





Spelling

Spell PHOSPHOROUS.

Additional Information:

Phosphorous is a nutrient that is essential to plant growth, reproduction, and metabolic activity. However, when there is an excessive amount of phosphorus in a river, stream, or other body of water, it can cause **algal blooms** that, when they decompose, deplete oxygen available to fish and other **aquatic organisms**.

Photo Zoom ID

Identify the item in the photo below.



Answer: Wastewater pipe

Fill in the Blank

A _____ is an area where water naturally drains. _____ plants naturally help to absorb water, slowing **runoff** and filtering out **pollutants**.

Answer: wetland

True or False

Building a fence to keep livestock, such as cows, out of a stream is an example of a **BMP**.

Answer: True

Drawing

Draw one of the following four types of **BMPs** that are used for stormwater management.

- 1) Rain garden
- 2) Porous pavement
- 3) Rain barrel
- 4) Green roof

Provide the following hint:
Stormwater BMP




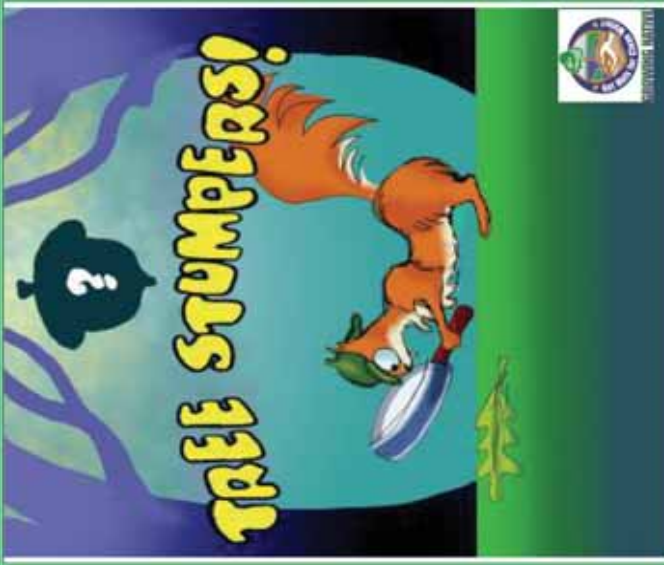


<p>Word Problem</p> <p>John Smith owns a home in the Potomac River watershed. On the edge of his property there is a hill that is eroding very quickly into a nearby stream. What is one solution for this problem?</p> <p>Possible Answers: Plant trees and shrubs to create a riparian forest buffer. Install stones or logs. There may be other correct answers.</p>	<p>Multiple Choice</p> <p>Which of the following three methods for disposing waste from a poultry farm would qualify as a BMP?</p> <p>a) Disposing the waste into a landfill b) Composting the waste c) Releasing the waste into a stream</p> <p>Answer: b</p>	<p>Multiple Choice</p> <p>Of the following three choices, which identifies the best weather conditions for applying spray fertilizers?</p> <p>a) A sunny day b) A windy day c) A rainy day</p> <p>Answer: a</p>
<p>Spelling</p> <p>Spell IMPERVIOUS.</p> <p>Additional Information: An impervious surface is a surface through which water cannot penetrate or pass. The presence of impervious surfaces increases stormwater runoff because water cannot be absorbed by the soil.</p>	<p>True or False</p> <p>A better location for a new housing development would be on a site that has never been developed, instead of on a site on which construction has previously existed.</p> <p>Answer: False. Building on a site that has never been developed would mean disturbing a site that is untouched, instead of building on a site that has already been disturbed.</p>	<p>Charades</p> <p>Act out the planting of a tree.</p>





<p>Fill in the Blank</p> <p>Water that is collected in a rain barrel can be used for what?</p> <p>Answer: The most common answer will be watering plants, but other answers can be accepted if they are realistic.</p>	<p>Fill in the Blank</p> <p>_____ is a type of farming technique in which the soil is minimally or not at all disturbed.</p> <p>Answer: No-till or conservation tilling (Note: slight variations on the answer can be accepted).</p>	<p>True or False</p> <p>The practice of farming the same crops in the same fields every year is an example of a BMP.</p> <p>Answer: False. Crop rotation, in which a farmer rotates different crops among his different fields every year, is an example of a BMP. Failing to rotate crops degrades soil by removing nutrients from it.</p>
<p>Word Problem</p> <p>Jane Smith is a homeowner in the Potomac River watershed. She likes to have green grass, so she fertilizes it with twice the amount of fertilizer that the package says to use. Why is this not a good example of a BMP?</p> <p>Answer: Excess fertilizer contributes to nutrient pollution in nearby waterways.</p>	<p>Charades</p> <p>Act out picking up waste while walking your dog.</p>	<p>Photo Zoom ID</p> <p>Identify the item in the photo below.</p>  <p>Answer: Water droplet</p>





<p>Word Problem</p> <p>There is an area in your neighborhood that has a stream. The stream is surrounded by various trees and shrubs. What is the name of the region with trees and shrubs surrounding the stream?</p> <p>Answer: A riparian forest buffer</p>	<p>True or False</p> <p>While harvesting timber, it is very important to ensure that sediment and erosion controls are in place.</p> <p>Answer: True. Controls reduce the amount of erosion that can occur after an area has been heavily disturbed during harvesting.</p>	<p>Word Problem</p> <p>The instructions on a bag of fertilizer you just bought for your lawn say to use half a pound of fertilizer per 1,000 feet of lawn. Your lawn is 500 square feet. How much fertilizer should you use?</p> <p>Answer: $\frac{1}{4}$ pound (.25 pounds)</p>
<p>Word Problem</p> <p>A farmer has an open field. The wind carries the soil away, eroding the field. Why would planting trees around the field be an example of a BMP?</p> <p>Answer: When there is a strong wind, the leaves and branches of the trees absorb most of the wind. This lessens the wind's ability to carry away and erode soil. Roots also anchor soil in place.</p>	<p>True or False</p> <p>A rain garden needs to be large to help filter runoff.</p> <p>Answer: False. Even small rain gardens can be helpful.</p>	<p>Drawing</p> <p>Draw a home, farm, or business area (e.g., a parking lot or office building) that has at least two examples of BMPs.</p>





<p>True or False</p> <p>An example of a BMP can be something as simple as diverting rain water from your roof into a garden, instead of onto an impervious surface, such as your driveway.</p> <p>Answer: True. By diverting the water from an impervious surface, the water infiltrates more slowly into the soil, reducing stormwater runoff.</p>	<p>Word Problem</p> <p>During a heavy storm, water rushes into a stream from a pipe that drains from an asphalt parking lot. Each time there is a storm, the fast-moving water erodes the stream banks, making the stream wider and carrying sediment downstream. Give an example of a BMP that would help address this problem, and explain why it would help.</p> <p>Answer: Possible answers may include planting trees or installing a storm water pond. There may be other correct answers.</p>	<p>Spelling</p> <p>Spell RIPARIAN.</p> <p>Additional Information: A riparian forest buffer is an area around a stream or water body that consists of trees and shrubs. Riparian forest buffers protect water bodies from pollutants and slow runoff.</p>
<p>Word Problem</p> <p>Farmer Joe has a grassy area that is naturally wet and swampy on one corner of his property. Because it cannot be used for farming, he wants to restore it to its former state as a wetland. Why is this a good example of a BMP?</p> <p>Answer: A wetland is an area that naturally absorbs water, preventing rapid runoff and filtering pollutants. Wetlands are helpful in areas such as farms, which have problems with erosion or excessive nutrients.</p>	<p>True or False</p> <p>Large amounts of nutrients in water bodies are good because they cause algal blooms.</p> <p>Answer: False. Algal blooms consume large amounts of oxygen as they decompose, endangering fish and other aquatic animals. They also block light from reaching aquatic vegetation, causing them to die.</p>	<p>Drawing</p> <p>Draw a before and after picture. The before picture should be what the area around a stream might look like without a riparian forest buffer. The after picture should be what the area around a stream looks like with a riparian forest buffer.</p> <p>Answer: The before picture should not have any trees or shrubs present, or very few of them. The after picture should have a large number of trees and shrubs present in the area around the stream.</p>





Drawing

Draw a construction site showing soil erosion and sedimentation entering into a stream.

Word Problem

Jane Smith, a homeowner in the Potomac River watershed, throws away all of her **organic** matter, such as vegetable parts and uneaten food, into the garbage. Instead of throwing it away, how could she better use the **nutrients** left in the organic material?

Answer: Composting

Photo Zoom ID

Identify the item in the photo below.



Answer: Leaves

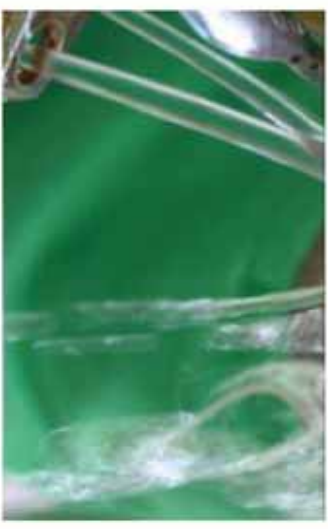
True or False

Septic systems can be a source of excess **nutrients** entering the groundwater supply.

Answer: True

Photo Zoom ID

Identify the item in the photo below.



Answer: Water fountain

Pollution Contributor

Farmer Kate allows her cows to wander into the stream in their pasture. You lose a turn.





<p>Pollution Contributor</p> <p>The owner of a large business builds a new parking lot. To make room for the new lot, he cuts down a nearby forest. The parking lot is made out of an impervious material instead of using materials that would allow water to penetrate the surface. You lose a turn.</p>	<p>Pollution Contributor</p> <p>John Smith does not pick up after his dog. You lose a turn.</p>	<p>Pollution Contributor</p> <p>Farmer Bob applies twice as much fertilizer as his crops needed a day before a large rainstorm is forecast. You lose a turn.</p>
<p>Pollution Contributor</p> <p>John Smith decides that he does not like the trees that surround a stream on his property, so he cuts them down, leaving the ground bare. You lose a turn.</p>	<p>Pollution Contributor</p> <p>A farmer who owns a poultry farm learns that the storage tank holding the waste from his chickens is leaking, releasing large amounts of waste into the ground and the nearby stream. Deciding it would be too expensive to fix, he leaves it to continue leaking. You lose a turn.</p>	<p>Pollution Contributor</p> <p>A farmer decides that instead of planting a cover crop to prevent erosion from occurring on his field, he will leave the fields bare and apply extra fertilizer the next spring. You lose a turn.</p>





Pollution Contributor

A homeowner does not like the swampy area created by diverting water from her roof into the yard. She decides to allow the water to run directly from her roof onto the driveway and into the street, where the storm drain is located. You lose a turn.

Environmental Problem Card

A stream located in a county with many new housing and shopping developments under construction has become clogged with sediment and has been placed on the impaired water list. Go back one space.

Pollution Contributor

While hiking in a nearby park, John Smith decides that it will be too troublesome to carry his trash with him until he finds a trash can, so he leaves his trash beside the stream where he ate lunch. You lose a turn.

Environmental Problem Card

After large storms, the wastewater treatment plant for a large town frequently receives more wastewater to treat than it can handle, so it dumps raw **sewage** into the nearby river. Consequently, the river has been found to contain dangerous amounts of **fecal coliform**, and has been placed on the impaired water list. Go back one space.

Environmental Problem Card


A stream in West Virginia has an abnormally low pH, meaning that it is acidic. After investigating, it is determined that this is being caused by **pollution** from a nearby mining facility. As a result, the stream is now listed on the impaired water list. Go back one space.

Environmental Problem Card

Each year, a power plant emits large amounts of **mercury** into the air. The mercury is then deposited into bodies of water, including a nearby river. When researchers find that the river contains dangerous amounts of mercury, it is placed on the impaired water list. Go back one space.





<p>Environmental Problem Card</p> <p>After rainstorms, large amounts of fertilizer run off of agricultural fields into a nearby river. Because of high nutrient levels, the river is placed on the impaired water list. You lose a turn.</p>	<p>Spelling</p> <p>Spell the word NITROGEN.</p> <p><i>Additional Information:</i> Nitrogen is an essential nutrient for plant growth, reproduction, and metabolic activity. However, excessive amounts of nitrogen in water bodies can cause algal blooms, which deplete available oxygen in the water as they decompose.</p>	<p>Word Problem</p> <p>Explain why having a green roof would help to reduce runoff and filter pollutants near your home.</p> <p><i>Answer:</i> The vegetation growing on the roof slows down and absorbs the water before it runs off the roof, also trapping pollutants that would otherwise reach nearby streams and rivers.</p>
<p>Photo Zoom ID</p> <p>Identify the item in the photo below.</p>  <p><i>Answer:</i> Acorn</p>	<p>Word Problem</p> <p>What does BMP stand for?</p> <p><i>Answer:</i> Best Management Practice</p>	