



Learn Outside!

How to Start an After-School Environmental Club

A Guide for Teachers of K–8th Grade Students



A pilot project created by the Chesapeake Bay Foundation and
Anne Arundel County Public Schools
Teachers in a *Chesapeake Classrooms* Professional Development Course

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Introduction

An environmental awareness club will thrill and excite your students as they learn about habitats, animals, outdoor spaces, and vegetation in the Chesapeake Bay region. This document will help you lead an after-school environmental awareness club. When, where, and how much time you commit to this club is your decision. The best thing to keep in mind is *keep it simple, keep it fun, and keep it green!* Resources, activities, and funding are available and easy to access. These guidelines will provide specific lessons and helpful hints, but you should customize the club so that it works for you. Use your creativity to fit this club into your schedule and to motivate your students to take an active role as a steward of their local environment. Read on to discover how you can creatively fit this club into your schedule.

Get excited!

Logistics & Getting Started

Your excitement to lead an after-school program will show! Keep it meaningful, interactive, and simple as you begin the process.

- Begin with students applying or signing up to join the club. *“General publicity could include posters, table tents on cafeteria tables, notices on classroom chalkboards, announcements on the public address system, or have interested students give short announcements in classrooms followed by a signup sheet for students who are interested in joining. Include the time and place of your kick off meeting with all publicity.”*¹
- Distribute permission slips no matter what you think you might be doing as a part of the club. It cannot hurt to have emergency information. See Appendix A.
- Do not accept more students than you can supervise; otherwise seek parent assistance.
- Plan your meeting day when no other clubs meet. This eliminates schedule conflicts.
- Correspond with your club members via their parents’ email—that way the parents will not forget when to pick up their child.
- Your first meeting should be a brainstorming session. Decide on a club name and a theme for the year, i.e., wildlife, habitats, oysters, vegetation, etc. Play some icebreakers (see Appendix B for an example).

Think about these questions² to make the Getting Started phase run smoothly:

- *How have other groups organized in your school?*
- *Is there funding for clubs?*
- *Do you need a certain number of interested students?*
- *What other environmental groups exist in your community?*
- *What support can these groups give?*
- *What are the major environmental problems in your school or community?*



1 *School Environmental Clubs in Wisconsin*, Section One: Starting or Revitalizing a School Environmental Club, 2007. www.uwsp.edu/CNR/wcee/EnvSci/clubs.htm

2 Ibid.

Suggested Timeline

Meeting 1 Establish club name, goals, schedule, and theme.
Hand out health forms (Appendix C) and journals (Appendix D).

Play a Game Outside—Example: Sediment-Sediment—sharks and minnows but sharks are Student Bay Savers who plant trees that catch sediments, nutrients, and toxics instead of minnows as they flow downstream.

Meeting 2 If your theme is **Oysters**, for example, have shells for students to touch, use oyster reef poster or maps to talk about habitat (available from CBF).



Play the Oyster Bean Game—*On a large cookie sheet or watershed map, make a mountain of dried beans to represent oysters. Half are white beans and half are brown beans. In round 1, have students use chopsticks to harvest beans/oysters. Talk about the initial way the Native Americans used hand tongs to harvest oysters. Students get only 10 seconds to represent the oyster season which is only in the winter. In round 2, use spoons and talk about the skipjack and how technology advanced. Notice how the shape of the underwater mountain changes because of new technology. In round 3, use small cups to represent the power dredges and power engines that boats now have. Only allow students 7 seconds instead of 10 because the oyster population has shrunk and the regulations are tougher. Throughout all rounds, if any oysters go off the cookie sheet, stop everyone and they must put them back. Those beans represent oysters that are too small (3 inch legal size). At the end, when the students' catch is much larger from power dredging than from hand tongs, tell them that the white beans are live oysters and the brown ones are dead because diseases like MSX and Dermo have severely impacted the oyster populations. Read *Oyster Wars of Chesapeake Bay* by John Wennersten for details.*

Outside Game: Predator/Prey—elbow tag in a circle, standing partners are clean oyster shell, person being chased is prey (example: fish like a blenny or a goby) that hides in the shell from the person who is “it” aka the predator (example: rockfish or a skate). Tell the students they must stay close to their habitat so that they’re not running off in every direction and that they can cross through the middle of the circle. The prey may not link on to the pair immediately next to them but rather needs to go at least two pairs away.

Meeting 3 Play Bay Jeopardy (See Appendix E).

Meeting 4 If oysters are your theme, decide if you would like to become Oyster Gardeners with CBF.

Hold a discussion of plant connections to oyster health: salt tolerant vs. freshwater plants, tall vs. short root system to stop erosion. Bring in an expert or go visit a wetlands expert at Arlington Echo Outdoors School.

Outside Activities: Do a short walk around the schoolyard and use magnifying lenses.

Make a Leaf Print: Place a leaf underneath a blank sheet of paper. Rub a crayon over the paper and you will see an imprint of the leaf. Use the prints to decorate the club’s bulletin board.

Play Camouflage: The game is played similar to Hide and Seek but the person who is “it” stands in one place and must try to spot the people hiding. Those who are hiding must try to camouflage themselves as best as possible. “It” can be a bald eagle and those hiding can be mice or fish hiding in the wetland. The person closest to the eagle without being seen after the 3rd round wins!

Meeting 5 **Take students on a field experience**— example: CBF’s Oyster Restoration Center in Shady Side, MD, or Arlington Echo, or Smithsonian Environmental Research Center, or White Marsh Environmental Center, or YMCA Camp Letts.

Meeting 6 **Complete CBF’s Schoolyard Report Card** (See Appendix F). Divide students into groups where each group focuses on one section of the document. At the end of the day everyone comes together to compile information. The group can use this information to make a map of the entire schoolyard and then determine the best type of restoration project and the best location for it.

Meeting 7 **Start planning for a rain garden.** Use native plant guide from USFWS to determine the best plants for your location. Find sponsors for wood and hardware supplies. Local chambers of commerce or Lions Clubs or Rotary Clubs are great resources.

Meeting 8 **Talk to students** about the people at school that the club will have to work with on upcoming projects. Go over basic skills like handshakes, eye contact, and a confident voice before introducing them to the maintenance staff and the administrators. A meeting like this will keep the communication lines open and will help facilitate relationships between everyone who will be working together on your project.

Meeting 9–10 or whatever time you need....

Build the rain garden when you are ready .

Meeting 11, 12, and 13

Prepare posters, handouts, skits, interactive displays for a community day to show off your garden.

Second to last week of semester or school year

Host a community day, invite people to see your rain garden and posters about oysters, have handouts so people can take action at home.

Last meeting of the school year

Do a wrap up with the club members, have them fill out an evaluation of the club, and set goals for next year. Have an eco-friendly party!

Topics

These topics are examples of how you can focus the direction of your club. Allow the students to choose what topics they are most interested in or what action projects they would like to do at school.



Habitats—Example: Trees³

Problem: Find a problem, issue, or area of investigation to study.

The Place: Our Schoolyard

The Issue: There are only a few trees

The Stake Holders: local wildlife, school developers, the local forestry board, the school community

1. **Context:** Set it in a real-life context—a storyline

“Who cares about trees anyway?”

Trees are important to people and play an important role in the Chesapeake Bay watershed. As a result of several schoolyard investigations, your class has recognized the fact that your schoolyard has only a few trees. Students have also noticed that wildlife such as birds and squirrels are absent as well. Your class has decided to investigate this problem further and to implement an action plan to address the issue. In addition, your class will learn how trees have played an important role in the lives of people throughout history and how they have an effect on water quality.

2. **Big, Organizing Question:** Teachers state the investigation in a big, organizing question.

“Why are trees important to ‘Save the Bay’ Middle School?”

3. **Supporting Questions:** Teachers get students to brainstorm supporting questions.

Examples:

- *What do trees provide to humans and wildlife?*
- *What kinds of trees were once on our schoolyard?*
- *How does the presence or absence of trees influence people?*
- *What do trees need to grow?*
- *Are all trees alike?*
- *How do trees affect water quality?*
- *How do you plant a tree?*
- *How are trees used as symbols?*
- *How is forestry important to people?*
- *What happened to trees when they are harvested?*
- *What happens to trees when they fall over in the woods?*

³ Sample unit taken from Bay Schools Project, written by Joe Davis, Chesapeake Bay Foundation, May 2003.

4. **Teaching and Learning:** Teachers use the supporting questions to plan what to teach and how to teach, what and how students will investigate, and what students will read, count and measure, write, etc. Teachers align projects and investigations with learning goals and curriculum.
- Demonstrations of Learning:** Teachers, in collaboration with students, design ways for students to demonstrate learning in meaningful ways through products, performances, and projects. Teachers define performance standards by developing various scoring tools that are aligned with the Voluntary State Curriculum. Students present their work to a discerning audience.

- Science**
- Conduct a biodiversity survey on the schoolyard.
 - Classify organisms found.
 - Identify native/invasive species.
 - Conduct investigations to explain how water flows through a tree.
 - Harvest native tree seeds and grow seedlings.
 - Investigate and explain the role that trees play in the Chesapeake Bay watershed.
 - Explain how human activities such as the removal of trees, accelerates natural processes.
- Math**
- Measure the circumference of trees on the schoolyard and use charts and graphs to display data collected.
 - Use mean, median, and mode to analyze collected data.
 - Estimate the height of trees using indirect methods.
 - Create a histogram to display numbers and types of trees on the schoolyard.
- Social Studies**
- Investigate the importance of trees to Native American cultures.
 - Explain the economic importance of trees.
 - Investigate how the availability of natural resources has an impact on human settlement patterns.
 - Display flags of states and countries that include trees as symbols.
 - Create maps to show the location of trees on the schoolyard.
 - Investigate the development and enforcement of recent environmental legislation related to the removal trees on local, state, and federal levels.
- Writing**
- Create observational drawings of trees and create captions, stories, and poetry.
 - Create a persuasive letter requesting funds for a tree planting event.
 - Create informative flyers to announce a tree planting event.
 - Create reflective journal responses to text, investigations, and fieldwork.
 - Create a children’s book about trees. Books are bound and reproduced to share with other students and to sell to raise funds for projects.
 - Create a page to be included in a class field guide to trees on the schoolyard.
 - Create a notebook or packet of observational drawings of trees with fitting captions, stories, and poetry.
 - Create a persuasive letter requesting funds for a tree planting event from a real or fictional organization.
 - Create informative flyers to announce a tree planting event.
 - Create reflective journal responses to text, investigations, and fieldwork, making connections to your experiences and what you have learned in science.

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- Reading**
- Read to perform a task—Explore directions for planting trees, creating planting boxes, and harvesting and planting native seeds, and then evaluate how easy they were to understand and use.
 - Read for literary experience—Write about how the themes, characters, or topics in *The Lorax* and *The Giving Tree* connect with your project.
 - Read to be informed—As you gather information about trees or their historical importance, evaluate pamphlets, brochures, and web pages for how well they helped you in your research.

- Art**
- Use watercolor, pencil, and ink to create artwork to be included in original children’s books.
 - Analyze symbolism in nature photography and paintings.

- Technology**
- Design and build seed boxes for the tree micronursery.

Education

- 5. Environmental Stewardship:** Students plan and organize a tree planting event. Students work with parents, CBF Restoration staff, and teachers to plant fifty native trees on the schoolyard. In the Fall, native tree seeds are harvested and purchased. Seeds are germinated and 200 seedlings are monitored in an indoor micronursery. In the Spring, seedlings are placed in an outdoor micronursery for future schoolyard and community planting projects.
- 6. Service Learning:** Students read and share children’s books that they have created with Elementary School students. Books are donated to the Elementary School library.
- 7. Fieldwork:**
 - Students go to Clagett Farm to investigate the role of trees in the Chesapeake Bay watershed.
 - Students visit a tree planting site at Gunpowder State Park in order to explain how trees affect biodiversity.
 - A representative from the Anne Arundel County Forestry board visits the school and presents to the class.
 - Students visit the Baltimore Museum of Art to investigate natural symbolism in artwork.
 - Students visit recently developed neighborhood to investigate how the removal of trees has affected the area.
 - An environmental attorney visits the classroom to explain environmental laws and their enforcement.



Habitats—Example: Wetlands

Organizing Question: What are the main wetland habitats of the Chesapeake Bay region and how does the average citizen affect them?

- 1. Develop Supporting Questions**—What is a wetland? What are some examples? Why are they important? What is their main function?

- 2. Activities/Field Work**
 - Nature hike
 - Nature/Journal writing
 - Read stories or watch a video.
 - Map games—Use Google Earth or Chesapeake Bay posters.
 - Play Camouflage game.
 - **Schoolyard Report Card**—What habitats exist in your school’s area? How do these habitats relate to the Bay? See Appendix F.
 - Conduct water chemistry tests above and below a wetland. See if there is a difference and discuss how the wetlands serve as a filter.
 - Do the Trace Your Trash activity as a way to link one meeting to the next. See Appendix G.



Animals—Example: Keystone species

Organizing Question: What are the keystone species in the Chesapeake Bay region and why are they important to our environment and culture?

1. Formulate Supporting Questions—What is the definition of a keystone species? What are some examples? What role do they play in the Chesapeake region?

2. Activities

- Food chain model—kinesthetically, musically, visually, etc. See Appendix H.
- Lap sit (*Project Wild*)—physically form interconnected circle to demonstrate components of habitat.
- Fish printing—The Japanese painted fish and made imprints of them on rolls of cloth to keep records of what types of fish they caught. It is called *Gyotaku*. You and your students can paint a rubber or a real fish, lay it on a piece of cloth (t-shirt, pillow case, etc.) and you can discuss the fish anatomy, focusing on the fins and their functions. See Appendix H for a fish anatomy guide.
- Leaf sack—fill an onion or potato sack with leaves, place in a stream bed, check for invertebrates, see decomposition process.
- Build a small garden with plants that will attract butterflies. Keep track of how many different species visit your garden.
- Play Animal Charades.
- Birdie-Birdie-Perch—The game works similar to musical chairs but players form two circles. Each player has a partner in the other circle. They must find each other when the music stops. One player is an osprey and the other is its perch. Drive home the idea that osprey come back to the same perch year after year.
- Set up an aquarium in the classroom, each student has a weekly responsibility to maintain it.
- Research and report out about individual critters—poster contest, puppet show, skits, drawing, fictional story they write, etc.

3. Suggested Discussions/Extensions

- Harmful Consumer Activities—See Detox Your Home and What Goes Down the Drain available at www.CBF.org.
- Adaptations, Producers/Consumers.



Vegetation/Watersheds— Example:

Organizing Question: What are some of the plants in the Chesapeake Bay region? What niche do they fill?

1. Formulate Supporting Questions

What plants exist in your schoolyard? How are plants different in high areas of the watershed versus in low areas? What niche do plants fill in the watershed?

2. Activities

- Find unique leaves for Leaf Prints.
- Microscopes/hand lenses—Go out to the school garden or the local creek to collect samples. Talk about micro vs. macro studies.
- Read “Aliens from Earth” about invasive species.
- Build a rain garden—full step-by-step guide available from CBF.
- Watershed Model—Create a tabletop landscape using pie pans as pavement, fake trees, small houses, etc. Use colored water to show nutrients, sediments, and toxics flowing downstream. Use sponges by the Bay to soak up pollution like wetlands.
- Develop a nature trail on school grounds.
- Present a panel discussion and debate on a controversial issue.
- Create a skit, slide show, or video.
- Present environmental tips of the week on the public address system or bulletin board.
- Establish an environmental library.
- Invite guest speakers.
- Letter writing campaigns.
- Cleanups.
- School wide recycling.
- Field trips.
- Community service projects.
- Poster contest.
- Environmental career day.
- Environmental quiz bowl.⁴

3. Suggested Discussions/Extensions

- Invasive Species—Why are they bad? Are all invasive species bad? What is the difference between invasive and exotic species?
- Submerged Aquatic Vegetation—Grasses in the Classes.
- Algae blooms, nutrients—How do they contribute to the Dead Zone? What is the Dead Zone? (Link to CBF’s Bad Waters Report)

⁴ *School Environmental Clubs in Wisconsin*, Section One: Starting or Revitalizing a School Environmental Club, 2007. www.uwsp.edu/CNR/wcee/EnvSci/clubs.htm

Resources

Project Suggestions & Resources

Field Experiences

Chesapeake Bay Foundation

Contact: Education Coordinator
Phone: 410-268-8816
www.cbf.org/programs
visit the Take Action...Outdoor-Activities...Oyster Gardening

Arlington Echo

Contact: Steve Barry
Phone: 410-222-3822
www.arlingtonecho.net

Smithsonian Environmental Research Center

Contact: Mark Haddon
Phone: 443-482-2218
www.sirc.si.edu

Baltimore Aquarium

Contact: Education Coordinator
Phone: 410-576-3800
www.aqua.org

Living Classrooms

Contact: Thara Mathew
Phone: 410-685-0295
www.livingclassrooms.org

Chesapeake Bay Maritime Museum

Contact: Robert Forloney
Phone: 410-745-2916
www.cbmm.org

Sources for Plantings

Maryland Native Plant Society

www.mdflora.org/events/plantsales.html
Go to "Find A Plant"

Photos of Plants

<http://plants.usda.gov>

DNR Tree-Mendous MD Program

Contact: Terry Galloway
Phone: 410- 260-8531

Local Forestry Boards

Phone: 410-360-8421
www.dnr.state.md.us/forests/art/county_map.asp
Contact: Kollar Nursery
Phone: 410 -836-0500

American Forest Global Re-leaf

Phone: 202-737-1944
www.amfor.org

Adkins Arboretum Events

Phone: 410 -634-2847
www.adkinsarboretum.org

Sources for Wetland Plants

Environmental Concern, Inc.

Phone: 410-745-9620
www.wetland.org

CHESPAX (Calvert County Only)

Contact: Tom Harten
Phone: 410 -535-2960

Signature Horticulture Service

Phone: 410 -329-6466

Technical Assistance

MD Cooperative Extension Service, Master Gardeners

Phone: 800-342-2507
www.hgic.umd.edu

Your County Soil Conservation District or Regional Natural Resources Conservation Service

Phone: 410 -757-0861
www.nrcs.usda.gov, www.handsontheland.org

County Parks and Recreation Department; Watershed Associations

Phone: 410-222-7300
www.aacounty.org/RecParks/

Maryland-National Capital Park and Planning Commission

www.mncppc.org
Phone: Prince George's Co 301-952-4314
Montgomery Co 301-495-4600

BayScaping Projects

US Fish & Wildlife Service 410-573-4500,
www.fws.gov/chesapeakebay/bayscapes.htm

Alliance for the Chesapeake Bay

Contact: Rebecca Wertime
Phone: 717-737-8622
www.acb-online.ORG/PROJECT.CFM?VID=85

Habitat Structures

(i.e. bird box plans)

DNR Wild Acres Program

Contact: Marilyn Mause
Phone: 410-260-8555
www.dnr.state.md.us/wildlife/wildacres.asp

Critters and the Classroom

Bay Grasses in Classes

Phone: CBF – 888-SAVEBAY and
MDMaryland DNR - (410) -260-8630
Register Online:
www.dnr.state.md.us/bay/sav/bgic

Oyster Gardening Program Chesapeake Bay Foundation

Phone: 410-268-8816
Contact: Stephanie Reynolds or Karl Willey
www.cbf.org/Page.aspx?pid=796

Aquaculture in the Classroom Schools in Schools Program

Contact: John Dillow at Living Classrooms
john@livingclassrooms.org

Horseshoe Crabs (raise them in the classroom)– Maryland DNR

www.dnr.state.md.us/education/horseshoecrab

Contact: Janice Hilliard at 410-260-8775
jhilliard@dnr.state.md.us

Or Cindy Etgen at 410-260-8716
cetgen@dnr.state.md.us

www.dnr.state.md.us/education/horseshoecrab/raising

Arlington Echo Outdoor School (Anne Arundel County Only)

Phone: 410-222-3822
www.arlingtonecho.net

Sources for Storm Drain Stencils

The Great North American Secchi Dip-In
dipin.kent.edu/StormDrain_Stencils.htm

Chesapeake Bay Foundation

Contact: Heather Tuckfield,
Phone: 410-268-8816
www.cbf.org/Page.aspx?pid=406

Stream Monitoring and Clean-ups

MD Dept of Natural Resources

www.dnr.state.md.us

Izaak Walton League, Save our Streams Program Watershed Stewardship Action Kit

Phone: 1-800-BUG-IWLA

<http://www.iwla.org/publications/watersheds/planguide2006kit.pdf>

Audubon Naturalist Society

Phone: ANS Water Quality Program Coordinator
301-652-9188 x10

www.audubonnaturalist.org/default.asp?page=520

or

www.audubonnaturalist.org/default.asp?page=551
(Montgomery County only)

Montgomery County Stream Teams Program, Montgomery County DEP

Contact: Diane M. Davis

Phone: 240-777-7714

Email: diane.davis@co.mo.md.us

Prince George's Co. Stream Teams Program, Prince George's Co. DEP

Contact: Sharon Meigs

Phone: 301-883-5898

Eyes on the Bay— DNR program

www.eyesonthebay.net

Lesson plans, "Ask an Expert," Monitoring Stories,
Data Explanations

Remote Sensing Information

Chesapeake Bay Remote Sensing Program

Hosted by the Horn Point Laboratory and the University
of Maryland Center for Environmental Studies

Contact information only available online

www.cbrsp.org/

Funding

Maryland DNR Aquatic Resources Education Grants (up to \$1,000)

Contact: Cindy Etgen cetgen@dnr.state.md.us

Phone: 410-260-8716

www.dnr.state.md.us/education/aregrantapp.pdf

Chesapeake Bay Trust— field experiences, teacher PD, in-class work, community efforts, or restoration projects

Contact: Kerri Bentkowski

Phone: 410-974-2941

www.chesapeakebaytrust.org

Publications

Chesapeake Connections

from *Arlington Echo*

Greening School Grounds

by *Green Teacher Magazine*

Wetlands Are Wonderful

Project Wild

Fiction stories

(*Chadwick, Wartville Wizard, Wanda's Roses, etc.*)

The Kid's Guide to Social Action

by *Barbara A. Lewis*

Aliens from Earth

Recycling

Recycling Presentation—Anne Arundel County Recycling Division Contact: Kelly Mackall

Phone: 410-222-4484

Email: kmackall@aacounty.org

Paper Recycling for Profit -Abitibi

Contact: Ernest Reed

Phone: 410-558-1704

Email: ernest_reed@abitibiconsolidated.com

Volunteers & Service Learning

Audobon Together Green










www.togethergreen.org/







Chesapeake Bay Foundation Service Learning Program

www.cbf.org/Page.aspx?pid=296

Restoration Projects

Below are examples of projects you can do as a culminating activity for the semester or the school year. Put all the positive energy you and your students have created to use on your own schoolyard!

Plants	Energy Conservation	Animals
 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Photo by Chesapeake Bay Foundation</p> <p style="text-align: center;">Rain Barrel</p> <p>Make a rain barrel to collect your school's storm water. Use it to water a rain garden</p>	 <p style="text-align: center;">Bike Racks</p> <p>To reduce the dangers of greenhouse gasses, students can organize car pools or bike clubs.</p>	 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Photo by Chesapeake Bay Foundation</p> <p style="text-align: center;">Oyster Gardening</p> <p>Oyster gardening is a hands-on activity for students to actively restore the oyster population. Contact CBF for more information.</p>
 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Photo by Chesapeake Bay Foundation</p> <p style="text-align: center;">Rain Garden</p> <p>Clean your school's storm water before it reaches the Bay! Collect it in a rain barrel and use it to water a rain garden.</p>	 <p style="text-align: center;">Carpool</p> <p>A car emits about 12,000 pounds of CO₂ every year. Carpool with someone else to have a positive effect on climate change.</p>	 <p style="text-align: center;">Bird Feeders</p> <p>Building bird feeders will help provide food and shelter for the birds in your schoolyard habitat. They are a great way to recycle materials as an art project too.</p>
 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Photo by Robert Meiz</p> <p style="text-align: center;">Wetland</p> <p>Your school's storm water retention pond can be a wetland. Make it a class project to plant native species around the edges.</p>	 <p style="text-align: center;">Solar Panels</p> <p>Installing solar panels at school will cut back on energy costs and create a real world situation for students to do math and engineering projects.</p>	 <p style="writing-mode: vertical-rl; transform: rotate(180deg); font-size: small;">Photo by Allyson Ladley Gibson</p> <p style="text-align: center;">Nature Trails</p> <p>Bring the community together by creating a trail on or near the school for visitors to see what your students are studying. It can be a short walk with signs or a long in-depth look at local habitat.</p>

Plants	Energy Conservation	Animals
 <p data-bbox="305 514 362 541">Pond</p> <p data-bbox="142 548 526 716">Working with students to build a pond on your school grounds will not only provide a wonderful habitat for plants and amphibians but also add beauty to your school.</p>	 <p data-bbox="756 514 862 541">SLOP Day</p> <p data-bbox="599 548 1024 751">Holding a SLOP (Stuff Left On Plate) Day will give students the opportunity to measure the amount of waste produced in one day in your cafeteria! Then hold a competition to see which lunch can reduce their trash by the most.</p>	 <p data-bbox="1187 514 1390 541">Worm Composting</p> <p data-bbox="1081 548 1495 716">Worm composting is a method for recycling food waste into a rich, dark, earth-smelling soil. Just add food waste and the worms will eventually convert the contents into rich compost.</p>
 <p data-bbox="524 892 540 1071" style="writing-mode: vertical-rl; transform: rotate(180deg);">Photo by Cindy Steedman</p> <p data-bbox="285 1119 375 1146">Meadow</p> <p data-bbox="115 1152 553 1287">Planting a meadow on your school property provides wildlife habitat and a natural filter of storm water. It can be a butterfly garden as well.</p>	 <p data-bbox="599 1100 1024 1127">Compare school and home energy use</p> <p data-bbox="607 1134 1016 1409">When students compare the amount of energy a family uses to the amount their school uses they will be able to create ways that both dwellings can save. Students can be proactive in helping to reduce the amount of energy produced by cutting down on water usage, turning off lights, and recycling.</p>	 <p data-bbox="1198 1127 1382 1155">Blue Bird Boxes</p> <p data-bbox="1101 1161 1479 1262">Building bird boxes will help provide food and shelter for the birds in your school's neighborhood.</p>

Critter Corners

Procedure:

1. Post the critter corner signs that you select to use. Have paper and pens available at the tables that the critter groups will be using.
2. Instructions to participants: Which critter has characteristics that you can identify with? Which critter do you most resemble, or find to be the most interesting to you? Wander around and read all of the signs, then choose one and stand under the sign. (You can set group size limits, if desired.)
3. Once groups are formed, have them take down the critter signs and take it to the closest table. On the paper provided have the group list two additional characteristics that they have in common with the critter. Encourage humor and creativity!
4. After several minutes have the groups list two or three questions about their critter that they do not already know the answers to. These should be things that they would like to learn about their critter.
5. After several more minutes have the groups share the characteristics and the questions.

Menhaden

Extremely tolerant of stressful conditions
Sociable—found in large groups

Crabs:

May pinch if provoked
Adaptable to almost any circumstance

Eels:

Mysterious travelers who never return
Never let an obstacle stand in their way

Oysters:

Hard on the outside, but soft on the inside
Provide home and habitat for many other critters

Rockfish:

Rebounding after some bad times
Beautiful and feisty

Shad:

Travel far, but always return home
Need access to pristine and quiet areas

Atlantic Sturgeon:

Slow to mature
Seem to never encounter others like themselves

Sample Journal Page

While exploring outdoors today I...

...smelled

...observed

...touched

...heard

I wonder if my outdoors could be healthier if...

Sample wonder questions:

I could help stop the erosion by

I could give more wildlife habitat by

I could help conserve water usage by

I could help reduce air pollution by

Bay Jeopardy

Procedure



1. Post signs with the category names. Under the category signs post the signs with the points on the front and the correct responses on the back. Post signs in ascending points order. Post the Final Jeopardy card off to the side. (Categories and Questions are listed below.)
2. Divide the class into two teams. Allow each team to give themselves a Bay-related team name.
3. Post a scoreboard for recording points earned for correct responses, and list the team names.
4. Begin the game by selecting one of the “answers” posted. It is up to the teacher to devise some clever and equitable way to do this!
5. Read the “answer” to the group. Teams may not raise their hands to respond until the “answer” has been completely read by the teacher. The first team to have a member raise their hand may respond in the form of a question. If the team member has a correct response, and states the response in the form of a question, they may choose the next category and point value “answer” for the teacher to read. If the team member gives an incorrect response, the other team may try to respond correctly. Go back and forth.
6. No team member may raise his or her hand to respond a second time until all other team members have at least attempted to respond
7. For Final Jeopardy read the topic category to the group. Allow the teams to “huddle” so that they can determine what point value the team wishes to “wager” on the Final Jeopardy question. After one minute, have the teams tell you the points they wish to wager. Post this on the scoreboard.
8. Read the Final Jeopardy selection to the teams. For this question the team must write down their response. Allow the teams to “huddle” for one minute to do this.
9. Warmly congratulate the winners of Bay Jeopardy!

The Mighty Bay

100 points

Half of the Bay's freshwater supply comes from this major river.

(Answer: *The Susquehanna River*)

200 points = Daily Double!!

The Bay's watershed extends across the borders of these six states.

(Answer: *MD, VA, WVA, DE, PA, NY, and DC- not a state though*)

300 points

Michael Jordan can walk over 2%, 12%, or 20% of the Bay without the water going over his head.

(Answer: *20%*)

400 points

All of the land that drains rainfall into a waterway is called this.

(Answer: *a watershed*)

500 points

The Chesapeake Bay is a partially enclosed body of water where freshwater from rivers mixes with sea water from the Atlantic Ocean so it is called this.

(Answer: *an estuary*)

Chesapeake Critters

100 points

These feisty critters are stressed, but are putting up a good fight.

(Answer: *blue crabs*)

200 points

This important pollution filter has been reduced to less than 2% of its historic populations.

(Answer: *oysters*)

300 points

This fish is considered to be the Bay's success story of effective fisheries management.

(Answer: *rockfish, also called striped bass*)

400 points

This type of Whelk is believed to have come into the Chesapeake Bay with ballast water of cargo ships.

(answer: *Rapa Whelk*)

500 points

This plankton eating fish comprises nearly 30% of all the commercial finfish caught in the Eastern US. It is a major fishing industry in Va.-located in Reedville, Va.

(Answer: *menhaden*)

Land Use

100 points

When rain hits the land, it becomes one of these two things.

(Answer: *runoff or groundwater*)

200 points

This land use creates the most runoff.

(Answer: *impervious or paved areas*)

300 points

This is one of the Bay's primary sources of nutrient pollution.

(Answer: *lawns, agriculture, industry, car exhaust, or sewage*)

400 points

This is the term for a strip of trees and shrubs that border and protect a waterway.

(Answer: *buffer zone*)

500 points

These are 2 ways that trees improve the Bay.

(Answer: *filter nutrients, trap sediments, stabilize stream or river banks, produce oxygen, and provide habitat for Bay critters that are part of the Bay's food web*)

Final Jeopardy

These are two important functions of underwater Bay grasses.

(Answer: *food source, hiding places, holding bottom sediments in place, providing oxygen*)



Schoolyard Report Card~

-By the Student Action Team of the Chesapeake Bay Foundation

How is your schoolyard doing? Is it helping the Chesapeake Bay or is it contributing to the Bay's current condition? Follow this Report Card and find out...

Runoff/ Erosion:

1. After looking at your schoolyard map describe where in this range it falls.

1 2 3 4 5 6 7 8 9 10

(1=Entirely made of concrete)

(10=Totally Forested)

2. Your school roof drains rainwater into mostly:

- a) well vegetated trees and shrubs or un-mowed grass (10 pts)
- b) mowed grass (5 pts)
- c) bare soil or impervious surface (4 pts)
- d) directly into storm drain (0 pts)
- e) even mix of all (5pts)

3. Look for patches of bare soil and signs of erosion such as areas where rainwater has carved out ditches or washed out vegetation. The schoolyard has:

- a) very little erosion and few patches of bare soil (10 pts)
- b) several patches of bare soil or areas where soil is eroding (7 pts)
- c) mostly bare, exposed soil or impervious surfaces (0 pts)

4. Does your school have any of these run-off control systems:

- Rain Garden (2 pts)
- Rain Barrel (2 pts)
- Meadow (2 pts)
- Wetland (2 pts)
- Forested buffer zone (More than 50 feet wide) (2 pts)

Helpful and fun solutions:

- Use the Bare Spot protocol
- Install a **Rain Barrel**
- Plant your own **Rain Garden**
- Plant a **Buffer** of trees next to your stream
- Get involved in building a **Wetland** or **Pond**

Excess runoff will affect these indicators of Bay health:



Your Score

1.

2.

3.

4.

**Runoff/
Erosion Total:**

Transportation:

1. Determine the number of people employed at your school (teachers, maintenance staff, food service staff, administrators, etc.) by asking office staff. Look at the school parking lot and determine the number of vehicles relative to the number of employees.
 - a) there are 50% fewer cars in the parking lot than employees (10 pts)
 - b) there are 25% fewer cars in the parking lot than employees (7 pts)
 - c) there is about one car per employee in the parking lot (5 pts)
2. Are there bicycle racks at your school and do people use them?
 - a) the bike rack is full of bikes (10 pts)
 - b) the school has a bike rack but there are only a few bikes in it (7 pts)
 - c) the school has no bike rack and no bikes on the property (0 pts)
3. Is there any reward or encouragement for teachers or students who walk to school, ride their bikes, carpool or take public transit?
 - a) Yes (10 pts)
 - b) No (2 pts)
4. Where does rain water drain after hitting the parking lot?
 - a) highly vegetated area (10 pts)
 - b) mowed or slightly vegetated drainage ditch (7 pts)
 - c) storm drain marked "Chesapeake Bay Drainage" (5 pts)
 - d) unmarked storm drain (0 pts)

Your Score

1. _____

2. _____

3. _____

4. _____

**Transportation
Total:**

Low Score? Try these solutions:

- Incentives to **carpool**, use public transportation or ride a bicycle to school
- Install and use **Bike** racks
- Storm drain **stenciling**
- Letter writing** to county for bike lanes
- Vegetated** run-off control for parking lot and roads

Cars and trucks release contaminants that enter the Bay's ecosystem, affecting these indicators:



Vegetation:

Your Score

1. Describe the vegetation on your schoolyard:
 - a) Trees and bushes cover a significant part of the schoolyard (10 pts)
 - b) Trees and bushes dot the landscape of the schoolyard (6 pts)
 - c) There are few or no trees on the schoolyard (0 pts)
2. How much of the grass and vegetated areas in your school are being mowed?
 - a) less than 50 % (10 pts)
 - b) between 50% and 80% (6 pts)
 - c) over 80% (4 pts)
3. Ask your school's lawn service or school maintenance staff how the mowed grass on the school grounds is fertilized.
 - a) Grass clippings are left on the grounds as natural fertilizer (10 pts)
 - b) Lawn fertilizer is used according to a formula after doing soil tests (8pts)
 - c) Lawn fertilizer is used according to instructions (6 pts)
 - d) Lawn fertilizer is applied randomly (5 pts)
4. Describe the vegetation in the lowest lying part of your schoolyard.
 - a) well vegetated with trees and shrubs (10 pts)
 - b) vegetated with unmowed grass (8 pts)
 - c) mowed grass (7 pts)
 - d) bare soil, pavement, or concrete (0 pts)

1. _____

2. _____

3. _____

4. _____

**Vegetation
Total:**

Any of these projects can add colorful habitat:

- Plant a wild **Meadow**
- Follow the CBF protocol to build a **Rain Garden**
- Begin your own **Micronursery** for tree plantings
- Scrub and shrub
- Attract wild colorful butterflies and birds by planting a **Wildlife Garden**
- Be aggressive and build a **Wetland**

Poor vegetation causes problems with these indicators of bay health:



BIODIVERSITY:

1. By counting the different types of leaves or bark, how many different types of trees are there on your schoolyard?
 - a) 10 or more (10 pts)
 - b) 7-9 (8 pts)
 - c) 4-6 (5 pts)
 - d) less than 4 (4 pts)

2. By counting the different types of leaves and berries, how many different types of shrubs are there on your schoolyard?
 - a) 7 or more (10 Pts)
 - b) 4-6 (7 pts)
 - c) less than 4 (4 pts)

3. Below are examples of habitats for animals. Which of the following apply to your schoolyard? (4 pts. for each)
 - a) woodlands with many layers of plants and trees
 - b) tall grassy fields/meadow
 - c) thick brush and brambles or a brush pile
 - d) dead standing trees or rotting logs on the ground
 - e) streams with forested buffers

Your Score

1. _____

2. _____

3. _____

**Biodiversity
Total:**

To bring more **LIFE** to your schoolyard:

- Plant native** shrubs and flowers that attract wildlife
- Identify what local **animals** may **need** and restore their habitat
- Ask your teacher how to **get involved**
- Plant **trees**

*Preserving and restoring habitat increase biodiversity
and help improve these indicators :*



Awareness:

*****BONUS*****

Your Score

1. Does your school have an environmental club, offer environmental science classes or a bay unit in science class? (1 point for each yes)
2. Is there a stream on your schoolyard? Is there access? (1 point for each yes)
3. Are there energy saving devices? (1 point for each yes)
 - compact fluorescent
 - skylights
 - signs reminding you to turn off lights
4. Test your principal/administrator/science teacher: (2 points for each correct answer)
 - a. Is there a body of water attached to your schoolyard
 - b. What is the closest sewage treatment plant?
 - c. Where is the closest landfill?
 - d. Is there incentive for the staff to use public transit? (2 pt. for yes)
 - e. Does your school recycle? (2 pt. for yes)
 - f. Do you want to improve your schoolyard? (2 pt. for yes)

1. _____

2. _____

3. _____

4. _____

Total Bonus Points:

How to find out more:

- Study** the Bay
- Go on a Chesapeake Bay Foundation **field experience**
- Read** about the Bay
- Ask your teacher about the **Chesapeake Bay**

Awareness of the Bay and solutions to its problems will improve all these indicators of Bay Health:



Totals:

Now it's time to add your scores together to find out the health of your schoolyard...

Runoff/Erosion _____

Transportation _____

Vegetation _____

Biodiversity _____

TOTAL _____

TOTAL + BONUS POINTS _____

If you scored: **150-120 A-B:**

Your school is **excellent** habitat for many plants and animals and is a very healthy part of the watershed!

119-90 C-D:

You are on the right track but there is more work to do if we want to Save the Bay!

89 or less:

Poor habitat. Many schools fall in this category so please help us in making your schoolyard a better place by doing one of the many projects listed at

www.cbf.org/actionprojects .

Trace Your Trash

Adapted from Salt Marsh Manual, Don Edwards San Francisco Bay National Wildlife Refuge, March 1996

Age: *Grades 1+*

Duration: *20-30 min.*

Group Size: *Any*

Objective: *The students will learn to divide their lunch garbage into appropriate categories for recycling and name the natural resources that waste material are made from.*

Method: *After lunch, the students will separate their trash and learn about where each piece of trash originally came from.*

Materials: *3 buckets, 3 recycling bins (in the Nature Center), labels for “rinse” bucket, “extra drink” bucket, and “extra food” bucket.*

1. After students finish eating their lunches, have them separate their waste materials into the appropriate bins: food, glass, plastic, aluminum, paper.
2. Did anyone have a tree in their lunch? Paper products come from trees. Did anyone have plankton in their lunch? The remains of aquatic organisms were buried deep underground for thousands of years until these remains became oil. Now we use oil to make plastic products.

What are natural resources? Resources that come from the environment. Resources can be classified as renewable or non-renewable. Renewable resources can be replaced. Trees can be cut for paper but then replanted again. Non-renewable resources are available in limited quantities, such as fossil fuels. Once they are used up they cannot be replaced. The USA is currently the largest consumer of non-renewable resources. The global supply of non-renewables, such as oil, aluminum, lead, tin, and natural gas, may be depleted within the next 100 years.

Every product or package is made from a natural resource. What are alternatives to using natural resources? Reducing, reusing, and recycling, and buying recycled products.

Where does garbage go if we don't recycle? Garbage goes to landfills. Landfills were historically built on top of wetlands. The less garbage we create, the less of a need there is for new landfills. Did you know that the average US citizen produces 3-4 pounds of garbage every day, and each student produces about 1/2 pound of garbage every school day!

-
3. Stand behind each recycling bin and hold up a product as you talk about it.

Aluminum: Comes from bauxite, a mineral that has to be mined from the earth. How do we use aluminum in our lunch, and what are some ways to reduce the need for mining bauxite? Cans and aluminum foil—we could use reusable containers to carry our lunch or our sandwich and we can recycle aluminum. Renewable resource? No.

Paper: Where does the paper we use in our lunches come from? Paper comes from trees that are logged. How can we reduce the need for paper in our lunches? Reduce the need for logging by packaging our lunches in lunch boxes, and reusable bags. Renewable resource? Yes.

Plastic: A plastic sandwich bag, for example, is made from oil. How could we reduce the use of plastic in our lunch? Use reusable containers such as Tupperware. Renewable resource? No.

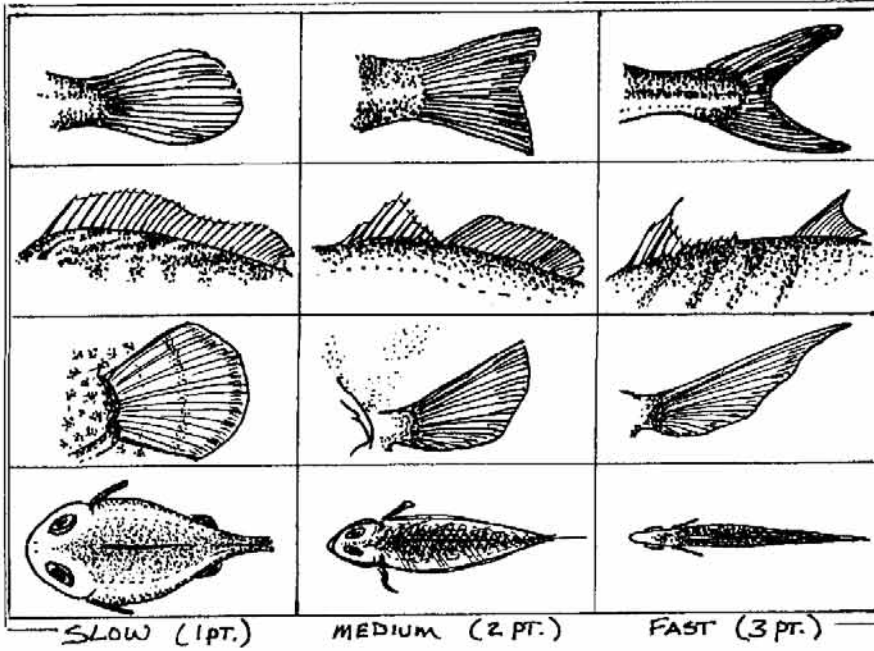
Glass: Is made from sand, lime and soda. Lime and soda are minerals that must be mined from the earth. How could we reduce the need for new glass? Use reusable containers for our drinks and by recycling the glass that we do use. Renewable resource? No.

Food: Where does food come from? Farms. How can we reduce the amount of food that goes in landfills? We can compost our leftovers. This creates rich soil for our gardens and helps plants to grow. Renewable resource? Yes.

4. How does reducing, reusing, and recycling help the estuary? By reducing the need for landfills around the estuary, you can help protect the estuary habitat and the plants and animals that depend upon those habitats.
5. Tomorrow, ask you parents to pack a no trash lunch so that you can help protect the environment!

Know Your Fish

SPEED: THE SHAPE OF A FISH'S BODY AND FINS DETERMINES ITS SPEED AND MANEUVERABILITY. THE MORE STREAMLINED SHAPES ARE FASTER AND ARE MOST SUITED FOR FISH THAT SWIM CONSTANTLY. THE SLOWER SHAPES ARE MORE SUITED TO SHORT BURSTS OF SPEED, SHARP TURNS, AND QUICK STOPS.



CAUDAL FIN (TAIL). MAIN THRUSTERS

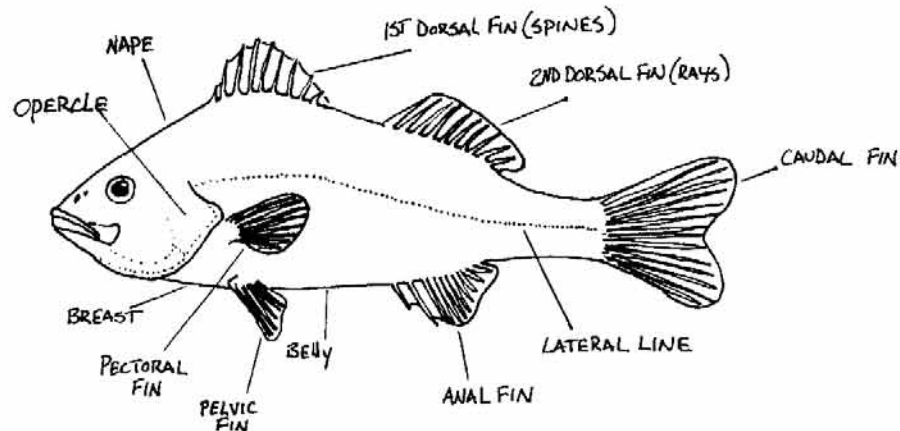
DORSAL FIN. KEEPS FISH UPRIGHT

PECTORAL FIN. TURNS & STOPS

BODY SHAPE (TOP VIEW)

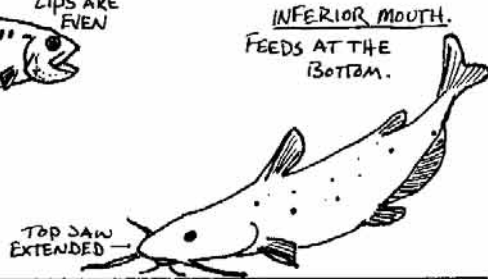
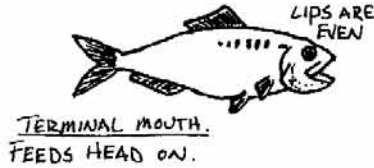
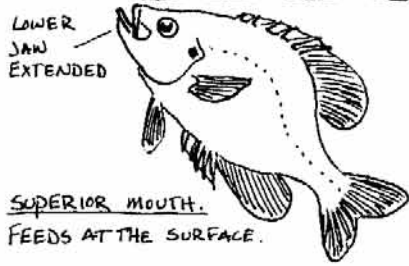
TOTAL POINTS

4. SLOW AS MOLASSES 5. VERY SLOW 6. SLOW 7. MEDIUM SLOW 8. MEDIUM
 9. MEDIUM FAST 10. FAST 11. VERY FAST 12. LIGHTNING FAST



FOOD

FISH ARE DESIGNED TO FEED AT DIFFERENT LEVELS OF THE WATER COLUMN AND TO EAT DIFFERENT TYPES OF FOOD. WHICH ONE MOST RESEMBLES YOUR FISH?



FRONT VIEW OF MOUTH (WHILE OPEN)



HORIZONTAL OVAL
SCAVENGERS AND LARGE CRUSTACEAN EATERS.

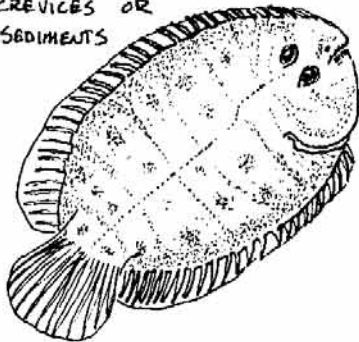
VERTICAL OVAL
PREDATORS (SUCH AS FISH EATERS) OR PLANKTON FILTERERS.

ROUND
SELECTIVE PLANKTON EATERS, OR "PICKING" SMALL FOOD ITEMS.

COLORS AND MARKINGS.

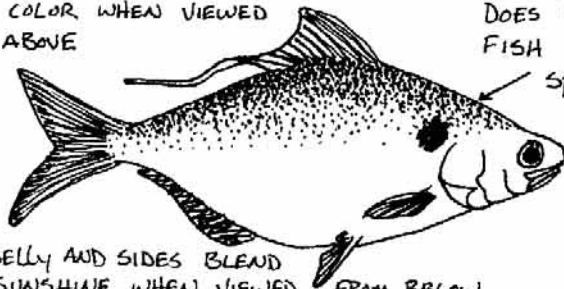
COLORS AND MARKINGS ALLOW FISH TO BLEND WITH THEIR SURROUNDINGS.

MOTTLED BROWN BACK AND SIDES HELPS FISH BLEND INTO CREVICES OR BOTTOM SEDIMENTS



DARK BACK BLENDS WITH WATER COLOR WHEN VIEWED FROM ABOVE

OLIVE GREEN BACK AND SIDES WITH VERTICAL STRIPES HELPS FISH BLEND INTO AQUATIC GRASS BEDS.



WHITE BELLY AND SIDES BLEND WITH SUNSHINE WHEN VIEWED FROM BELOW

DOES YOUR FISH HAVE A SPOT ON ITS BODY?

WHAT ADVANTAGE WOULD A SPOT ON ITS BODY GIVE TO A FISH?

(PAGE 2.)



A pilot project created by the Chesapeake Bay Foundation and
Anne Arundel County Public Schools
Teachers in a *Chesapeake Classrooms* Professional Development Course

Dear Parents:

The _____ has been given permission to take a trip to _____
(Grade or Class) (Place)

on _____, _____. The trip will be taken on a properly insured carrier. Transportation for this trip
(Day, Year)

will be provided by _____. The cost of the trip will be _____ per student.
(Bus Service) (Total Cost)

This amount includes _____ for _____.
(Cost) (Admission Fee, Lunch, etc)

Please be advised that **all** field trips are subject to cancellation **at all times** by the Board of Education, the Superintendent of Schools or the Superintendent's designee when, in their sole discretion, cancellation is in the best interests of students and staff. In such cases, parents and students bear the risk of loss for financial or other commitments they have made. The Board of Education, its employees and agents will not be responsible for any losses arising out of cancellations.

The group will be accompanied by teachers and adult chaperones in a reasonable ratio of adults to the number of students taking the trip. The students will leave the school at _____(Time) and return by _____(Time). Please sign and return the lower part of this form to the school if your child has your permission to go on this trip.

Sincerely,

(Teacher)

(School)

Approved by Principal:

(Principal Signature)

(Date)

Please complete and return this section to the classroom teacher within five school days.

_____ has my permission to make the trip to _____ on _____.
(Child's Name) (Place) (Date)

I (we) believe that the necessary precautions and plans for the care and supervision of my child during this trip will be taken. I understand I may be responsible for payment in the event of cancellation or postponement of the field trip.

Phone number in case of emergency

Parent/Guardian Signature

Pertinent physical or medical concerns that the staff should be aware of (i.e., allergic to bee stings, etc.):



Student Information for a Field Trip

Student's Name	Date of Birth
----------------	---------------

Street Address

City	State	Zip	Home Phone
------	-------	-----	------------

Home School	Destination	Dates of Trip
-------------	-------------	---------------

Parent's/Guardian's Name	Home Phone	Work Phone	Cell Phone
--------------------------	------------	------------	------------

In Case of emergency, contact	Relationship	Phone Number
-------------------------------	--------------	--------------

Doctor's Name	Phone	Medical Insurance	Policy Number	Date of last Tetanus Shot
---------------	-------	-------------------	---------------	---------------------------

Student is Allergic to:

Bee Stings Poison Ivy Ragweed Penicillin Other:

Asthma Diabetes Seizures Heart Condition Other:

Special Dietary Considerations (i.e. Kosher, vegetarian, allergies)

Activities student should not participate in

Medications

Yes No I give my permission for AACPS personnel to administer an antibacterial ointment to my child if needed for a cut or an abrasion.

Yes No I give my permission to authorized personnel to carry out such emergency diagnostic and therapeutic procedures as may be necessary for my daughter/son, and also permit such procedures to be carried out at, and by the local hospitals in the event that my daughter/son has been taken there for emergency care. I understand that any medical expense will be directly billed to me or my insurance company.

All medications (prescription and/or over-the-counter drugs) must be accompanied by Form #2210/1 (Rev.2/93), Parent's Request to Administer Medication at School (available from home school).

Parental/Student Media Release

Yes No I hereby grant the Anne Arundel County Public School System the right to obtain and/or use my child's photograph; and/or video image; and/or voice for educational and informational purposes. I understand that all publications, presentations and productions will be used within the school system and/or community at large, and that all images, productions, and content therein become the property of Anne Arundel County Public Schools.

Student Contract

I agree to follow all rules and regulations set by Anne Arundel County Public Schools. I understand that failure to follow these rules or regulations, counselor requests, or failure to conduct myself in a manner that will promote a safe and successful experience will result in an immediate return to home.

Student's Signature	Date	Parent's/Guardian's Signature	Date
---------------------	------	-------------------------------	------

The Anne Arundel County Public School System does not discriminate on the basis of race, sex, age, national origin, religion, disability, or socioeconomic status in matters affecting employment or in providing access to programs. For more information, contact Mr. Leslie N. Stanton, Specialist in Human Relations, Anne Arundel County Public schools, 2644 Riva Road, Annapolis, Maryland 21401; 410-222-5318; (TDD) 410-222-5500.