Fertilizer Runoff

This activity will explore the effect heavy rainfall has on fertilized fields and nearby water bodies.

Did you know that Oklahoma lakes and ponds provide just over 1,400 square miles of water area? That's enough to cover the entire state of Rhode Island and then some! And, we also have more than 167,500 miles of rivers and streams. Whether it's a creek or a lake, these bodies of water are often relied upon by the people who live near them. Uses can range from recreation, tourism, and even drinking water for humans and livestock. Protecting our water supplies is even more important during the cycles of drought our state is known for.

One of the things that can threaten these water supplies is runoff. Runoff is typically pollution from farms and other industrial areas draining into the local water supply, but it can easily come from your own backyard. There is one type of runoff that just might surprise you - fertilizer.

WHAT YOU NEED:

Rectangular Food Containers/With Lids
All-purpose Fertilizer Beads (like Osmocote)
Nitrogen Testing Strips
Grass Seeds
Soil
Hammer
Small piece of netting
Water
16 z. Plastic water bottle with lid
Push pin
Book or block of wood

WHAT TO DO:

Experiment Prep

First you will need to set up your two test fields.

Cover about half of the bottom of each container with about an inch or so of soil. Staple a small piece of netting or burlap over the exposed end to hold the soil in place.

Lightly sprinkle a layer of seeds over the top of the soil.

Carefully, pour about 4 ounces of water over the newly seeded area and then cover the container with the lid.

The lids will keep the soil moist and give the seeds the perfect environment to sprout. Now you play the waiting game. Check on them daily and once the seeds sprout, remove the lid and place in a well-lit area until the seedlings are about an inch tall.

Experiment

Prop the grass side of each field on a book or piece of wood so that the field slants downhill toward an empty "catch basin" that will serve as our creek bed. Label one field "control" and the other "fertilizer".

Next, place 4 beads of fertilizer inside a folded piece of paper or foil packet and use a hammer to crush the pellets into dust. Sprinkle the powder evenly across the "fertilizer" test field.

Fill a 16 oz. water bottle with tap water. Use one of the nitrate testing strips to check nitrate/nitrate levels.

Included Test Strip Procedure – Dip one test strip into a water sample for **2 seconds** with motion. Remove the strip. **Wait 1 Minute.** Match the color of the test strip with the included chart. (Complete the color matching within **1 minute**)

Record your results.

Next, screw the lid on the water bottle and turn the bottle over so that the bottom is facing up. Use a push pin to poke a series of holes in the bottom of the bottle.

To simulate a heavy rainstorm, hold the bottle over the control field, turn it right-side-up and squeeze the sides bottle until about half of the water is used.

Repeat the process and apply the remainder of the water over the fertilized field.

Use test strips to check the nitrate/nitrite levels in the water runoff at the lower end of each test field.

Record and compare your results to your original test strip. What do you notice?

WHAT'S GOING ON?

Fertilizers are an important part of farming and home landscaping in Oklahoma. Making sure that the soil we use has enough nutrients in it for crops, lawns, trees and flowers to grow is a big deal. However, there can be too much of a good thing. When fertilizer that's high in phosphates and nitrates gets into a water supply it can throw the entire eco system out of whack. Algae will use all those nutrients to grow quickly and get out of hand, creating a Harmful Algae Bloom. These blooms can last weeks, secrete toxins, and can deplete the oxygen supply in the water. But it doesn't stop there when these blooms die off the microbes that feed off the decaying algae use up even more of the oxygen in the water and can create dead zone where plants and animals can't live.

Want to level up this activity? Try taking water from a local aquatic ecosystem like a pond or creek and filling up a few plastic bottles. Then add different amounts of crushed fertilizer to them. Place them in a well-lit location and see what happens.

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