



The Mud Puddle

Muskingum Soil and Water Conservation District
225 Underwood Street, Suite 100
Zanesville, OH 43701
www.muskingumswcd.org

Fall
Issue
2011

CRITTER CORNER

Macroinvertebrates – Little creatures with a BIG impact

When I talk about our stream monitoring program, I often refer to macroinvertebrates. More often than not, I have to explain what these things are. So, to put this question to rest, I have devoted this issue's Critter Corner to the macroinvertebrates.

The term macroinvertebrates includes all the insects (six legs, adults with two pair of wings and antennae) along with other invertebrates (animals with no backbone including clams, snails and flatworms) and arthropods (jointed legged animals including crustaceans, isopods, etc.). These organisms are termed "macro" because they are visible to the naked eye.

Macroinvertebrates are typically abundant in streams, rivers and ponds. They are easier to locate and study than the more mobile animals such as fish. Most of these organisms have specific habitat requirements and levels of tolerance to environmental pollution. The presence or absence of certain animals has a direct correlation to the quality of the aquatic environment. Simply put, some can only live in really clean water, some in somewhat clean water and some in polluted water. The animals found in the stream tell you what the water quality is like. An abundance of pollution sensitive species (like caddisflies and hellgrammites) indicate a healthy habitat for vertebrate species, such as fish and amphibians.

Macroinvertebrates are found in most bodies of water and live in a variety of habitats. Benthic species (some of the most sensitive to pollution) are found on the bottom, often under rocks, debris or in the sediment. Some live on or among vegetation in the water, either floating, submerged or emergent. Finally, many live directly on the surface. Even different areas of the stream support different organisms. Swift moving areas, such as riffles, provide higher levels of dissolved oxygen, while slower moving water and deep pools have less oxygen. You can literally find an entirely different group of organisms living only a few feet away!

Macroinvertebrates are classified not only by taxonomic group (order, family, genus and species), but also by feeding group (shredders, detritivores, etc.), role in the ecosystem (predator, prey, etc.) and tolerance or sensitivity to pollution. We sample for these organisms in the stream during the fall, spring and summer, since different animals have different life cycle stages during different seasons (confused yet?). The data we collect each year is compared with that from previous years to determine if any changes, positive or negative, have occurred in the water quality. By monitoring we have a base to determine what is normal for a stream, discover when pollution occurs and its source, and take the necessary steps to fix the problem. Involving students in monitoring activities allows them the opportunity to learn field collecting techniques, use of monitoring equipment and helps them understand human impact on aquatic ecosystems. The bonus is looking for macroinvertebrates is the fun side of monitoring. What kid doesn't like playing in water?



Tis' the Season... for Stream Monitoring!

As fall approaches, the cooler temperatures and lower water levels provide the ideal opportunity to get students interested in water quality. The seventh grades from Maysville and West Muskingum participate each year in the District's stream monitoring program. Stream monitoring provides a unique experience for students to use data collection techniques, learn to properly use scientific equipment and discover proper sampling methods used to determine water quality in rivers and streams. Students currently monitor on sections of the Jonathan Creek, Joe's Run, Blunt Run, and the Salt Creek.

To prepare for the field trip, I visit the classroom several days prior to the monitoring to introduce students to stream monitoring and why we monitor water quality in streams, give a presentation on type and uses of equipment, animals found in the stream, and safety while in the stream. On the actual field day, students arrive at the monitoring site, divide into groups and begin the day's work. Students have the opportunity to use the technical monitoring equipment to determine pH, conductivity, dissolved oxygen, flow rate, turbidity, and temperature. They also use chemical testing methods to record pH, nitrate and phosphate levels, dissolved oxygen and coliform. Students participate in activities to explain the biological organisms in the stream and their role in stream ecology. Best of all, the students participate in biological monitoring where they find and carefully collect macroinvertebrates. This means they get into the stream and normally get really wet. After collecting the organisms, students bring them to shore where they identify each species using I.D. charts and dichotomous keys and record their findings. The students then discuss their overall findings and determine the condition of the stream ecosystem.

Stream monitoring offers a wonderful opportunity to introduce students to field collection and sampling methods, while helping students understand the correlation between the actions of humans and the impact on water quality. The hands-on activities allow students to collect important data which can be used from year to year to monitor changes in the watershed. I would like all 7th grades in the county, and any other interested teachers, to participate in this outstanding program. Funding is available through a grant to pay for busing students to monitoring sites and I also look for sites within walking distance from schools. If you are interested in participating, please give me a call. I schedule monitoring field days in September and October.



The Muskingum Soil and Water Conservation District presents

"It's My Conservation District"

67th Annual Celebration of Conservation

Supervisor Election ■ Buffet Lunch ■ Awards Program ■ Children's Activities ■ Door Prizes

Saturday, October 1, 2011

11:00 - 2:30

Friendly Hills Grange Camp

5880 Friendly Hills Road

Zanesville

Entertainment by The Wayfarers

Deadline to reserve tickets:

Wednesday, September 21, 2011

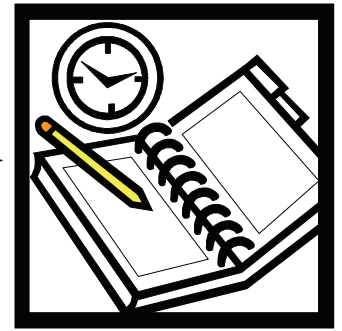
Contact MSWCD at 740-454-2027



"Take care of the earth and she will take care of you." - Author Unknown

Schedule Now!!!

2011-2012 School Year Classroom Presentations



Our Education Specialist, Nicole Hafer, is available for the 2011 - 2012 school year to present hands-on activities to Muskingum County classrooms free of charge. All programs meet Academic Content Standards for Science grades K-12. Check out our **New** Middle and High School Programs!

Earthworms! (Grades Pre-K-3)

In this presentation students learn about the fascinating life of the earthworm and visit with Squirmin' Herman, our six foot long earthworm friend. Activities include observation of live earthworm behavior and a great worm story!



Monarch Madness (Grades 1-4)

Students learn about the amazing life journey of the Monarch butterfly. This presentation includes information on the lifecycle, life history and migration of this amazing insect.

Reptiles and Amphibians (Grades 1-6)

Discover the wonders of these groups of animals and the role they play in a healthy ecosystem. This program also discusses their declining population worldwide and the importance of biodiversity. Live animals are utilized during this presentation.

Our Ohio Mammals (Grades 2-5)

Students learn about the life histories of many common Ohio mammals by examining their skulls, fur and tracks.



Fall Forestry (Grades 3-5)

Learn why leaves change colors and how trees prepare for winter. Students also learn how to identify several common Ohio tree species by their branch arrangement and how to use a dichotomous key.

Watersheds and the Water Cycle (Grades 3-6)

Students become water molecules and go on an incredible journey through the water cycle. They record their journey and identify the states of water while on their journey.

Soils with Weathering and Erosion (Grades 3-6)

This program was developed to meet the Science Content Standards' third grade soil requirement. Students learn about soil composition, formation and the importance of soil conservation.

Insects 101, The Basics of Bugs! (Grades 3-6)

Discover the amazing world of insects, from their life cycles to their role in the food web. Learn about their incredible adaptations and ability to live everywhere on Earth. Live insects included on a seasonal basis.

Enviroscape Demonstration (Grades 3-9)

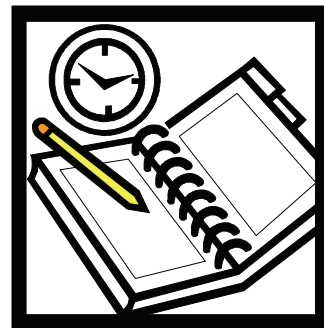
A land use model of a watershed demonstrating the effects of the surrounding land use on water quality. Students learn about non-point source pollution and the best methods to manage our land so as to protect our water resources.



Continued on next page.....

Schedule Now!!!

2011-2012 School Year Classroom Presentations



Go Green with Recycling (Grades 3-12)

Learn about the importance of recycling, what items can be recycled, and how we can all help reduce the human impact on our environment. The content has been expanded to include curriculum through 12th grade. This presentation is ideal to help students understand human impacts on the environment. We discuss waste disposal, the associated problems and solutions for the future.

Food Webs and Forest Ecology (Grades 4-6)

This presentation meets academic content standards for life sciences in the 5th grade. Students experience the interdependence of plants and animals in a forest ecosystem and how living things adapt to changes in their environment.

Changing the Land (Grade 4-8)

Students compare historical aerial photographs with current aerial photographs to determine what factors influence land use decisions, the impact of different land uses in an area and future changes in land use and their effects.

Soil Ecology (Grades 5-10)

In this presentation, students examine the life under their feet, compare soil ecosystems to other ecosystems and learn about the complex relationship among soil organisms. The presentation can be scheduled in the fall or spring when the ground is not frozen!

Forest Forensics (Grades 9-12)

Students will use several methods of data collection to discover that a forest is a complex, dynamic and constantly changing ecosystem. Access to a wooded area on school grounds is needed for high school students to get the most out of this program.

Biodiversity in Ecosystems (Grades 9-12)

This presentation is designed for students to discover the interconnectedness of all components in an ecosystem. Students will be able to define carrying capacity and limiting factors and how they relate to population fluctuations. They will also discover how environmental factors affect heredity and the impact of non-native species in an ecosystem.

New!! Geology Program (Grades 7-12)

Check back for details or contact Nicole with questions.

New!! Stream Monitoring Program (Grades 7-12)

Check back for details or contact Nicole with questions.

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Available Teacher Resources

Our office has a variety of resources available to teachers to help supplement the curriculum. We offer a variety of publications and fact sheets as well as many great ideas for bringing nature into your classroom. Contact Education Specialist Nicole Hafer @ 454-2027 to schedule classroom programs or for assistance enhancing your current curriculum.

Teacher Resources for Water Quality

Give Water a Hand

National organization that offers student materials for grades K-5 and additional teacher resources, with FREE, downloadable guidebook in English and Spanish. A program of the University of Wisconsin - Environmental Resources Center. The URL is: <http://www.uwex.edu/erc/gwah/>

Kids Corner: The Groundwater Foundation

Lessons, hands-on experiments, and games for students and teachers with the subject matter of groundwater and related natural resources. The URL is: <http://www.groundwater.org/kc/kc.html>

Learning to Be Water Wise and Energy Efficient

A conservation educational program developed by the National Energy Foundation for grades 4 -8. The program is implemented through local businesses, usually water or energy utilities. A sample activity is available at the site. The URL is: <http://www.resourceactionprograms.org/>

Watersheds: Connecting Weather to the Environment

Online course is a primer on how weather events relate to the health of a watershed, and how the public can take simple actions to protect watershed health. The on-line curriculum contains a collection of graphics that make it easy for meteorologists and others to explain watersheds visually. Developed through a grant from the U.S. EPA. The URL is: <http://www.met.ed.ucar.edu/broadcastmet/watershed/>

Water Environmental Federation: Student Resources

"A not-for-profit technical and educational organization, WEF's goal is to preserve and enhance the global water environment." Educational materials for grades K-12 and Spanish speakers are available in PDF format; also, resources for teachers and information on organizing a water festival.

The URL is: <http://www.wef.org/WefStudents/index.jhtml>

Watershed Action

The Watershed Action site offers one-stop help in planning and organizing service-learning projects to prevent water pollution in your watershed. Access on-line everything from curricula to local experts, from step-by-step project plans to storm drain stencils. All resources are free or low-cost. From the Center for Global Environmental Education and Watershed Partners.

The URL is: <http://cgee.hamline.edu/watershed/action/>

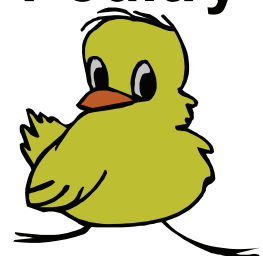
GREEN (Global Rivers Environmental Education Network)

This Earth Force program offers educators and watershed organizations a family of integrated services and tools to engage youth in improving their water resources. The new GREEN website offers users a place where they can enter and track data, download classroom activities, follow a step-by-step action process to improve a waterway, upload projects stories and photos and more.

The URL is: <http://www.green.org/>

**17th ANNUAL
2011 FARM - CITY DAY
Saturday, September 17th, 2011
9:00 a.m. – 1:00 p.m.**

Poultry

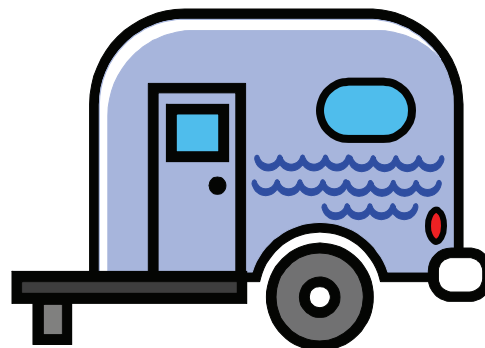


Chicks Dig It!

Have You Heard?

Coming Soon.... An Exciting Addition to our Conservation Education Program!

We are excited to announce that we received a grant from the Muskingum Watershed Conservancy District to purchase and have fabricated an aquatic education trailer. The trailer will contain exhibits about water quality, aquatic ecosystems and point/non-point source pollution. The trailer will be professionally designed and constructed by the Cincinnati Museum Center. This traveling exhibit will be taken to schools as part of our education program as a wonderful hands-on activity to introduce students to the many issues concerning water quality.



The aquatic education trailer will be available beginning in the 2012-2013 school year.



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Great Curriculum Resource!

Discovery Channel hosts a fantastic website called Discovery Education. The site offers a ton of free educational materials, including activity sheets and complete lesson plans for K-12 students. A few of the many lessons offered include: friction, mars, space exploration, volcanoes, sound waves, technology, electromagnetic spectrum, oceans and water quality. The site boasts lesson plans in multiple subjects other than science, including English, math and social studies. Check it out at:

www.discoveryeducation.com/teachers

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All SWCD programs and services are offered on a non-discriminatory basis, without regard to race, color, national origin, age, religion, marital status, or handicap.