels are normal and what excess is created by human point and non-point source pollution. *If an outside water source (i.e. pond or stream) is available and assessable the water can be collected and tested onsite or brought back to the classroom. **Standards: S7L4 c**

Turning Chaos into Order- You don’t have to be outside very long to notice the vast differences in organisms in our very backyards. From trees to birds to bees, each organism has very specific characteristics. In this lesson, students will explore basic concepts of taxonomy, by student-led discussion. As a class, they will develop a system to sort themselves by the characteristics they create. In small groups, students will practice using a dichotomous key to classify the various fish specimens found in our watershed. **Standards: S7L1**

Marvelous Microbes- Have you ever wondered how wastewater gets treated? Similar to a game of sharks and minnows, the students will either be “food” (some of the various components of wastewater such as bacteria, algae, nutrients, or food particles) or they will be a microbe that eats the food. This lesson allows students to interactively learn about a few of the microorganisms

that we use to break down wastewater and how we can use them to our benefit. **Standards:**
S7L4 a