



Pond Studies

We all have a special attraction for animals and living things. Edward O. Wilson wrote about this attraction, proposing the term biophilia. It is important to recognize this is an innate, intrinsic, and unlearned reaction. Various cultures have generated different mythologies and symbols based on animals, extending this innate tendency. Part of this attraction arises from the aesthetic appeal of their external appearance as well as their behavior. There are the colorful plumages of birds, or the striking markings of leopards and zebras, among many numerous markings of animals. One way of observing living organisms is to collect pond water and set up observation tanks to study their behavior. There are many kinds of pond organisms which are a source of fascination for students of all ages.

Making close observations of living things should be a part of every student's education. There is a practical reason why this doesn't happen much in formal schooling: there are the necessary and time-consuming aspects of caring for and feeding the animals, as well as ethical considerations of what should be bought into the classroom. One type of study, if done responsibly, provides a firsthand look at organisms without having a complex arrangement. This is the study of pond organisms.

I've brought buckets of pond water in many classrooms and to students of various ages. When students scoop out a cup of the pond water and place it on a container on the desk, some are initially reluctant (to engage?/explore?). However, pretty soon after the introduction, there is a great deal of excitement as they discover a variety of creatures swimming around. After several sessions of sorting, I usually split students in small groups and ask them to study one organism at a time. They can make large, detailed drawings on newsprint sheets, with room to describe the organism's behavior. Then they set up containers in which some of the organisms are placed for a long term study. Observations are made over several months of what the organism do and how they interact. Through this long term study, students can develop an understanding of the concepts of habitats, food chain, adaptive behavior, camouflage. The more abstract concept of form and function can also be developed. Later, close ups of different organisms behavior can be studied from YouTube videos.

This type of study can be done at three levels. In first or second grade, a large container can be set up that holds goldfish, snails, tadpoles, crayfish. In fourth or fifth grade, a large soda bottle can house pond water with dragon fly larvae, daphnia, and other macro invertebrates. In eighth grade, small containers can be used to house different kinds of micro-organisms. In this last model, pond water can be used, supplemented with organisms from a science supply business. A year long investigation can be carried out with this set-up, in which students observe what is happening to the organisms at various points in the year.

There are several ways that art can be part of these explorations. Drawing can be a way of carrying out a close observation of an organism. Some eighteenth century naturalists who made important discoveries were noted for their drawings: historians argue that their drawing abilities were a key element of their scientific processes and data-gathering. Ernst Haeckel published a book of drawings and paintings that are noted not only for their scientific importance, but also because the images have great aesthetic appeal. Some students will need help in how to render their drawings so that they can become confident. In my experience, the initial drawings tend to be cartoon-like, not showing much detail. It requires several iterations before students really capture the full details of an organism. One time in a second grade class, students were composing drawings of a gold fish. One student's drawings in particular stood out: it turned out that she had been taking lessons at the local art museum. Given time and practice, students who think they are not good at drawing can become proficient. The art teacher can provide useful advice and encouragement.

In many mythologies there are hybrid creatures, such as the Sphinx in Egypt. Some dragons are a combination of a bird and another animal. Having spent some time doing close observations and drawings, the art teacher can challenge students to make imaginary creatures. They could also make small sculptures using oil based modeling clay and some other materials such as beads and wire. Stories could be written about what these creatures do and what they signify.

At the end of each of the extended investigations, teachers can conduct an embedded type of assessment, calibrated to the ages and grades of the students. Students can be asked to make a three dimensional imaginary creature. This is similar to the hybrid creatures challenge, using similar materials. In this situation, students need to relate the form and structure of their creature to survival traits. What kind of niche does their creature inhabit? How does it survive? What does it eat? What might eat it? There can be two types of assessment. From the science perspective, teachers can ask: to what extent did they incorporate adaptive characteristics in their imaginary creatures? How conventional or unconventional were their imaginary creatures? How imaginative was their stories about their creatures? A curriculum guide for the science activities can be found at: [amazon](#), [bernie zubrowski](#), [trees and ponds](#).

Pond Study-Grades one or two

| ART | SCIENCE |
|--|---|
| <p data-bbox="207 600 786 743">Learning to draw organisms Students get help in drawing organisms. What are ways of making drawings proportional and ways of adding details?</p> <p data-bbox="207 932 737 1115">Making Imaginary Creatures Students can create imaginary creatures. They can be hybrids of various animals, possibly using photo shop.</p> <p data-bbox="207 1230 743 1297">Students can view the illustrations of Ernest Haeckel.</p> | <p data-bbox="831 453 1403 821">Setting up a mini pond Using a small wading pool, large tray or several wallpaper trays glued together, an observational container can be set up. It can include gold fish or other fresh water fish, large snails, tadpoles and crayfish. Freshwater plants are also included as well as rocks and small plastic containers for the crayfish to hide.</p> <p data-bbox="831 863 1295 1079">Close observation of each of organisms. Students make drawings on large newsprint sheets of each of the organisms. These are shared and discussed with the whole class.</p> <p data-bbox="831 1121 1386 1304">Long term observations Over a period of several months students make observations of the behavior of the different organisms. They take turns feeding the organisms.</p> <p data-bbox="831 1346 1409 1451">Observations of videos Various videos of each the organisms can be viewed and studied on you tube.</p> <p data-bbox="831 1524 1403 1745">Creating a creature that might survive in a pond- an embedded assessment. Students either make a imaginary fish, snail, or crayfish from modeling clay wire, pipe cleaners, and other materials.</p> |

Pond Studies, GRADES 5,6- MACRO INVERTEBRATES

| ART | SCIENCE |
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| <p data-bbox="203 558 816 667">Drawing Pond Organisms The art teacher instructs students on ways of rendering each pond organism.</p> <p data-bbox="203 1003 816 1188">Drawing Imaginary Pond Organisms Students can create an imaginary pond organism based on previous observations and/or develop a short story about what it does and symbolize.</p> <p data-bbox="203 1373 846 1482">Dance Creating a Dance based on the movement of pond organism (Optional)</p> <p data-bbox="203 1524 846 1709">A Mural Students make a large wall size mural which includes the pond organisms they have observed, plants and other animals that may visit the pond.</p> <p data-bbox="203 1856 826 1927">Art teacher assists students in making their imaginary pond organism for science class.</p> | <p data-bbox="894 485 1485 814">Pond water Sorting Pond Organisms collected from a Pond Students scoop out cups of pond water onto a plate and discover what creatures are moving. After a rough inventory, they can place some of these creatures in large soda bottles for long term observation.</p> <p data-bbox="894 856 1495 1115">Close Observation of the Organisms Small group of students make drawings of one organism while also observing and recording their behavior. These drawings and observations are shared with the whole group. Questions are generated for future observation.</p> <p data-bbox="894 1157 1463 1524">Setting up containers for Long Term observations Add a limited set of organisms to a container. Add water, plants, and pond soil as well. Over a period of several months, students make occasional observations and see if they can answer some of the questions generated during their initial explorations.</p> <p data-bbox="894 1566 1485 1703">Observational Study of You Tube Videos of Pond organisms. Or, students can make and study their own videos</p> <p data-bbox="894 1713 1476 2028">Some Simple Experiments Using different kinds of containers student can try out different conditions. For example, Will Daphnia move toward light or away from light? What happens when Daphnia are placed in a small container with a dragon fly larvae?</p> |

Classifying Pond Organisms

Students try different ways of classifying pond organisms using cut out images of organisms that are in pond water, as well as those which frequent the pond, such as birds.

Inventing a Pond Organism

Students can invent a pond organism: the assignment can include discussions of their imagined organism's adapted characteristics for a particular niche. For example, do their organisms have appendages that serve useful purposes, such as their eating and predator behavior?

Pond Organisms Grade 8-Micro Organisms

| ART | SCIENCE |
|---|---|
| <p data-bbox="207 445 516 478">Imagine an organism</p> <p data-bbox="207 483 743 592">Students can make drawings of imaginary, small organisms moving in an imaginary world.</p> | <p data-bbox="831 487 1286 520">Reviewing previous pond studies</p> <p data-bbox="831 562 1019 596">Observations</p> <p data-bbox="831 600 1279 634">Observing a drop of pond water</p> <p data-bbox="831 676 1367 898">Using microscopes, students can inventory how many microorganisms are in the drop of pond water. (In some situations these may have to be ordered from a science supply business.)</p> <p data-bbox="831 970 1198 1003">Drawing Micro Organisms</p> <p data-bbox="831 1075 1344 1108">Experiments with Micro Organisms</p> <p data-bbox="831 1192 1312 1264">Studying you tube videos of micro organisms</p> |