Topographic maps

How fast does water flow? How does it make a difference to water quality?

Background

In most instances, where there is an algae bloom in a water source, farming and food production are blamed. But is this the full story? Complete the water quality elearning course at http://grownextgen.org/ to find out more about algae blooms and their effects. Then, complete a survey of the watersheds (drainage areas of creeks, rivers and lakes) around your area. There may be multiple quadrangles (sections of maps) that contribute to the drainage area of a lake that experiences algae blooms. Try to investigate as many as possible.

Topographic maps are representations of the land surface. (Maps are available through the United States Geologic Service or state departments of natural resources. Contact your local office. In Ohio, maps are available for purchase from http://geosurvey.ohiodnr.gov/publications-maps-data/topographic-maps). They show elevations, water features, land use and road types. These features give information about the water flowing into a body of water. Spend some time looking at these maps to get clues about what might affect how water flows and the quality of the water entering the creeks, rivers and lakes.

Materials

topographic maps of a watershed
washable markers
rulers

Procedure

1. Write the name of your map: _____
2. Examine the legend for the map. Look for the following:
   - contour interval (this is the elevation difference between lines)
   - contour lines are usually brown
   - scale (this tells the sizes of things on the map)
   - colors: red represents developed areas; green, forests/parks; white, fields or undeveloped land; blue, water (creeks, ponds, rivers, lakes)

Fill out the table below after taking a few minutes to examine your map.

What do you see?	What do you think?	What do you wonder?

Water Quality

3. Look at the colors that surround the water sources on your map. What effect does the type of land use have on the quality of a stream or lake? What are some of the impacts from the land uses on your map?

4. Look for the highest and lowest points. Circle them with a marker. Note them here:

   Highest elevation: _____ Lowest elevation: _____

5. Locate water sources. Note which way water is flowing by drawing an arrow in the stream/river.

6. Measure out one mile along a water way. What is the elevation of the surrounding area across that mile? This will give you the elevation change in feet/mile.

   _____ feet.

7. If a drop of water falls on the southern one-third of the map, which way will water flow? Mark it with an arrow.

8. If a drop of water falls on the northern one-third of the map, which way will water flow? Mark it with an arrow.

9. Mark arrows for the direction water will flow from the western and eastern sections of the map.

10. Follow the path a drop of water would take to the water source shown on your map. What does that drop encounter along the way?

11. The speed of moving water in a water source is determined by many factors. Name as many as you can think of below:

12. Write a two-sentence conclusion below about what factors contribute to algae blooms.

Extension: What effect does the amount of time run off stays in a water source have on what it carries into the water? In other words, if water is in a stream longer, what effect will that have on any nutrients included in the run off (are they “biodegradable”)?