pH Changes in a Small Ecosystem

Summary

A pond water/hay infusion will be developed and observed. Student groups will add a range of acid and base solutions to look for changes.

Time Frame

3 class periods of 45 minutes each

Group Size

Small Groups

Materials

pond water (tap will do, it takes longer for microorganisms to develop)
hay (available from Barbara Gentry, JSD)
one beaker per group
microscopes
acid and base solutions (range from pH 3 to 11)

- student page
(attached)

Background for Teachers

Time needed:
40 minutes first day to set up. 15 minute observations every other day for a week. 30-40 minutes on pH day, 50 minutes to finish

Instructional Procedures

Students need to create their ecosystems and observe for about a week. At first, they will not see many microorganisms. Suggest they focus on a small piece of hay and look around the edges. You may wish to get out a "flex cam" to show the whole class what they are looking for. When the groups all have seen microorganisms in their systems, assign each group to a pH. These should be mixed ahead of time to avoid chaos. This would be a good time to discuss the properties of an acid and a base. By adding 50 mL to their ecosystems the students probably will not change the pH of the entire system to the pH of the solution they add. If they want to check the new pH, it might be very interesting to see what it is. If you want to let them add enough of their pH solution to change the whole solution, you can. It will lengthen the time needed to do this and the students may add too much and have to go back and forth and it may unnecessarily harm the microorganisms.
Students should add the solution to their ecosystem and observe again within a day or two. A smell will develop and a plastic wrapping for a lid may be essential.
The final observations should be posted on the board or an overhead so that all the students can see what happened at the various pH levels. High levels of acid or base will kill the microorganisms.

Bibliography

Lesson Design by Jordan School District Teachers and Staff.

Authors

Utah LessonPlans