Point and Nonpoint Water Pollution Card Sorting Activity

Lesson Summary: (Grade Levels: 5-8) Students will be introduced to point and nonpoint source water pollutants by reading and discussing reference sheets that provide information. Students working in pairs or threes are provided a set of cards of both types water pollution sources mixed up together. They then sort the cards into two different piles, either point or nonpoint pollution. They will check their stack of cards against a provided answer key. In cases of any incorrect answers, they will refer to the reference lists for point and nonpoint pollution for clarification. When they are finished going over any incorrect answers, the students are provided a list of Best Management Practices for decreasing or eliminating any nonpoint water pollution sources and try to match up the nonpoint cards to different best management practices as much as possible.

Missouri Learning Standards: 5.ESS3.C.1

Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Missouri Learning Standards: 6-8.ESS3.C.2

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Related Vocabulary: Students may be unfamiliar with other terms in the reference handouts besides the vocabulary listed below. Explain any unfamiliar terms as the reference sheets are read and discussed.

Point Source Water Pollution	*Best Management Practices (BMPs)*	*Run Off / Sediments / Erosion / Nutrients*
Nonpoint Source Water Pollution	*Clean Water Act Household Hazardous Wastes*	*Herbicides / Insecticides/ Fungicides*

Related Web Links / Background Information:
Resources for Students and Educators about Nonpoint Source (NPS) Pollution | US EPA

Required Materials: Make copies of the following handouts and tell students NOT to write on them so that they can be reused:

- Nonpoint Sources of Water Pollutants Reference List
- Point Sources of Water Pollution Reference List
- Best Management Practices (BMP)

Safety Considerations: None

Preparation Time Requirements: Time needs to be set aside for the photocopying of reference sheets, card sets and the cutting of cards. Using a paper cutter will speed up that process. Once copies are made, future preparation time can be eliminated by having students NOT write on the referral handouts and reuse the card sets.

Determine the number of photocopies needed, do the copying and then cut them out. Make sure that in each set the cards are mixed up. Clip each set together or store sets in individual envelopes with the activity name for easy distribution and collection. If possible, make sets on different colors of photocopying paper. Sets are less likely to get mixed up and can be can be resorted quickly. *Tell students NOT to write on the cards or the referral handouts so you can reuse them*

Lesson Warm Up: Ask students to brainstorm all the ways that water is used. Then ask students what our lives would be like if that water was too polluted to use safely for these purposes. Be sure the discussion includes how vital water is to life itself. After discussing this dilemma, tell students that they are going to learn about the two groups or types of water pollution and how to avoid these problems. There are numerous short videos on the internet that explain the difference that could be used to enhance the warm up.

Point and Nonpoint Water Pollution Card Sorting Activity:

1. Pass out the copies of the handout, **Point Sources of Water Pollution.** Start by reading the definition of "point source" pollution by the *Clean Water Act* on the back. Tell students that there are national and state laws that regulate these sources of water pollution so the public's health and the environment are not in danger. Do mention however, that water pollution does enter our waterways sometimes but not nearly as much as in the past due to the Clean Water Act of 1972.

2. Go over the tables in the **Point Sources of Water Pollution** handout with students posing questions to help ensure students follow along. Introduce and clarify terms that may be unfamiliar with students as you go (commercial, industrial may be unfamiliar to lower grades).

3. Repeat the step above with the handout, **Nonpoint Sources of Water Pollution**. Go over the handout but this time include the background information at the top of the handout. Tell students they will learn more about the *Best Management Practices (BMP)* referred in the introduction later in the activity.

4. Take the reference sheets away from students. Hopefully they were paying attention to the reference sheet discussion so they have some basic knowledge!

5. Tell students that together with a classmate(s), they now are going to get a set of cards to divide into two piles. They will need to sort the cards so all the point sources water pollution are in one pile and the nonpoint sources of water pollution are in another. Tell them to discuss each card with each other before deciding which piles to place the cards in. Divide students as desired and provide them cards sets.

6. Once the students have sorted the cards, provide each group of students with an answer key to check their accuracy. If they have any incorrect answers, they need to ask the teacher for the reference sheets and determine where they had gone wrong. Their group needs to discuss the correction.

7. Next provide students with the handout: **Best Management Practices.** Tell them to sort though all of the *nonpoint sources of water pollution cards* to see what BMPs could be used to decrease or eliminate nonpoint sources of water pollution. Discuss them with the class when all groups have done this step. Emphasize the things that they can actually do themselves.

Lesson Wrap Up: Ask the students if their ideas about how water gets polluted have changed. Ask a few students to share new information they learned from the activity. Tell students that keeping waterways free of pollution is a big important job of many people who get education and training, and who work hard to protect us all. Tell them that ordinary people in their everyday lives around their homes and communities can either help or harm their waterways by making wise or unwise choices like was demonstrated in the activity.

Modifications:

The lesson difficulty could be decreased by making the following adaptations:
Instead of using the reference lists, make a tree diagram of the two pollution groups on the board as reference for the lesson. Use the water pollution cards to make the diagram. Erase before doing the card sorting activity.

The lesson difficulty could be increased by making the following adaptations:
Examine the following list of lesson links from the EPA for water pollution and find a good fit for your students:
Resources for Students and Educators about Nonpoint Source (NPS) Pollution | US EPA

Assessment: Have students construct a Venn diagram comparing and contrasting point and nonpoint water pollution sources and make a list of ways they can decrease nonpoint source water pollution around their home.