Watershed Woes

Water Science: Human Use

This activity satisfies one of the required JNMN lessons needed to complete the Junior Water Science Master Badge.

Appropriate Ages 8-12

Expected Time: 50 min

Learning Objectives:

Students will learn that pollution is often too small to be seen in our waterways and can negatively impact people and wildlife downstream.

Students will apply what they learned in their pollution detective work from the Mystery of the Wonder Wetlands Program by interacting with a physical watershed model.

NE Science Standards:

SC 3.7.2.E
SC 4.13.14.C
SC 5.13.4.C
SC 5.13.4.D
SC 6.13.5

Did You Know...

Everyone lives in a watershed.

BEFORE YOU TEACH

BACKGROUND KNOWLEDGE

Point source pollution is pollution is easy to identify. Hence the name, it comes from a single source that can be identified or 'pointed at'. such as a smokestack or discharge pipes. Non-Point Source Pollution is much harder to identify and prevent as it comes from many different sources at once.

Materials And Prep:

Large Watershed Tabletop Model
Student Watershed Models - Paint Molds
Paint and demonstrate pollution instructions
Presentation Guide instructions
Paper Towels
Plastic tablecloths
Nebraska Watershed Map

VOCABULARY

Precipitation: Water in all of its forms that originates in the atmosphere and descends onto the land.

Watershed: Region or land area that contributes precipitation to a collective body of water. Wetlands can be found both along bodies of water or in upland depressions that collect water. They can be thought of as a sponge, the soil and vegetation work together to absorb and store water. Wetlands act as a natural filter for our Earth.

Engage:
Do students know the names of the large bodies of water near them? Are they familiar with the term watershed? Display both the large and individual watershed models and have the group identify areas of the model to their own community. For example, neighborhoods, shopping centers, businesses, golf courses, lakes, etc.... Locate your own watershed using the Nebraska Watershed Map.

Explore:
Initiate painting of the watershed molds suggesting it's reminiscent of some of the places near their homes. Consult the Paint and demonstrate pollution directions.

Explain:
Follow the Presentation Guide beginning at # 2. Move throughout the model asking students for ideas of pollution on the farm, forest, golf course etc. Give students an opportunity to LIGHTLY apply a pollutant to the affected area after identifying a source of pollution. We see that as it rains, it picks up many of the toxins, soil and contamination to the waterbody within that watershed. Lead students to imagine this large model as only a piece of an entire watershed. At the county level, how could we determine exactly which farm, or which neighborhood was the source if every farm and neighborhood used the same pollutants? Non-Point Source and Point Source Polluters can then be defined for the tabletop watershed model.

Evaluate:
What can people do to limit water pollution? Introduce the concept of mitigating pollution with wetlands as you place the wetland props on the model.

Extend:
Using shakers and a spray bottle on their own, newly painted watershed models, students reenact similar stories to those told on the large watershed tabletop version.

JUNIOR NEBRASKA MASTER NATURALIST

WATERSHED MODEL INSTRUCTIONS

Paint and demonstrate pollution on the smaller watershed model molds
Helpful Tips for Time Management, Easy Prep and Clean Up:

Activity 1: 20 min. Paint student models

Activity 2: 15 min. Using the large tabletop watershed model, demonstrate how people impact watersheds.

Activity 3: 10 min. Reenact a similar story on their painted watershed models.

Have the plastic mold watershed model kit in sight when reviewing these instructions.

Use paper towels instead of water to clean brushes between paint colors.
This paint chain is less likely to spill if students open just one color at a time.
When first opened, instruct students to use the paint from the lid first.

One watershed kit is provided for every three students. As a team, determine where the buildings will be placed and where students will paint the river banks, lake, road, crop field and parking lot. The tallest hill and its creek should also be painted on the model.

One student will be responsible for painting every building and parking lot. Instruct the student to press his/her fingers into the inside of the building and then paint each of the four sides. All buildings can then be completely painted without requiring extra drying time. There is no need to tape buildings onto the landscape, they can simply be set down on top of the model.

The second student will paint the river banks, river, and pond/lake. Due to drying time, it is important for these to be painted first as actual water will be moving across the model at the end of the lesson.

The third student will paint the remaining landscape green, the roads black/gray and use brown for the soil on the construction site and farmer's field.

Finally, students working together, should help one another finish painting the road and parking lot. Bridges are not necessary, but if time allows, students can work together to add bridges. Construction paper or poster board can be used to build the bridges attaching them with the model using tape.

Activity 2. Communicate with the Junior Master Naturalist Coordinator or review the instructional binder. Using the large model and additives, students identify and introduce contaminants on the models you tell the stories of how people live and work along the watershed. "Make it rain" to demonstrate the mixing and movement of water with the pollutants. Take out the cork that is under the lake, drain the polluted water and add clean water back onto the watershed in the form of rain. Repeat. See instructional binder for complete clean up directions.

 Activity 3: Back at their models, reassemble the students and have them reenact the stories from the larger model for the last 5 minutes using the pollution shakers and a spray bottle.