4th Grade

SCIENCE BASIC: Hitting the Mark - The students will distinguish between accuracy and precision, investigate the relationship of 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: S4L1**

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 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: S4L1**

Just Pipe Up! – This activity ties the water cycle to water treatment. This lesson begins with the book "The Magic School Bus: At the Waterworks", which discusses both the water cycle and drinking water treatment. The second half of the lesson is an interactive construction of the drinking water treatment and conveyance using clear tubes and marbles. Students hold the tubes in the proper order (labeled on the tubes) and using elevation and gravity have to move the marbles from the river through the water treatment process. There are discussions about water line breaks and the consequences. It is a fun, hands-on approach to learn about the water process, the water cycle, and how they are related. **Standards: S4E3, S4P3**

The Incredible Journey - This is a great Earth Science activity that covers condensation, evaporation, and electromagnetic forces. The Incredible Journey utilizes the skills of organizing (mapping), analyzing (identifying components and relationships), and interpreting (describing). When children think of the **water cycle** they often imagine a circle of water flowing from stream to ocean, evaporating into clouds, and raining down. In this activity, students will role-play a water molecule as it travels through the water cycle. This activity helps students to conceptualize the water cycle as more than a predictable two-dimension path. As students move through the water cycle they will collect beads that map the route of water. The incredible meets the standards for Earth Science and Ecology and aims to get the students to describe the movement of water within the water cycle and identify the states of water. A short "icebreaker" is used to show students how much of the Earth is land and how much is water. This discussion leads to the realization of how much of that water is actually usable. **Standards: S4E3**

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: S4L1**

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: S4L1**