Facilitator Handbook

Maryland

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

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SECTION ONE

Project WET 101

History of Project WET

Project WET was established in 1984, by the North Dakota State Water Commission as a pilot project. Montana State University - Bozeman invited the director of Project WET to duplicate the program in Montana, Idaho and Arizona in 1989.

The National WET program was developed in 1990. To initiate the National program, national field tests and expert reviews were conducted by science educators and program evaluators from the Western Michigan University Center for Science Education and Science and Mathematics Program Involvement. The evaluation consisted of a two-step process:

1. Gathering information from classroom educators, non-formal educators and recognized experts and practitioners regarding the appropriateness, "teachability," an accuracy of the field test versions of the activities.
2. Compiling and analyzing data (see Project WET activity guide for additional details on the process).

In 1991, the Council for Environmental Education joined Montana's Watercourse as co-sponsor of the WET program. In 1997, WET's international program was launched. WET USA is now in more than 45 states while there are international programs in Canada, Northern Marianas Islands and Mexico.

What is Project WET?

Water is one of our most important and easily accessible natural resources. Project WET (Water Education for Teachers) believes that the development of a water ethic must begin at an early age. Children benefit from parents, teachers and mentors who recognize not only the scientific but also the social and cultural aspects of water resource education. Project WET is grounded in the belief that when informed, people are more likely to participate in the decision making process and to make a difference through their actions.

The Goal of Project WET is to facilitate and promote the awareness, appreciation; knowledge and stewardship of water resources through the development and dissemination of classroom ready teaching aids and the establishment of state and international sponsored Project WET programs. Project WET believes that:

- Water is important for all water users including energy producers, farmers, ranchers, fish and wildlife, manufacturers, recreationists, rural and urban dwellers.

- Wise water management is crucial for providing tomorrow's children social and economic stability in a healthy environment.

- Awareness of and respect for water resources can encourage a personal, life-long commitment of responsibility and positive community participation.

The focus of the workshop is the Project WET activity guide designed for grades K-12, which has more than 90 innovative, interdisciplinary activities that are hands-on, easy to use and fun! The guide addresses the following content areas.

- Water has unique physical and chemical characteristics
- Water is essential for all life to exist
- Water connects all Earth systems
- Water is a natural resource
- Water resources are managed
- Water resources exist within social contexts
- Water resources exist within cultural contexts

Educators can quickly choose supplemental activities for their curriculum by referencing the appendix charts in the back. Those charts divide the activities up by water resource topics, subject areas or student skills. For example, a language arts instructor can have students learn about water resources through “Nature Rules”, which is an activity where students write their own news stories about natural disasters including flooding. The activity, “The Long Haul”, illustrates the lengths early pioneers went to when transporting water to and from their homes. Students across several disciplines can experience the water cycle through “The Incredible Journey”, which simulates the movement of water through Earth’s systems.

Project WET is a K-12 interdisciplinary, supplementary water education workshop for Maryland educators. Project WET sponsors believe that educating youth about Maryland water resource issues and concerns is an important component of the state’s water management program. Activity topics range from aquatic ecosystems, water conservation and ground water to water pollution prevention, waste water treatment and water history. The WET guide was written, reviewed and field tested with input from thousands of educators, university and state education staff, natural resources personnel, environmental and industry representatives.

Project WET was introduced in Maryland in 1996 and is a program coordinated by the MD Department of Natural Resources. The WET activity guide contains 94 lessons. Leaders in non-school settings such as camps, parks and nature centers have also found WET activities useful in relating water related ecological principles.

Trained volunteer facilitators are available to conduct WET workshops in Maryland. During WET workshops, activities are demonstrated and educators learn how to bring Maryland water issues into the classroom. Material and equipment requirements for the activities are minimal.

Project WET materials are only distributed to those who complete an educator’s workshop of at least six hours. Workshops take place in a one day long session or in two or more shorter sessions. Workshops are free or of minimal expense to participants. Local sponsors may reserve a site, pay some workshop costs and help advertise.

Project WET Facilitator

Responsibilities

As a Project WET facilitator we ask that you:

- Offer at least two educator's workshops per year.
- Contact resource people to assist you with your program when necessary.
- Know the subject being taught and be properly prepared for the program.
- Complete and submit, in a timely fashion, all necessary paperwork.
- Maintain a professional attitude and be warm, friendly and courteous to all participants.
- Be objective in your presentation of materials and related issues.

Maintaining Active Facilitator Status:

To maintain your status as an active Project WET facilitator, we ask that you schedule/complete two educator's workshops each year. If you have not conducted or scheduled two programs at the end of a 12 month period, you will be sent a letter identifying your options. They are:

- Schedule and/or conduct the number of programs within the next six months that will increase your total to two.
- Ask to receive additional training or to co-facilitate a program.
- Ask to be removed from the active facilitator list.

Dismissal of a Facilitator:

A facilitator is a representative of Project WET Maryland and of the Maryland Department of Natural Resources. If the Project WET Coordinator feels that a facilitator is not carrying out his/her assigned duties as set forth in this manual and/or is not acting as an appropriate representative, the facilitator may be dismissed. Investigation of a facilitator may be initiated as a result of complaints from participants in the programs, poor evaluations from program participants or other circumstances. A facilitator may appeal the decision in writing to the Project WET Coordinator.

Project WET Facilitator

Characteristics

A Project WET facilitator is a talented, caring person who has:

- the desire to promote an appreciation of the natural world by sharing their basic experiences and information;
- the dedication and motivation to share ideas and inspire others;
- the enthusiasm to work with people of all ages, backgrounds and interests;
- the flexibility to cope with the unpredictable;
- the generosity to give time to Project WET and it's mission;
- the ability to keep a program focused and organized by effectively arranging time, materials and people;
- the ability to communicate clearly and effectively to engage participants in discussions and to create a relaxed climate for learning;
- the aptitude for listening to, assessing, understanding and responding; both verbally and non-verbally, to participant's needs and encouraging feedback;
- the willingness to learn from mistakes and use those experiences to improve leadership skills; and
- the sense of humor to dress up like a fish, fly like a bird or take a role as part of a tree!

In other words, a facilitator is someone we couldn't do without! Facilitators can play an integral role in communicating the shared goal of all the projects—to educate youth and educators about the environment. Facilitators achieve this goal by teaching workshops and presenting programs, activities and materials to schools and youth organizations. If you enjoy wildlife and the outdoors and working with people, join the fun!!!

SECTION TWO

So You Want to Conduct a Workshop!

Organizing & Conducting WET Workshops or Seminars

Selecting a site for your WET workshop or seminar:

Successful workshops have been conducted in a variety of settings, indoors and outdoors. When scouting your area for an appropriate facility consider school sites, conference rooms, nature centers, natural areas, state parks and your local library. A facility that will offer an array of opportunities for indoor and outdoor activities will work best. When choosing the site, keep in mind that you might have to alter your schedule depending upon weather conditions.

Look for a facility that has comfortable chairs! Meeting in the science lab may bring you access to sinks and washable work surfaces...and may place the participants atop high, hard seated stools. Activities involving movement—such as mime or improvisation or even the process of gathering for small group projects in different sectors of the room—can keep discomfort to a minimum.

Room arrangements are important! Set up the room to encourage learning and interaction. Factors that will influence the arrangement of the room include the size of the room and the types of activities that you plan to conduct. Make sure that whatever arrangement you choose, all participants can see the demonstrations and activities.

Windowless rooms are great for showing films or slides or demonstrating phosphorescence but can be stifling for nature lovers on a beautiful day! If you meet in such a room, consider incorporating one, or several outdoor excursions in the context of the activities you choose to present.

Promoting your workshop or seminar:

Remember to be clear, both in your pre-workshop information and your introductory remarks, about the goals of your workshop. Many educators are uncomfortable about teaching science. Use your promotional activities as an opportunity to identify that the Projects DO NOT require an extensive science background and that all curriculum areas can be met using the activities. Much of the groundwork for a successful workshop lies in providing participants with adequate information ahead of time. Workshops can be effectively advertised through flyers, brochures or announcements. Key items to include:

- a summary of Project WET
- the goals of your workshop
- facilitator(s) name/title
- other resource people involved
- sponsors
- date and time
- location (include map and directions)
- what they should bring (rain gear, walking shoes, etc)
- what they will acquire (WET activity guide, a wealth of information, etc)
- how to obtain further information
- workshop fees (if any)

Use your imagination in creating a flyer, poster, invitation, announcement or article which conveys all of these items, as well as your creativity and originality. Make use of existing communication channels within your school, district or county educational system. In addition, particularly if you'll be inviting teachers from more than one school, locate a reliable contact in each school to help spread the word personally. Send special invitations to people you'd really like to participate and include extra flyers for them to share with others. It may also be appropriate to announce your workshop through newsletters of various educational or environmental associations and organizations. For example: schools, Boy/Girl Scouts, 4-H Clubs, garden clubs, nature groups, etc. Many organizations also place workshop announcements on their web page. Use whatever format and avenue that makes sense in your setting.

Co-Facilitated Workshops or Seminars:

"Team Teaching" will bring people with different backgrounds together to lead a workshop. A combination of an educator and resource professional can make an excellent workshop team, exposing participants to a greater diversity of experiences and knowledge of water resources. A word of caution; communication is critical to organizing and conducting a co-facilitated workshop. Identify what responsibilities each of you will have at the onset.

By co-facilitating, leaders share the teaching burden. Altering the responsibility to lead allows one leader to prepare one activity while the other leads a different one.

Developing an Agenda:

- We suggest you have at least 14 people registered in order to conduct a successful workshop. If you should cancel your workshop for any reason, please contact your Project WET Coordinator.

- A WET educator's workshop should be at least six hours in length and incorporate at least five activities from the WET guide.

- Above all else when planning your agenda or conducting the actual workshop, remember to stay flexible! Be prepared for the unexpected, including having an extra activity to present if the workshop goes quicker than planned.

Consider planning the workshop around a theme or subject, not simply by choosing random activities. For instance, planning and advertising your workshop as having a focus on wetlands may attract more people than simply advertising a WET workshop. Themes are endless and should be tailored to the audience you intend to attract. You might also consider themes such as biodiversity or urban habitats. Advertising a workshop with activities related to social sciences or language arts may also help draw participants.

Choosing Activities:

- Include activities which are attractive to all learning styles and that cover a variety of grade levels (unless you are working with a specific grade level). Some participants will learn best with hands-on activities while others best by listening.
- Remember to correlate the activities with the goals of your workshop.
- Tailor the selection of activities to the needs and interests of the participants and modify the activities appropriately.
- Provide a range of activities from high action participation to quiet, reflective and creative.
- Participants should experience at least five activities in the course of the workshop. You may decide to include more.
- Have a clear developmental sequence in mind, but be ready...a sudden rainstorm or local event can be a good reason to use alternative approaches.
- Decisions about which activities to include can be made in light of several factors, including time(s) and space(s) chosen, areas of interest for both you and participants, and your preferences.
- Select activities reflecting the range of concepts addressed by Project WET, the interdisciplinary nature of activities and their usefulness in many subject areas and at all grade levels. (Try to do activities from several icon groups).
- Select activities that are user-friendly. Show the participants Project WET activities can be conducted without great expense, preparation time or need to collect expensive or rare materials.

Many facilitators are more comfortable incorporating activities they have already used with their own students. This strategy has many advantages: you know how the activities work from direct experience; you may have invented useful modifications or extensions or located valuable resource materials.

Sample Planning Timetable

Goal: One Project WET Workshop in December

September:

1. Contact local sponsor for December workshop.
2. Work with sponsor to select workshop date and location.
3. Confirm sponsor and nature of their sponsorship (e.g. cover costs of room rental, provide refreshments or meals, distribute public service announcements, etc.).
4. Order guides from Project WET Coordinator.
5. Document expenses and in-kind contributions.

October:

1. Prepare workshop agenda.
2. Contact speakers.
3. Prepare press releases, contact local newspapers & radio stations about running PSA's.
4. Document expenses and in-kind contributions.

November:

1. Confirm speakers.
2. Disseminate press releases and public service announcements, post flyers.
3. Confirm location, refreshments, etc.
4. Pre-register workshop participants.
5. Obtain guides from Project WET Coordinator.
6. Document expenses and in-kind contributions.

December:

1. Conduct Project WET workshop.
2. Send thank you's.
3. Forward documentation to Project WET Coordinator (including: participant mailing list, workshop evaluations, facilitator reporting form).

Workshop Planning Checklist

Pre:

- Decide on workshop date and time.
- Arrange a workshop site.
- Find a workshop sponsor.
- Set workshop agenda; including objectives, goals and activities.
- Submit workshop proposal form to Maryland Project WET Coordinator.
- Determine supplies needed for the workshop and make arrangements to get WET guides.
- Advertise workshop with flyers, posters, letters or phone calls.
- Make meal arrangements, if applicable.
- Confirm participants.

During:

- Arrive early to set up.
- Check conditions of area, if planning outdoor activities.
- Have participants complete sign-in sheet (including name, phone and complete address).
- Distribute and collect participant evaluations.
- Remember to write down any specific request for resources.
- Distribute certificates.
- Close workshop.
- Clean up facility.

Post:

- Complete facilitator-reporting form and send to the Project WET Coordinator along with workshop evaluations and participant mailing list.
- Return any borrowed materials.
- Send letter of thanks to facility, resource professionals and others involved in the workshop.
- Contact participants about one month after workshop to ask if they have used the materials or are having any problems

SAMPLE CONFIRMATION LETTER

April 1, 2006

Jane Doe
Environmental Education Center
111 Environmental Way
Environment, MD 21111

Dear Ms. Doe:

We are excited to be working with you on the upcoming Project WET workshop. This will be a great opportunity to get information about Maryland's water resources to educators.

Enclosed please find a flyer announcing our scheduled Project WET workshop. In addition, please take note of the tentative agenda. Thanks again for working with us. I look forward to our upcoming water education event. Please call me at 410-260-8716 if you have any questions or need help.

Sincerely,

Cindy Etgen
Project WET Maryland

SAMPLE NEWS RELEASE

Annapolis---Teachers and youth leaders are invited to attend a workshop focusing on Maryland's water resources Friday, February 7, from 9 am – 3 pm at the Department of Natural Resources, 580 Taylor Avenue in Annapolis.

Project WET workshops are for persons interested in natural resources and environmental education (public and private school teachers, Boy and Girl Scout Leaders, 4-H Leaders, resource agency personnel, environmental educators and others).

The Workshop is FREE! Pre-registration is required. To register, contact Cindy Etgen, Project WET Coordinator, Maryland Department of Natural Resources at 410-260-8716 or email cindy.etgen@maryland.gov .

Project WET Maryland Workshop Agenda

8:30	Raining Cats & Dogs (Cultural)
8:50	Welcome o Introduction to Project WET o Workshop Goals o Background, Dive into the Guide
9:20	Water Crossings (Social Constructs)
9:50	Incredible Journey (Earth Systems)
	Just Passing Through (Earth Systems)
10:20	Super Bowl Surge (Management)
10:50	Sum of the Parts (Natural Resources)
11:15	Lunch
12:15	Aqua-bodies (Life Processes)
1:00	Additional & Supplemental Resources
1:20	Group assignments & preparations for group presentations
2:00	Group presentations
3:30	Evaluations
3:35	Thunderstorm (Earth Systems)

Getting Started

Plan to arrive at your workshop site with plenty of time to spare for preparation tasks. Immediately post a notice or sign in a conspicuous place to reassure participants that they are in the correct location. Remember to include floor and room number.

Use visual aids to liven the workshop space. Filling the workshop site with visually exciting tools, such as maps, posters and sample of products to be created will help put participants at ease and create a comfortable learning environment.

Greet participants as they enter the facility. Ask them to complete a registration form, if they haven't already, and a name tag. If time permits, start the workshop by asking participants to design a name tag using art materials you have provided.

Introduce yourself and provide the participants with a brief explanation of your interest in Project WET and environmental education workshops. No matter how clear you think you've been about stating the purpose and time frame in the pre-workshop materials, take some time to review the goals and objectives you have set for the workshop! The participants are coming together for the workshop as "students" and, especially if they don't know each other beforehand, the learning environment can be enhanced by creating a friendly informal atmosphere for getting acquainted at the beginning of the workshop activities.

Workshop Incentives

Consider reserving some of the resource materials you may have obtained as door prizes. Posters may be available in limited supply, but you may be able to provide one during each workshop to the person whose birthday is next or the one that sits in a chair with a sticker on it.

Take with you some of the many natural resource books, posters, videotapes and audio tapes you have in your personal collection. Set one table aside at the back of the room as a resource area, where participants can review the material during breaks.

Fueling the Body:

Mealtime can be learning time too, whether the group eats together or apart. Sometimes when we've sent folks out for food, we've asked them to do "assignments" – one or two activities they can complete on their way to or from lunch. Check the WET guide for applicable activities.

Ask a local sponsor to provide a snack, drink or lunch for the workshop. If a sponsor cannot be found, you may want to charge a small fee to cover the cost of refreshments and ask participants to bring a sack lunch (remember you CANNOT charge for activity guides or materials provided by MD DNR). Ask that they "lug a mug" to minimize the use of disposable cups and clean up time. Consider playing environmental music or providing appropriate entertainment during lunch.

Keeping Momentum:

Just a few tips:

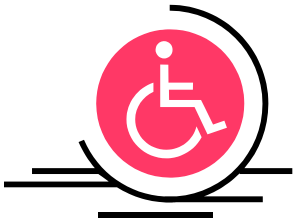
1. Have FUN!

2. Set the stage. Share your objectives and agenda with your participants.

3. Pay attention to attention. Notice when participants need a break or change of pace. Your adrenaline as the facilitator may keep you in high gear all day—but other people might not have that additional energy going for them. Offering a variety of activities helps—and certain modes work better at certain times of day. For instance, we've found that drawing pictures or other visual displays can be a more stimulating activity than making lists—especially after lunch, as an attractive alternative to the siesta tendency. Activities which call for physical movement are even better!

4. If you can, include a period of "alone time" for reflection, assimilation of the events of the workshop or individual activity from the WET guide.

Accommodating Disabled Individuals



When designing a program, you should also remember to be prepared for participants with disabilities. Project activities are designed to be adaptable in a variety of ways—including use for students with disabilities. As you are selecting activities, consider how each activity could be modified if necessary. To guide your decisions, use the following scenarios and think about how you could adapt each activity.

1. You are asked to conduct the activity with a group of 25 students. One of the students is wheelchair bound and two of the students have attention deficit disorder (difficulty concentrating and remaining focused for prolonged periods of time).

2. You are asked to conduct the activity with a group of 20 students. One of the students is hearing impaired and three of the students have difficulty with fine motor skills (writing, picking up objects).

3. You are asked to conduct the activity with a group of 22 students. One is blind and one student has auditory processing problems (will hear what you say but may not comprehend it).

4. You are asked to conduct the activity with a group of 20 students. One of the students has attention deficit hyperactivity disorder and one of the students has a speech impediment.

5. You are asked to conduct the activity with a group of 22 students. One of the students cannot read. One of the students has difficulty moving quickly (balance problem).

6. You are asked to conduct the activity with a group of 18 students. One of the students has a disability that interferes with his ability to run and one of the students is color blind.

Always remember to be sensitive to everyone's needs!

Adapting the Project WET "Incredible Journey" activity for students with visual impairments

Written by: Lee R. Koepfinger, Jr.
Educational Specialist for the Visually Impaired/Blind (K-12)
Columbus Public Schools (Ohio)
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Written in his own words on October 15, 2004 at a WET educator workshop

"The Incredible Journey is a phenomenal activity for all students and as I was participating in the activity with some fellow elementary school teachers I thought of how I might adapt this educational science project for some of my students. The following suggestions could be easily included to make the activity more interesting for all students, especially for those with visual impairments.

1. Braille the blocks and posters with a Braille labeler or brailler.
2. Incorporate tape recordings with sounds for each station (i.e. animal sounds for animal station, thunder & lightening sounds for the cloud station, etc.).
3. Use tactile art for posters (i.e. cotton for clouds, felt & fur for animals, water for river, etc.).
4. Incorporate mobility lesson by actively engaging in listening skills.
5. Have students answer questions about each station either auditorally or using Braille writer.

Hopefully these ideas will help your visually impaired/blind students to feel more a part of your classroom."

Handling
Controversial Issues

Since environmental education involves handling varied points of view, one is bound to run into controversy. This controversy may be in the classroom or at a workshop. The controversy may be used as a learning experience by discussing the opinions of group members. However, it may be best to refer those with adamant opinions to a resource specialist who would be more qualified to review all of the related facts.

The workshop or seminar is an appropriate time to address handling issues with the participants. There are many activities in the guides that could lead to heated discussions, so teachers who are prepared will be able to use the situation as a springboard to investigate the issues. Issue investigation is a key component of a well-rounded environmental education program.

There are many strategies for investigating issues. Here are some to suggest to your participants for discussion:

- Research
- Surveys
- Questionnaires
- Role Playing

You may also refer to the following activities:

- Every Drop Counts
- People of the Bog
- Water Court

Introducing The Project WET Activity Guide

Some facilitators like to distribute the activity guides and make time for participants to look them over right away; others explain Project WET's background and purposes first, hand out descriptive literature or jump right into experiencing the activities, leaving the talk until later. Each of these routes—and others—can work.

Feel free to experiment with various strategies and choose what feels most comfortable for you, and most effective for your work group. Keep in mind the strategy of "think, pair, share". The more you can get your group to use the guides now, the more likely they will be to use them again later. You may choose to use one of the "guide safaris" to allow participants a chance to begin using the guide.

Thumb through the activity guides or glance over the Table of Contents, the Topic Index, the Skills Index or Subject Area Cross – Reference Index...or drop a guide and see where it falls open...whatever you'd like to do to find activities that will fit workshop situation and will inspire you!

SPLASH THROUGH THE GUIDE

You can use the following to mark your activity guide to make it easier to remember what to say to the group when explaining the organization of the book. You really don't need to write out all you want to say, just mark the pages you want to talk about and maybe a reference note.

1. Table of Contents (pages vi to ix)

2. Page i - Tell them this is a good introduction to Project WET and suggest they read it on their own later. Be sure to go over the Project WET goal and beliefs.

3. Page xiv—Talk about how Project WET is set up into "water units" that are **color coded**

4. Page xv to xx - Show them the alphabetic listing of activities.

5. Page xiii and or page 3- Talk about how Project WET activities are set up. Mention that each activity is set up with summary, objectives, materials, making connections, background, procedure, assessment, **reading corner**, extensions, K-2 option, and resources. Mention the side bar on each activity that contains grade level, subject areas, duration, setting, skills, charting the course and vocabulary.

6. The Appendices begin on Page 545.

7. Page 546 – Acknowledgments for those that wrote, field tested and reviewed the activities for the Guide Revision (2008-2011). Name the Maine participants.

8. Page 548 - Topics Appendix

9. Page 550 - Subject Areas Appendix

10. Page 552 - Time Required Appendix

11. Page 554 - Grade Levels Appendix

12. Page 555 - Setting Appendix

13. Page 556 - Teaching Methods Appendix

14. Page 558 - Assessment Strategies Reference and Appendix

15. Page 559 - Skills Appendix

16. Page 560 - Environmental Education and Project WET Reference and Framework

17. Page 562 - Measurements

18. Page 566 - Glossary. This provides definitions for most terms given in the activities.

A SPLASHTHROUGH THE PROJECT WET GUIDE (ACTIVITY)

To get to know your PROJECT WET guide and how to use it most effectively, it helps to have a suggested guided tour. You might have some prizes (pencils, rulers, posters or other items) and make a game of finding the answers. After a guided tour, be sure to allow some time to explore on your own.

1. What is the definition of a flood plain?
   Ans. - Any normally dry land area that is susceptible to being inundated by water from any natural source; usually lowland adjacent to a stream or lake. **Page 575** of the Glossary

2. What are the objectives of the activity "Hitting the Mark"?
   Ans. - Students will 1) distinguish between accuracy and precision. 2) investigate the relationship of accuracy and precision as it relates to water quality data collection. 3) develop and write clear procedures and communicate the limitations of those procedures. **Page 327**

3. Name an activity that involves the skill of applying?
   Ans. - Will vary Skills Index, **Page 559**

4. What subjects are covered in the activity "Nature Rules"?
   Ans. - Language arts, Government, Environmental Science and History **Page 277**

5. Does the activity "Just Passing Through" need to be conducted indoors or outdoors?
   Ans. - Outdoors. Setting. **Page 163 or Page 555 (from Settings index)**

6. Name the 7 Water Themes that make up the Framework Overview and Color Key.
   Ans. - Water has unique physical and chemical characteristics, Water is essential for all life to exist, Water connects all Earth's systems, Water is a natural resource, Water resources are managed, Water resources exist within social constructs, Water resources exist within cultural constructs. **Page xiv**

7. What seven categories are given in each side bar?
   Ans. - grade level, subject areas, duration, setting, skills, charting the course, vocabulary **Page xiii or any activity page**

8. Name an activity that requires up to one week to finish, if the entire activity is done.
   Ans. – My Water Footprint, The Rainstick, Super Sleuths Time Required Appendix **Pages 552-553**

9. Name the teaching methods used in Project WET activities.
   Ans. - Teaching Methods Appendix **Pages 556-557**

10. Where in the guide will you find a discussion of strategies with regard to assessing student learning?
Ans. - Assessing Student Learning. **Page 55**

11. What materials are needed to do the activity "Blue River"?
Ans. - Materials List. **Page 135**

12. What are the objectives of the activity called “The Thunderstorm”?
Ans. – Students will: 1) work cooperatively to mimic the sounds of a thunderstorm. 2) Monitor and record “precipitation”. 3) Learn to map rainfall. Page **209**

13. How many Maine educators participated in the national field test and review of the Project Wet Guide?
Ans. **Page 546-547**

14. Which Project WET activity requires students to make a pioneer water craft for crossing a water barrier? Ans. - Water Crossings **Page 487**

15. Which Project WET activity links football to wastewater treatment? Super Bowl Surge **Page 405**

16. According to information in the activity titled *The Price is Right*, how much did the Hoover Dam Project cost the federal government in 1935? $353 Million **Page 359**

17. What concept is discussed in the activity titled *Sum of the Parts*? Nonpoint Source Pollution **Page 283**

18. Which activity discusses the Dr. John Snow, the father of the science of epidemiology? Poison Pump **Page 107**

19. Name the 9 cross reference and planning charts found in the Project WET Guide. **Page 545**

BONUS Who are the state sponsors of Project WET?
Ans. - Lake Auburn Watershed Protection Association. Books provided with a grant from Poland Spring.

Please feel free to build your own series of questions or add to these!

Closing the Workshop

Try to tie all of the day's experiences together when closing the workshop. Leave participants excited to take what they learned and use it with their students.

Participants should reflect on the content and processes of activities. Include time for sharing of what they've learned and for them to express their views and values on the environment. Ask what activities they would or would not use with their students. How would they expect students to react, or what would they learn. How would they propose an activity be altered to make it more effective?

Participants are required to complete a Participant Evaluation Form. Since they will be anxious to get on their way, don't leave the evaluation until the last minute! Give them sufficient time to collect their thoughts and complete the form.

Distribute certificates to participants. And most importantly—Finish on time!

Reflections & Evaluation

Take a few moments while the day is fresh in your mind to review the workshop. What do you feel worked well? What did not go as smooth as you expected? Were there any activities that you didn't feel comfortable leading and need to prepare better for next time? Did the participants raise any ideas on how to make the activity better—something that you might want to add to your next workshop? What would you like to do differently next time? Jot some notes to yourself so that you can review these as you plan for your next workshop.

Wrap up your paperwork! Remember to mail the evaluation forms, participant mailing addresses and your facilitator reporting form to your Project WET Coordinator as soon as possible. Thank you notes to the person or organization that requested or hosted the workshop, persons donating materials and to guest speakers are always greatly appreciated.

Ice-Breakers

First impressions are important. Open the workshop with an exciting activity that will energize participants and provide motivation. Ice breakers are an excellent technique to make participants comfortable and to allow them to meet those that share their interest in learning about Project WET.

It is important to build a feeling of community and sharing throughout the workshop. People that know each other might balk at an “ice-breaker,” so you may consider promoting the activity as a warm-up exercise, mixer or environmental integrator. Several examples of effective ice-breakers follow.

Raining Cats and Dogs

As you meet other participants, match one of the following water phrases with the illustration they have drawn on an index card. After confirming if you are correct, write their names next to the phrase. Several participants may have the same phrase. Have fun meeting everyone!

It's water over the dam_____

Treading water_____

Stillwater runs deep_____

Like water off a duck's back_____

Muddy the waters_____

In hot water_____

Water under the bridge_____

Troubled waters_____

Throw cold water on it_____

You can lead a horse to water but you can't make it drink_____

Like a duck to water_____

One hand washes the other_____

Water, water everywhere but not a drop to drink_____

Cross that bridge when we get there_____

Get your feet wet_____

Somebody is "all wet"_____

Burn your bridges behind you_____

Walking on thin ice_____

Break the ice_____

Tip of the iceberg_____

Sink or swim_____

Something smells fishy_____

Wash my hands of the matter_____

Icy stare_____

When it rains it pours_____

Up the creek without a paddle_____

The well's run dry_____

He is a drip_____

A drop in the bucket_____

On cloud nine_____

Jump in with both feet_____

Having a rippling effect_____

Down the drain_____

Change horses in mid stream_____

Took it hook, line & sinker_____

Something snowballs_____

Sandbagging_____

A flood of tears_____

A stepping stone to something_____

Find your sea legs_____

Make a big splash_____

Madder than a wet hen_____

Mind in a fog_____

Blood is thicker than water_____

Crying buckets_____

Wet behind the ears_____

Get your ducks in a row_____

When our ship comes in_____

Wet your whistle_____

Raining cats and dogs_____

WET Human Scavenger Hunt

Directions: Try to have at least one person sign his or her name before each statement. Try to get a different person for each line.

1. _____ Drinks eight glasses of water every day.
2. _____ Swam in the ocean this past summer.
3. _____ Knows the amount of their monthly water bill.
4. _____ Can tell a fish story or caught a whopper-sized fish.
5. _____ Collects sea shells.
6. _____ Uses well water.
7. _____ Sings in the shower.
8. _____ Has hauled water with a bucket.
9. _____ Has watched a fish spawning operation.
10. _____ Has a rain gauge.
11. _____ Has water that tastes funny.
12. _____ Has been in a flood.
13. _____ Can name a waterborne disease.
14. _____ Has seen a clean lake.
15. _____ Does not let the water run when brushing their teeth.
16. _____ Toured a water purification or waste water treatment plant.
17. _____ Has been in a hurricane.
18. _____ Has eaten seaweed.
19. _____ Was once a life guard.
20. _____ Has witched for underground water.

Wild Human Scavenger Hunt

Directions: Try to have at least one person sign his or her name before each statement. Try to get a different person for each line.

1. _____ Has a “Save the Bay” license plate.
2. _____ Is actively recycling.
3. _____ Can identify two Maryland endangered species.
4. _____ Contacted a government official about water resources.
5. _____ Has held a fish.
6. _____ Enjoys wildlife photography.
7. _____ Feeds birds in the winter.
8. _____ Has seen an osprey nest.
9. _____ Has seen a bald eagle nest.
10. _____ Has seen a wild turkey.
11. _____ Has a fishing license.
12. _____ Has seen a bird of prey catch fish.
13. _____ Has a hunting license.
14. _____ Has canoed in one of the Bay’s Tributaries.
15. _____ Has been camping more than twice a year.
16. _____ Has used a kayak.

Project WET Activity Extensions

Educators utilizing the activities in the Project WET Activity Guide are encouraged to adapt activities to meet local conditions and student interests and needs. Some ways that some activities have been modified by educators are described below. If you have any additional adaptations that you have found successful, please submit them to your Maryland Project WET Coordinator for inclusion in future updates of this publication.

Activity: "Raining Cats and Dogs"

If you have conducted the ice-breaker "Raining Cats & Dogs" from the Project WET guide, you maybe interested in trying out a few new water proverbs from the Virgin Islands. (West Indian proverbs, written in island dialect, are from the book Not so Cat Walk by George A. Seaman.

- Who got out starch cloths mus' look out fo' rain.
  - On the continental United States, we would say: "People who
  - live in glasses houses shouldn't throw stones."
- When man no like yo' dey say give yo' basket fo' carry watah.
  - If a person doesn't like you, he or she will make things difficult as you try to achieve your goals.
- Watah can' stan' 'pon cliff.
  - If a person, an organization, or a house is built on a weak foundation, it will eventually crumble.
- Stone a wata no know when sun hot.
  - The protected person is often unaware of reality.
- Duck no hab watah fo' drinkhe say he a wash he skin.
  - If you indulge in many things that are really beyond your capacity to pay for or do, you are putting on airs.

Remind students that proverbs evolve from observation, experimentation and experience, and reflect the wisdom of generations. They have been characterized as the "wisdom of many and the wit of one."

Activity: "Sparking Water"

When preparing for the "Sparkling Water" activity, make certain that the alum to be used—which will be mixed with bleach is PURE ALUM. Alum purchased at some pharmacies has been ammoniated. Mixing ammonia with bleach creates a serious health hazard.

Activity: "Incredible Journey"

Have students create a water cycle bracelet. As students move through the water cycle, ask them to label their journey maps in the order in which they move from station to station. For example, if they roll the die and rain into the "ocean", have students record #1 by the ocean; #2 by the second station they roll, and so forth.

After they have played the game and disclosed their conclusions about the water cycle, have them create a water cycle bracelet. Make available lengths of twine or gimp on which beads may be strung. Purchase beads in colors that relate to the cycle: brown for groundwater, blue for the ocean, white for the glacier and so forth. Using their maps, students will string the appropriate colored beads on their bracelets, relative to the order of the stations they visited.

Have students wear the bracelets and, as they point to each bead, tell the story of the water molecule as it moves through the water cycle. (Project WET, Oregon)

Activity: "Water Match"

"Water Match" can be adapted as a great icebreaker. Distribute one card to each person and instruct students that they have to find their match (If necessary, you may have three in a group). Players must introduce themselves and share one water story. This leads into a great discussion of the three stages of water. (Project WET, New Jersey)

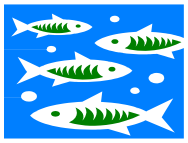
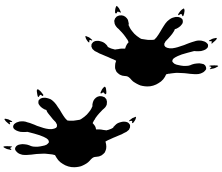
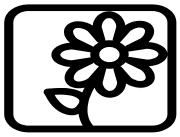
Activity: "The Long Haul"

Just for fun, add a little humor to "The Long Haul". Before students can run the bucket of water from the water source to the destination, they have to pull on clothes unique to the time period when "hauling water" was a daily chore. Have a huge pair of overalls and a straw hat, or oversized long dress and bonnet, that students must quickly pull on over their own clothing before they can pick up the bucket and walk to the destination. (The clothing should be large, but short enough so students do not trip.) (Project WET, North Dakota)

Activity: "Sum of the Parts"

To relate to Maryland's water resources and the impact that many people have on the Chesapeake Bay, use a Chesapeake Bay Watershed Map (available through the US Fish and Wildlife Service).

Wetland Bingo

Great Blue Heron 	Beaver 	 Dragonfly	Snail 
 Minnows	Turtle 	Snake 	Footprints 
Cattails or tall grasses 	 Flowers	Water 	Duck 
Eagle 	Butterflies 	Water  Strider	Red-Winged  Blackbird

Remember to only look, not touch! Check the objects that you find.

Jeopardy Icebreaker for Project WET Workshop

WATER ON THE MOVE	EARTH SCIENCE	WATER USE	PHYSICAL/CHEMICAL PROPERTIES OF WATER	HOW CLEAN IS YOUR WATER?
The continuous movement of water that collects, purifies, and distributes it around the world. THE WATER/ HYDROLOGIC CYCLE Incredible Journey	The percentage of all water on earth that is salt water. 97% A Drop in the Bucket	The use of water-saving methods to reduce the amount of water needed. CONSERVATION Every Drop Counts	The molecular formula for water H2O Hangin' Together	Constructed opening in a road system through which runoff from the road surface slows into an underground collection system. STORM DRAIN A-Maze-Ing Water
Water traveling over the land surface. It often picks up contaminants. RUNOFF Rainy-Day Hike	Water stored in pores, cracks, and openings of subsurface rock material GROUNDWATER Get the Ground Water Picture	The amount of water on the Earth available for and suitable for consumption. LESS THAN 1% A Drop in the Bucket	The Universal Solvent WATER What's the Solution?	Solid materials removed from wastewater during the treatment process. It is sometimes then used to make fertilizers. SLUDGE Sparkling Water
These form when water vapor in the atmosphere condenses into tiny ice crystals or water droplets. CLOUDS Poetic Precipitation	The force of water causing the displacement of large amounts of soil. EROSION Just Passing Through	The amount of water used to clean a load of dishes in a typical dishwasher. 20 GALLONS Water Meter	Water is the only substance on Earth naturally found in these three states. SOLID, LIQUID, GAS Water Match	A continuous emission from a source of underground contamination that moves with ground water and shows a starting point and noticeable pathway. PLUME A Grave Mistake, The Pucker Effect

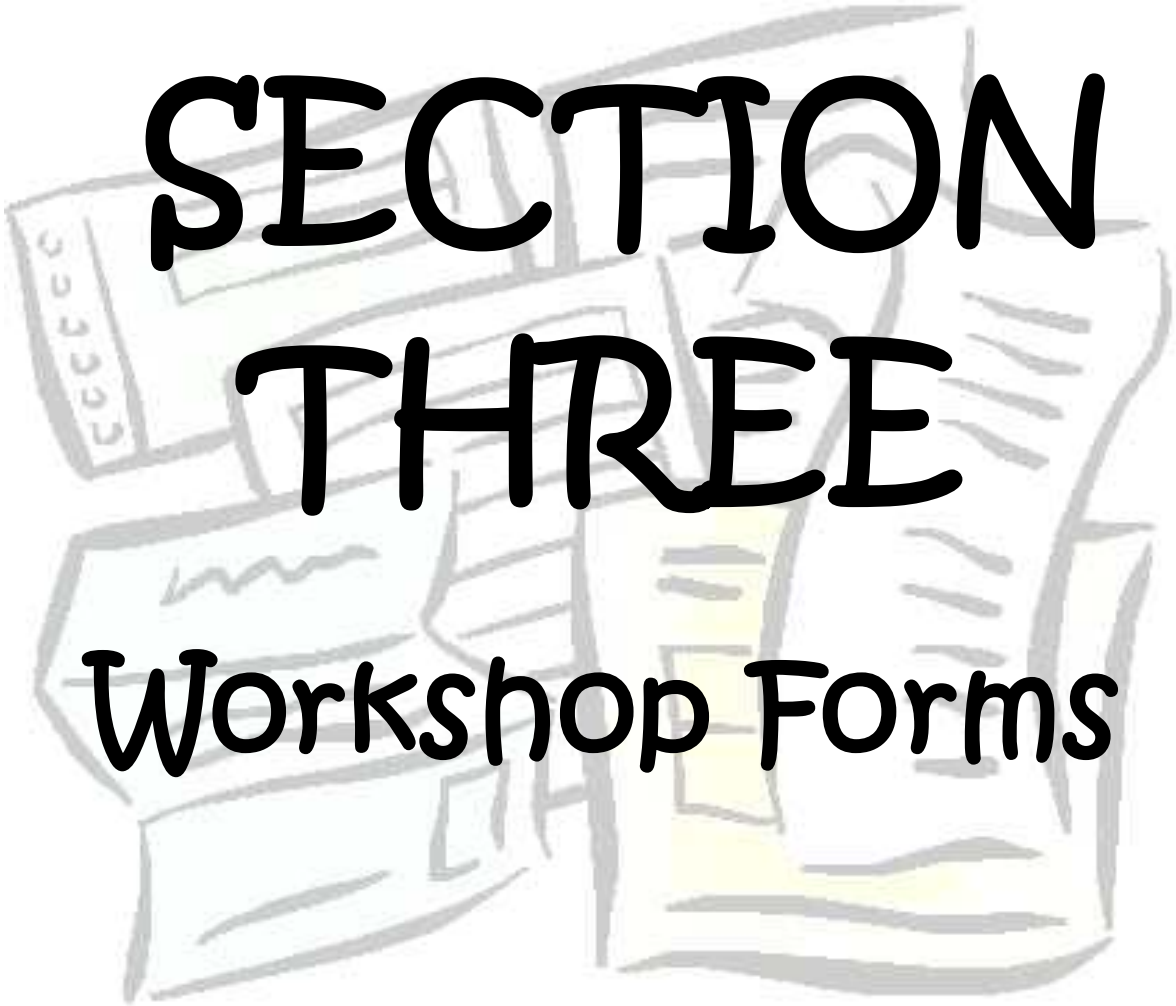
Evaporation of water from stomata on the trunk, stem, or leaf surfaces of a plant. TRANSPIRATION Thirsty Plants	The land area that drains water to a lake, river, or ocean. WATERSHED Branching Out!	A form of landscaping that utilizes a variety of indigenous and drought-tolerant plants to conserve water. XERISCAPING Thirsty Plants, Every Drop Counts	The attraction among water molecules that creates a skinlike barrier between air and underlying water molecules. SURFACE TENSION H2Olympics	Organisms that lack an internal skeleton and which act as bioindicators, providing clues about a stream's water quality. MACROINVERETEBRATES Macroinvertebrate Mayhem
The four processes that drive the water cycle. EVAPORATION, CONDENSATION, PRECIPITATION, TRANSPIRATION Imagine!	An underground formation of saturated soil or rock that is capable of storing and transmitting water. AQUIFER Get the Ground Water Picture	This doctrine regulates water rights through the tenet of "first in time, first in right." PRIOR APPROPRIATION DOCTRINE Pass the Jug	The means by which water is drawn through tiny spaces in a material, such as soil, through the processes of adhesion and cohesion. CAPILLARY ACTION H2Olympics	Contamination whose entry point into a watershed are difficult to locate such as runoff from a field. NONPOINT SOURCE POLLUTION Sum of the Parts

Water Address Cards

I can grow over 5 feet long! My name describes the pattern on my body. I like to eat fish that are smaller than me. Humans try to catch me from the Chesapeake Bay. Striped Bass/Rockfish	I am a resident in the Chesapeake Bay. I can walk and swim sideways. I turn bright red when you cook me. As an adult, my bright blue claws are strong so that I can break clam shells to bits. Blue Crab
I am a large rodent that lives in the marsh. I eat the roots of the cordgrass and common reed. My houses are called "push-ups" and my babies are called "kits". Muskrat	I have been around since before the age of the dinosaurs. In the Spring I lay my eggs on beaches at the high tide line. Most people think that I am scary looking, but I am really a gentle creature. Humans rely on my blood for medical research and testing drugs for impurities. Horseshoe Crab

Water Address Cards

I like to lay on the mud flats and bask in the sun. I eat grass, small fish, and crabs that live in the salt marsh. I need to lay my eggs on dry land. The pattern on my shell is a clue to my name. Diamondback Terrapin	I am a year round resident of Maryland and live near any marsh, swamp, pond, river, lake, or bay. I am known for my brightly colored feet. Males have a shiny green head with a white neck ring. I am the only animal that really "quacks". Mallard Duck
I filter microscopic plants and animals from the waters of the Chesapeake Bay. I was once harvested by watermen that used boats called "Skip Jacks". My populations in the Chesapeake Bay have decreased to low levels. A group of us growing together is called a "bed". Oyster	I live in both tidal brackish waters and fresh water along rivers, ponds, streams, and wetlands in Maryland. I have long, narrow leaves and stem that is edible. I stand tall. I have a flower that looks like a hot dog or a cat's tail. Cattail



SECTION THREE

Workshop Forms

MD Department of Natural Resources
Aquatic Resources Education

Project WET Workshop Proposal

Facilitator Name:_____

Organization Name:_____

Address:_____

Phone Work:_____ Home:_____

Fax:_____ Email:_____

Workshop Date(s):_____ Time:_____

Location:_____

Other Facilitators:_____

Type of Workshop: □ Educator (6-10 hrs) □ Demonstration (1-2 hrs)

- *Please submit a copy of the proposed agenda at least 30 days prior to the workshop.*

Proposed Number of Participants:___

Number of curriculum & guidebooks needed:_____ Delivery Date:_____

- *Only one curriculum & activity guidebook per participant. Participants may not receive any guidebook without completing a six hour educator's workshop. Participants will not be certified if they do not complete the workshop.*

Please mail or fax this form to:

Cindy Etgen
MD Department of Natural Resources
580 Taylor Avenue – E-2
Annapolis MD 21401
Phone: 410-260-8716
Fax: 410-260-8739
Email: cindy.etgen@maryland.gov

- All Requests must be received at least two weeks prior to requested delivery date. Thank you!

Project WET Workshop
Sign In Sheet

Facilitator Name:_____
Workshop Date:_____
Workshop Location:_____

Name	County	Complete Address (including zip code)	Phone, Fax and Email Address	Occupation

Project WET Workshop
Sign In Sheet

Facilitator Name:_____ Workshop Date:_____ Workshop Location:_____

Name	County	Complete Address (including zip code)	Phone, Fax and E-mail Address	Occupation

Workshop identification information

WET Workshop Evaluation Form

Thank you for your interest in water resources. Your responses are important to us.

Who do you teach/will teach

❑ Preschool ❑ PreK–2 ❑ 3–5 ❑ 6–8 ❑ 9–12 ❑ University/college ❑ Preservice teachers ❑ Adult

In what setting do you do your work or teach? (check one)

❑ Urban ❑ Suburban ❑ Rural

Please indicate your educational setting. (check one)

❑ After school ❑ Agency ❑ College/University ❑ Family ❑ Homeschool ❑ Nature/environmental center
❑ Private school ❑ Public school ❑ Preservice or teacher credential candidate ❑ Summer program ❑ Other

How strongly do you agree or disagree with the following statements?

	Strongly DISAGREE						Strongly AGREE
I acquired new skills at the workshop.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The workshop increased my knowledge of how to use water resources as the context for interdisciplinary teaching and learning	1	2	3	4	5	6	7
Students/participants will learn from Project WET activities.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The facilitator showed ways to integrate activities into my program.	1	2	3	4	5	6	7
The facilitator was well prepared.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The facilitator demonstrated ways to modify activities.	1	2	3	4	5	6	7
The facilitator was knowledgeable.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
It was worth my time to come today.	1	2	3	4	5	6	7
I am excited to use Project WET.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The resources and materials provided at the workshop are useful.	1	2	3	4	5	6	7
I will recommend this workshop to colleagues and friends.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Overall, the workshop was excellent.	1	2	3	4	5	6	7

Just for teachers

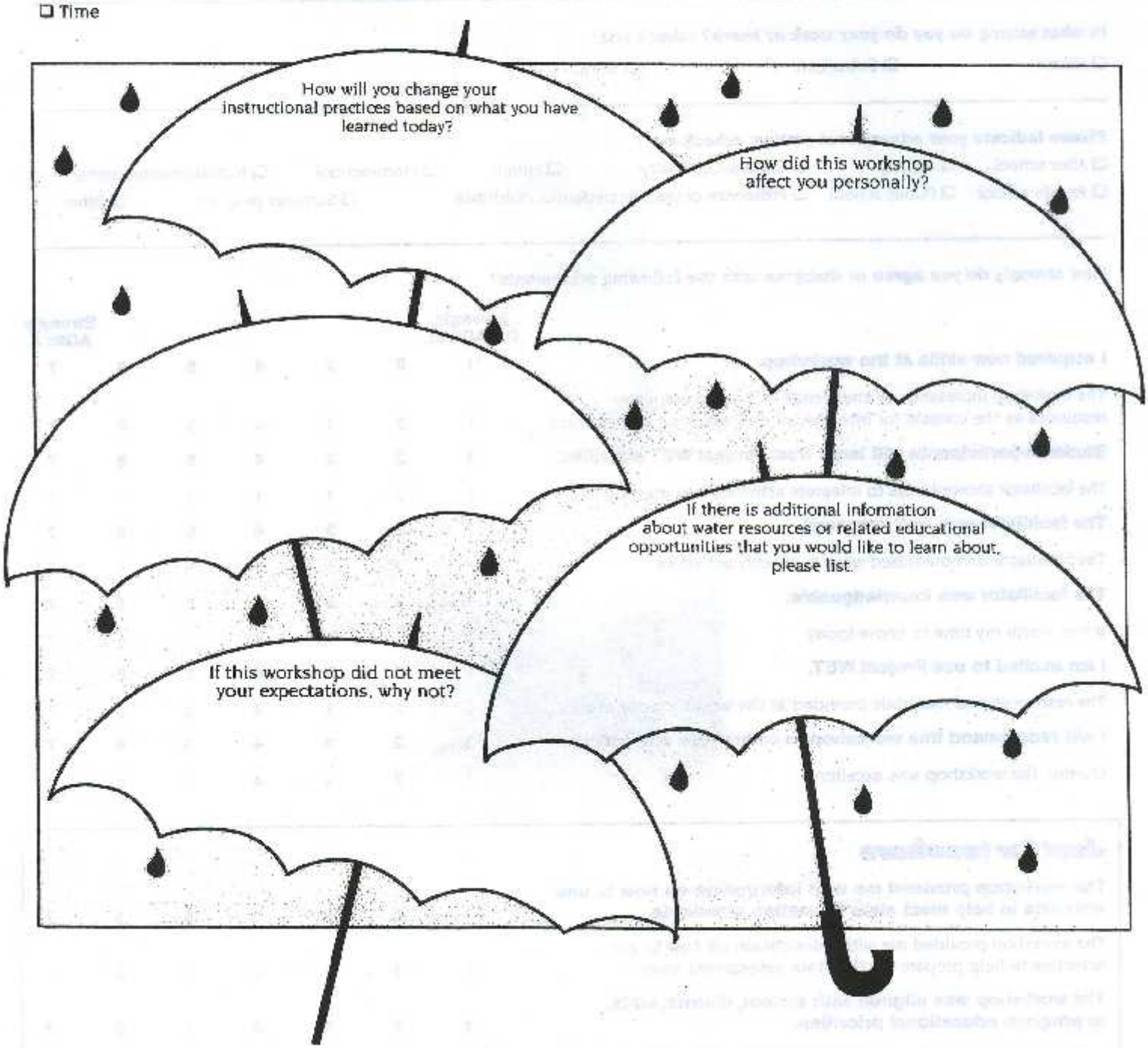
The workshop provided me with information on how to use activities to help meet state education standards.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The workshop provided me with information on how to use activities to help prepare for the state assessment tests.	1	2	3	4	5	6	7
The workshop was aligned with school, district, state, or program educational priorities.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

How might you implement what have you learned today? (Check all that apply)

- ❑ Assessment
- ❑ Camp
- ❑ Church/community program
- ❑ Festival
- ❑ Field trips
- ❑ Fill-in activity
- ❑ Interdisciplinary unit
- ❑ Naturalist program
- ❑ Personal behavior
- ❑ Preservice or teacher credential candidate
- ❑ Professional development
- ❑ Single lesson
- ❑ Supplemental activity
- ❑ Unit
- ❑ Youth groups

What are the potential barriers to implementing Project WET? (Check all that apply)

- ❑ Administrative support
- ❑ Insufficient knowledge
- ❑ Materials
- ❑ Money
- ❑ Prescribed curriculum
- ❑ Space
- ❑ State assessments
- ❑ State standards
- ❑ Supportive colleagues/team members
- ❑ Time



MARYLAND PROJECT WET
FACILITATOR REPORTING FORM

(Please print in blue or black ink only)

Facilitator Name:_____ Date:_____

Address:_____

_____

Email:_____

Phone: Day:_____ Evening:_____

Workshop Location:_____ Workshop Date:_____

Other Facilitators:_____

Workshop Type:

□	Demonstration	___ hrs	□	Educator	____hrs
□	Facilitator	___ hrs	□	Other	____hrs

Number of Participants:_____

Audience Makeup (Provide totals in each applicable category

____	Preschool Teacher	____	Superintendent
____	Elementary Teacher	____	Environmental Educator
____	Middle School Teacher	____	Youth Organization Leader
____	High School Teacher	____	Pre-service Teacher
____	Industry Representative	____	Special Educator
____	Media Specialist	____	Curriculum Specialist
____	College Faculty	____	College Student
____	Principal	____	Other

Please complete the reverse side.

Total Instruction hours for this workshop:_____

Total time for this workshop:_____

Your total expenses for this workshop:_____
(gas, refreshments, instructional materials, postage, room rent, etc)

Comments:

Attach copies of the workshop evaluations, sign-in sheets, agenda, all advertisement and promotional flyers and mail to:

Cindy Etgen
MD Department of Natural Resources
580 Taylor Avenue – E-2
Annapolis MD 21401
Phone: 410-260-8716
Fax: 410-260-8739
Email: cindy.etgen@maryland.gov

SAMPLE COMPLETED FORM

MARYLAND PROJECT WET FACILITATOR REPORTING FORM

(Please print in blue or black ink only)

Facilitator Name:_____Jane Doe_____

Address:_____Wye Island NRMA, 632 Wye Island Rd._____
Queenstown MD 21658

Email:_____Jdoe@dnr.state.md.us_____

Phone: Day:__410-827-7577_____Evening:_____410-555-3233_____

Workshop Location:__Wye Island NRMA Conf. Rm_ Workshop Date:__5/30/06_____

Other Facilitators:_____Joe Smith_____

Workshop Type:

☐	Demonstration ___ hrs	☐	Educator __6_hrs
☐	Facilitator ___ hrs	☐	Other ____hrs

Number of Participants:_____15_____

Audience Makeup (Provide totals in each applicable category)

____	Preschool Teacher	____	Superintendent
_5__	Elementary Teacher	____	Environmental Educator
_5__	Middle School Teacher	____	Youth Organization Leader
____	High School Teacher	____	Pre-service Teacher
____	Industry Representative	__5_	Special Educator
____	Media Specialist	____	Curriculum Specialist
____	College Faculty	____	College Student
____	Principal	____	Other

Please complete the reverse side.

Total Instruction hours for this workshop:_____6 hours_____

Total time for this workshop:_____8 hours_____

Your total expenses for this workshop:_____$5.00_____
(gas, refreshments, instructional materials, postage, room rent, etc)

Comments:

Much smoother program for me than previous ones. Teachers were generally interested and participated whole-heartedly in activities.

Joe kept them alert after lunch with his "Sounds of the Rainforest" and "Rain Stick" activities. The "Sounds of the Rainforest" is great for all ages and is better with larger groups (simulates rain shower in the jungle). Divided into three groups:

1. Start with group one rubbing hands back and forth and go around to groups two and three. (light rain)
2. While groups two and three continue rubbing hands, group one starts snapping fingers (heavier rain) and this continues to groups two and three.
3. Slaps hips (even harder rain) same sequence.
4. Stomp feet (down pour) same sequence.
5. Back to beginning, rubbing hands back and forth (light rain) ending-same sequence.

Lunch was furnished at the center for $2. The only thing that surprised me was that the teachers did not want to take breaks during the mid-morning and afternoon. They wanted longer lunch hour to be able to leave early. It worked out fine.

Attach copies of the workshop evaluations, sign-in sheets, agenda, all advertisement and promotional flyers and mail to:

Cindy Etgen
MD Department of Natural Resources
580 Taylor Avenue – E-2
Annapolis MD 21401
Phone: 410-260-8716
Fax: 410-260-8739
Email: cindy.etgen@maryland.gov
Project WET

Model Release

Date _____

For consideration agreed upon and received by me, I _____ consent that you Project WET, your clients and agents, may use my name and photographs of me for any form of advertising and commercial purposes, or for purposes of trade, or for uses that you wish.

Signed _____

Address_____

As parent or guardian of the above named person (if under 18 years old), I consent to the above release and signature thereto and the uses therein set forth.

Signed _____

Address_____

Cit, State, Zip _____

Phone (_____)_____

Aquatic Resources Education - Demographic Data Sheet

Please fill out this data sheet to the best of your ability by typing right into the form and saving it! These figures are used by the MD Department of Natural Resources when applying for federal funding, grants, and other funding.

Today's Date:					
Name:					
School/Organization:					
Complete Address:					
City:		**State:**		**Zip Code:**	
County:					
Date of Program:					

Name of Program (Please check only one):

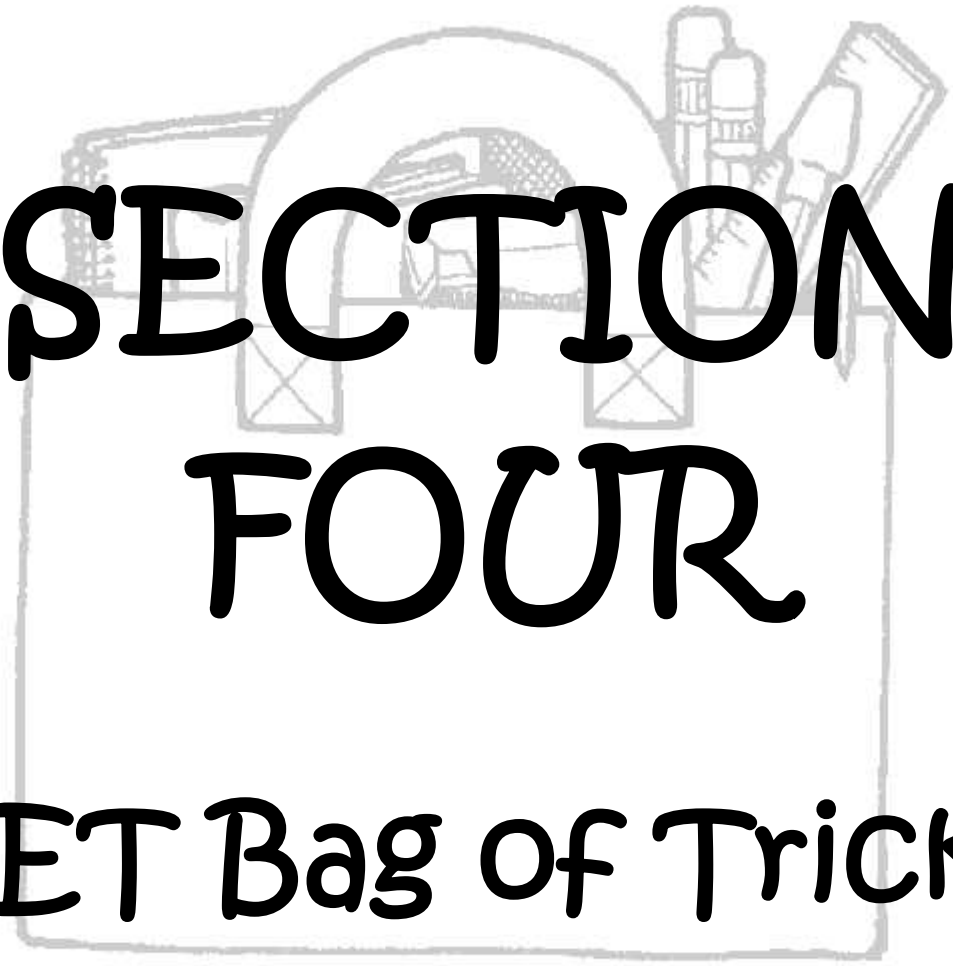
Hooked on Fishing Clinic Program	☐	Fishing Tackle Loaner Program	☐	Hooked on Fishing Day Program	☐
TEAM Presentation: Please use the drop down box to select the program	☐	Project WET Workshop	☐	Sturgeon and Students	☐
Aquatic Resources Education Grant	☐	WOW! Workshop	☐	Horseshoe Crabs in the Classroom	☐
Storm Drain Stenciling	☐	Green Eggs & Sand	☐	Adult Fishing Training	☐
Other:	☐	Special Events:			
Length of Program in hours:					

Demographic Data
for your students/participants being reached through this training/workshop/program:

Number of Males		Number of Black or African American	
Number of Females		Number of Latino or Hispanic	
Total Number of Students		Number of Asian	
Number of Participants with Disabilities		Number of Native American or Alaska Native	
Number of Volunteers/Parent Helpers		Number of Native Hawaiian or Pacific Islander	
Percentage of Students on Free or Reduced Lunches (School-wide)	0%	Number of White	

Please return to your instructor the day of your training/workshop/program
or if receiving educational materials through the mail please mail/fax/email to:

Cindy Etgen
Aquatic Resources Education Program
Tawes Bldg E-2
580 Taylor Avenue
Annapolis, MD 21041
cindy.etgen@maryland.gov FAX 410-260-8739



SECTION FOUR

WET Bag of Tricks

STORM DRAIN STENCILING

Educator: Storm drain stenciling is a relatively simple project for students which has the potential of making a big difference in reducing the amount of trash entering local waterways. Have students practice stenciling letters onto paper grocery bags or newsprint, so that they can become comfortable with using the right amount of paint- using too much paint will cause the color to drip under the stencil and letters will be unreadable.

INTRODUCTION:

Storm drains were designed to be the fastest and most efficient way of getting rainwater off streets and parking lots. Think about the way that water rushes into a storm drain in the middle of a parking lot, or alongside a street. Have you ever stopped to wonder where that water goes? Most storm drain systems empty directly into a local waterway. If you live in the Chesapeake Bay watershed, that local waterway eventually empties into Chesapeake Bay. Unfortunately, the water that flows into your storm drain often carries trash and sediment from the street; nutrients in the form of fertilizers, toxics in the form of pesticides, household cleaners, gasoline and motor oil. Imagine all of these things rushing into your small stream, your local river, and into the Bay!

Stenciling storm drains in your community with the words "DON'T DUMP! CHESAPEAKE BAY DRAINAGE" may encourage people to think twice about putting trash into a storm drain or putting pollutants on their lawns and driveways. Teaching people that storm drains are connected to our waterways helps them to remember that only clean water should enter the storm drains.

OBJECTIVE: To raise community awareness about the function of storm drains and their link to water quality, both locally and watershed-wide.

MATERIALS:

- water
- trash bag
- drop cloth
- paint stirrer
- traffic cones
- masking tape
- screwdriver
- "Wet Paint!" signs
- exterior latex paint
- wire brush
- hand broom
- "Don't Dump!" Chesapeake Bay Drainage" stencils
- 3" paint brush
- 3" sponge brush

PREPARATION:

1. Locate a storm drain near your school. Look for storm drains in your school parking lot and/or along the streets that surround your school. Consider contacting your Department of Public Works for a map of the storm drain system in your area to find out where the storm drain system empties.

2. Get permission. If you are planning to stencil storm drains on school grounds, you will need to get permission from your principal. For all other sites, contact your local Department of Public Works to see if you require permission. You may need to obtain a permit, so contact them several weeks prior to the date you want to begin. Be prepared to provide the following information:

   - ✓ The location of the storm drain(s) you wish to stencil.
   - ✓ What you plan to stencil onto the storm drain: "Don't Dump!" on the horizontal side, "Chesapeake Bay Drainage" on the vertical side.
   - ✓ Who will provide supervision for the project.

3. Purchase or borrow supplies. Some of the materials required for this project (paint brushes, masking tape, etc.) can probably be borrowed from your homes. Ask people in the community, local businesses, or organizations to donate supplies or money for the supplies. This is your chance to get people in the community involved and educate them about the storm drain issue. Storm drain stencils can be borrowed from the Maryland Department of Natural Resources. Contact Joann Wheeler at (410)260-8809 or jywheeler@dnr.state.md.us for more information.

4. Publicize. Contact the news media (radio and television stations) at least two weeks in advance and provide them with details about the project (time, location, and contact names). Remind the media of the event a day or two before. If possible, announce the project over the school's PA system. In addition, distribute flyers to residents who live near the storm drains to be stenciled. Your flyer should include:

   - ✓ the date and time;
   - ✓ the purpose of the event;
   - ✓ the exact location of the drains to be painted;
   - ✓ a person to contact with question or concerns, and
   - ✓ a request to move cars blocking designated storm drains on the day of the event.

5. Safety first! Since drivers may not see you standing or kneeling near parked cars, plan to have an adult hold a traffic flag and alert oncoming cars. If your storm drain stenciling is on a very busy street, arrange for police to direct traffic. Call your local police station several weeks in advance to ask for help.

6. Practice. Use a flat paper bag to do a practice run with the stencil. Remember, less is more with paint- if applied too thick it will "run" under the stencil. Dab the paint into the stencil, to get into the crevices of the surface you are stenciling.

ACTION:

1. The pavement must be dry for the paint to stick. In addition, the paint will not dry well if it is colder than 50° F. If it is raining, cancel the project and choose an alternative date instead.

2. Place traffic cones 2-3 feet in front of the storm drain and clean up any debris on or around the storm drain. Be sure to wear protective gloves and put all debris found in a trash bag. Separate any recyclable materials from regular trash. Use a wire brush to remove rust if you will be stenciling any metal part of the storm drain. Place the drop cloth in front of the drain to prevent any of your materials from falling into the storm drain.

3. Center the "Don't Dump!" stencil on the horizontal (top) face of the storm drain, and the "Chesapeake Bay Drainage" stencil on the vertical (bottom) face. Outline the stencils with masking tape to create a straight, rectangular border on the areas you are painting. Set the stencils aside, leaving the rectangular borders.

4. Paint inside the rectangular borders with white or beige paint. Wait 15-30 minutes, or until paint is dry to the touch.

5. Once again, center the "Don't Dump!" stencil on the horizontal surface and the "Chesapeake Bay Drainage" stencil on the vertical surface. Tape both stencils into place.

6. As one or two students apply paint to the letters, other students can help them by holding the stencil flatly and firmly in place. Be careful not to use too much paint or it will run and smear! Generally, if you are using the right amount of paint, you will need to "reload" your brush with paint every two letters. When you are finished stenciling all of the letters, lift the stencils off carefully so that you don't smudge the wet paint. Remove the masking tape borders.

7. Clean up the stenciling site. Use paper towels to wipe any excess paint from the stencil. Place any paint brushed used in a plastic bag, while you go to the next stenciling site. Tape a "Wet Paint!" sign next to drain. Clean your bushes thoroughly with water and dry them with newspaper. Since you have used a water-based latex paint, it is safe to rinse brushes and containers in a bathroom sink.

REFLECTION:

Group

- Extend your project to a cross-aged teaching experience - teach older and younger people in the community why it is important to stencil storm drains.

- Monitor trash around storm drain one-week prior to and one week following stenciling. Assess whether the project has made a difference in the amount of trash that enters the storm drain.

Individual

- In your journal, reflect on the project. What went well? What didn't? How would you change the project if you were to do it again? What were the benefits of the project—to the community, the environment, to you?

- Design another stencil or sticker that you could use in a similar way to encourage people to help the environment by changing the behavior.

Storm Drain Stenciling:
An Action Project to Help Save the Bay!

Objective of Project: To raise community awareness about the function of storm drains and their link to water quality.

General Information: Storm drains were designed to be the fastest and most efficient way of getting rainwater off streets and parking lots. Unfortunately, the water that flows into your storm drain carries trash and sediment from the street, nutrients in the form of fertilizers, toxics in the form of pesticides, household cleaners, gasoline and motor oil. All of the water in the storm drains ends up in your local stream, river and eventually, the Chesapeake Bay.

Stenciling storm drains in your community may discourage people from putting harmful items and trash in the drains!

Deposit Required!

The cost of borrowing a stencil kit is a **$25.00 deposit** (stencils and video must be returned). The check will be returned upon receipt of the stencils and video.

The Kit Includes:

Directions for stenciling
The use of 1- 4 sets of "Chesapeake Bay Drainage" "Don't Dump" stencils
Use of a "How To" video

Contact Information: Cindy Etgen, MD DNR, 1-877-620-8DNR EXT. 8716 or cindy.etgen@maryland.gov

Return the stencils after you are finished. Mail them back to MD DNR (use address above). Clean the stencils so that another group can use them in their neighborhood or community!

IMPORTANT! You must seek permission from your local Department of Public Works and community before stenciling any storm drains!

Chesapeake Bay Storm Drain Stencil Form

Contact Information: Cindy Etgen, MD DNR, 1-877-620-8DNR EXT. 8716 or cindy.etgen@maryland.gov

Send Your Deposit Check And Order Form To:
Please make out your $25.00 check to the ***Maryland Department of Natural Resources***
Cindy Etgen – Storm Drain Stencils
Maryland Department of Natural Resources
580 Taylor Avenue, E-2
Annapolis, Maryland 21401

IMPORTANT!!: You must seek permission from your local Department of Public Works and community before stenciling any storm drains!

ALL INFO BELOW MUST BE PROVIDED BEFORE PROCESSING YOUR REQUEST!

Number of Stencils needed (you may borrow **up to 4** stencils): _____
Your best estimate for info below :
Date(s)of Stenciling Event: _____
Number of Storm Drains Being Stenciled: _____

Demographic Data:

# of males		# of Volunteers/parent helpers		# of Asian	
# of females		% of students on Free or Reduced lunches (if known)		# of Native American	
Total # of Students		# of Black/African American		# of Hawaiian/Pacific Is.	
# of participants w/disabilities		# of Latino/Hispanic		# of White	

Your Name: _____ Email:_____
School or Group: _____

Street Address (where you want stencils mailed):
Street: _____
City/State/Zip: _____
Phone: _____

Storm Drain Stenciling Addresses:
ALL intended Streets:
_____
_____
_____
City_____
County_____

In borrowing these stencils and video I understand that the video and stencils (even damaged stencils) must be returned cleaned no later than 2 weeks after my stenciling event to the Department of Natural Resources at the address above. My $25.00 deposit will be returned once MD DNR receives the stencils and video:

_____ _____
Signature Date

OFFICE USE ONLY: _____ _____ _____
Received Sent Returned

Project WET

Sample Pre and Post Questions

1. Circle your choice of the three major categories of water users in your community in the order of who you think uses the most water.
    A. Industrial (includes mills, processing plants, and service agencies) agricultural, and residential (cumulative)
    B. agricultural, residential, industrial
    C. residential, industrial, agricultural
    D. residential, agricultural, and industrial

2. Circle the major source of water for your community.
    A. Groundwater (wells)
    B. Surface water- lakes and rivers
    C. Surface water- reservoirs
    D. A combination of A and B and C.

3. Is sufficient water quantity or quality more of a concern in your community among the water users?
    A. quantity
    B. quality
    C. neither
    D. both

4. What percentage of the earth's water is potable or available for drinking?
    A. 30%
    B. 3%
    C. .03%
    D. .003%

5. Where is most of the earth's freshwater located?
    A. Glaciers and ice caps
    B. Groundwater (hidden underground)
    C. Surface water (lakes and rivers)
    D. Atmosphere (as a gas form or water vapor)

6. If the available water on the planet were to be divided by the number of people on the planet and we assumed that distribution or access was not an issue, the calculation would show approximately that:
    A. There is not enough water for all the people to have 1 liter.
    B. There is enough water for all the people to have at least 100 liters.
    C. There is enough water for all the people to have in the millions of liters- enough for a lifetime.
    D. There is enough water for all the people to have in the billions of liters- much more than is ever needed in a lifetime.

7. Arsenic as a pollutant in groundwater can come from:
    A. modern industrial sources (pesticides and hazardous waste sites)
    B. cemeteries, when arsenic was used as an embalming fluid
    C. natural bedrock sources
    D. all of the above

8. Groundwater contamination plumes (the pathway of a pollutant from its source) are difficult to trace because:
    A. Plumes can spread thousands of feet from a source
    B. Plumes can persist for many years even after the contaminant source is removed.
    C. Both A and B
    D. There is no predictability in the way that groundwater moves

9. Arsenic poisoning is a difficult social problem to manage because:
    A. it is a newly discovered contaminant and not many doctors recognize the medical symptoms
    B. as of yet, there are no standards for acceptable levels in drinking water
    C. the source can not be discovered from the results of one well test
    D. none of the above

10. Surface tension in water is a result of:
    A. adhesion
    B. cohesion
    C. neither
    D. both

11. Adhesion and cohesion are primarily:
    A. A result of gravity
    B. A result of molecular attraction
    C. Properties of all liquids
    D. Concepts that pertain to insects

12. The following event/s take advantage of cohesion and adhesion properties:
    A. The ability of paper towels to absorb liquids
    B. Plants pulling up water from soil
    C. Insects living on the surface of water
    D. All of the above

13. Water moves through, around, and over the earth as:
    A. a liquid
    B. a solid
    C. a gas
    D. any one of the above depending on the circumstances

14. The key factor/s influencing the movement of water on the earth is/are:
    A. gravity
    B. the sun's energy
    C. electromagnetic energy
    D. all of the above

15. The movement of a water droplet on the earth is:
    A. predictable
    B. a two dimensional path
    C. changing from day to day, month to month, year to year
    D. not influenced by animals

16. The average household consumes the following amounts of water per day:
    A. 200 (760 liters) gallons
    B. 2 gallons
    C. 2000 gallons
    D. 20,000 gallons

17. Households use more water today than 100 years ago most likely because:
    A. there is a limitless supply
    B. water is treated and is therefore safer today
    C. people have easier access
    D. none of the above

18. The health of a stream is not usually characterized by:
    A. dissolved oxygen levels
    B. temperatures conducive to growth
    C. a diversity of organisms
    D. the color of the water

19. When assessing the biodiversity of a stream, the most important factors to consider are:
    A. total number of organisms found
    B. total number of different species found and type
    C. location of the organisms found
    D. size of the organisms found

20. Which sample of macroinvertebrates in a stream most likely indicates poor water quality:
    A. caddisfly larvae, mayfly nymphs, and stonefly nymphs
    B. midge larvae, rat-tailed maggots, and damselfly nymphs
    C. mayfly nymphs, dragonfly nymphs, and damselfly nymphs
    D. caddisfly larva, dragonfly nymph, and rat-tailed maggot

21. An epidemiologist is primarily interested in:
    A. the numbers of people who contract a disease
    B. the strength and type of the bacterium causing a disease
    C. identifying the source and transmission agent of a disease
    D. developing a vaccine to treat a disease

22. Most humans in the north western hemisphere don't have to worry about contracting cholera because:
    A. the water is treated for such bacterium
    B. they receive lasting immunity from vaccines
    C. the animal host that carries the bacterium is not typically found in this climate
    D. none of the above

23. An epidemic refers to:
    A. waterborne diseases
    B. diseases that occur in catastrophic proportions
    C. diseases that affect more than one country
    D. diseases that affect human beings only

24. Musicalogists believe that different cultures:
    A. each had totally unique purposes for making musical instruments
    B. all started with rhythm instruments
    C. made instruments to imitate natural sounds
    D. only used instruments in sacred ceremonies

25. Rainsticks were primarily used by cultures who:
    A. used natural products in their environment to make instruments
    B. lived in the desert
    C. lived in the rain forest
    D. grew rice

26. The sound of an instrument is determined by:
    A. the material from which it is constructed
    B. the way in which it is played
    C. the shape, or length and diameter
    D. all of the above

27. 'Best management practices' refer to:
    A. land use measures to reduce pollution in water
    B. the monitoring of point and nonpoint source pollution
    C. organic farming measures which help reduce pesticide contamination in water
    D. none of the above

28. Nonpoint source pollution is:
    A. the source of the contaminant has yet to be detected
    B. the source of the contaminant is unidentifiable
    C. a type of water pollution emanating from such places as, a golf course, a paper mill, or a sewage treatment plant
    D. a type of pollution that isn't yet regulated by a federal agency

29. Watershed investigations involve the following:
    A. rivers, lakes and wetlands in an area
    B. mining, logging, and construction in an area
    C. monitoring volume and flow rates over time
    D. all of the above

Project WET

Sample Pre and Post Questions KEY

A. Common Water

2. Circle your choice of the three major categories of water users in your community in the order of who you think uses the most water.
    A. Industrial (includes mills, processing plants, and service agencies) agricultural, and residential (cumulative)
    B. Agricultural, residential, industrial
    C. Residential, industrial, agricultural
    D. Residential, agricultural, and industrial

    Answer depends on the location.

4. Circle the major source of water for your community.
    A. Groundwater (wells)
    B. Surface water- lakes and rivers
    C. Surface water- reservoirs
    D. A combination of A and B and C.

    Answer depends on the location.

5. Is sufficient water quantity or quality more of a concern in your community among the water users?
    A. Quantity
    B. Quality
    C. Neither
    D. Both

    Answer depends on the location.

B. A Drop in the Bucket

1. What percentage of the earth's water is potable or available for drinking?
    A. 30%
    B. 3%
    C. .03%
    D. .003%

    Answer: D

2. Where is most of the earth's freshwater located?
    A. Glaciers and ice caps
    B. Groundwater (hidden underground)
    C. Surface water (lakes and rivers)
    D. Atmosphere (as a gas form or water vapor)

    Answer: A

3. If the available water on the planet were to be divided by the number of people on the planet and we assumed that distribution or access was not an issue, the calculation would show approximately that:
    A. There is not enough water for all the people to have 1 liter.
    B. There is enough water for all the people to have at least 100 liters.
    C. There is enough water for all the people to have in the millions of liters- enough for a lifetime.
    D. There is enough water for all the people to have in the billions of liters- much more than is ever needed in a lifetime.

Answer: C

C. A Grave Mistake

1. Arsenic as a pollutant in groundwater can come from:
    A. Modern industrial sources (pesticides and hazardous waste sites)
    B. Cemeteries, when arsenic was used as an embalming fluid
    C. Natural bedrock sources
    D. All of the above

Answer: D

2. Groundwater contamination plumes (the pathway of a pollutant from its source) are difficult to trace because:
    A. Plumes can spread thousands of feet from a source.
    B. Plumes can persist for many years even after the contaminant source is removed.
    C. Both A and B.
    D. There is no predictability in the way that groundwater moves.

Answer: C

3. Arsenic poisoning is a difficult social problem to manage because :
    A. It is a newly discovered contaminant and not many doctors recognize the medical symptoms.
    B. As of yet, there are no standards for acceptable levels in drinking water.
    C. The source can not be discovered from the results of one well test.
    D. None of the above.

Answer: C

D. H2Olympics

1. Surface tension in water is a result of:
    A. Adhesion
    B. Cohesion
    C. Neither
    D. Both

Answer: B

2. Adhesion and cohesion are primarily:
    A. A result of gravity.
    B. A result of molecular attraction
    C. Properties of all liquids
    D. Concepts that pertain to insects

    Answer: B

3. The following event/s take advantage of cohesion and adhesion properties:
    A. The ability of paper towels to absorb liquids
    B. Plants pulling up water from soil
    C. Insects living on the surface of water
    D. All of the above

    Answer: D

E. The Incredible Journey

1. Water moves through, around, and over the earth as:
    A. A liquid.
    B. A solid.
    C. A gas.
    D. Any one of the above depending on the circumstances.

    Answer: D

2. The key factor/s influencing the movement of water on the earth is/are:
    A. Gravity.
    B. The sun's energy.
    C. Electromagnetic energy.
    D. All of the above.

    Answer: D

3. The movement of a water droplet on the earth is:
    A. Predictable.
    B. A two dimensional path.
    C. Changing from day to day, month to month, year to year.
    D. Not influenced by animals.

    Answer: C

F. The Long Haul

1. The average household consumes the following amounts of water per day:
    A. 200 (760 liters) gallons
    B. 2 gallons
    C. 2000 gallons
    D. 20,000 gallons

    Answer: A

2. Households use more water today than 100 years ago most likely because:
   A. There is a limitless supply.
   B. Water is treated and is therefore safer today.
   C. People have easier access.
   D. None of the above.

Answer: C

G. Macroinvertebrate Mayhem

1. The health of a stream is not usually characterized by:
   A. Dissolved oxygen levels
   B. Temperatures conducive to growth
   C. A diversity of organisms
   D. The color of the water

Answer: D

2. When assessing the biodiversity of a stream, the most important factors to consider are:
   A. Total number of organisms found .
   B. Total number of different species found and type.
   C. Location of the organisms found.
   D. Size of the organisms found.

Answer: B

3. Which sample of macroinvertebrates in a stream most likely indicates poor water quality:
   A. Caddisfly larvae, mayfly nymphs, and stonefly nymphs.
   B. Midge larvae, rat-tailed maggots, and damselfly nymphs.
   C. Mayfly nymphs, dragonfly nymphs, and damselfly nymphs.
   D. Caddisfly larva, dragonfly nymph, and rat-tailed maggot.

Answer: B

H. Poison Pump

1. An epidemiologist is primarily interested in:
   A. The numbers of people who contract a disease.
   B. The strength and type of the bacterium causing a disease.
   C. Identifying the source and transmission agent of a disease.
   D. Developing a vaccine to treat a disease.

Answer: C

2. Most humans in the north western hemisphere don't have to worry about contracting cholera because:
    A. The water is treated for such bacterium.
    B. They receive lasting immunity from vaccines.
    C. The animal host that carries the bacterium is not typically found in this climate.
    D. None of the above.

    Answer: A

3. An epidemic refers to:
    A. Waterborne diseases.
    B. Diseases that occur in catastrophic proportions.
    C. Diseases that affect more than one country.
    D. Diseases that affect human beings only.

    Answer: B

I. The Rainstick

2. Musicalogists believe that different cultures:
    A. Each had totally unique purposes for making musical instruments.
    B. All started with rhythm instruments.
    C. Made instruments to imitate natural sounds.
    D. Only used instruments in sacred ceremonies.

    Answer: C

3. Rainsticks were primarily used by cultures who:
    A. Used natural products in their environment to make instruments.
    B. Lived in the desert.
    C. Lived in the rain forest.
    D. Grew rice.

    Answer: A

4. The sound of an instrument is determined by:
    A. the material from which it is constructed
    B. the way in which it is played
    C. the shape, or length and diameter
    D. all of the above

    Answer: D

J. Sum of the Parts

1. ‘Best management practices’ refer to:
   A. Land use measures to reduce pollution in water.
   B. The monitoring of point and non-point source pollution.
   C. Organic farming measures which help reduce pesticide contamination in water.
   D. None of the above.

   Answer: A

2. Nonpoint source pollution is:
   A. The source of the contaminant has yet to be detected:
   B. The source of the contaminant is unidentifiable.
   C. A type of water pollution emanating from such places as, a golf course, a paper mill, or a sewage treatment plant.
   D. A type of pollution that isn’t yet regulated by a federal agency.

   Answer: B

3. Watershed investigations involve the following:
   A. Rivers, lakes and wetlands in an area.
   B. Mining, logging, and construction in an area.
   C. Monitoring volume and flow rates over time.
   D. All of the above.

   Answer: D

WATER QUALITY & CONSERVATION

Water Conserve is a water conservation portal providing up-to-date news stories from around the world and hundreds of links to water-related sites, organized into categories. www.waterconserve.info/news/

American Ground Water Trust promotes awareness of the environmental and economic importance of ground water through educational tools such as books, conferences, pamphlets, and videos, and provides guidance in testing water quality and a consumer hotline for ground water. www.agwt.org, 800/423-7748

Groundwater Foundation works with communities to cultivate ground water awareness by sponsoring local Groundwater Guardian teams made up of business people, citizens, educators, and local government officials to assess their community's ground water protection needs and then develop a strategy to meet those needs. www.groundwater.org

Environmental Protection Agency, Office of Water and Office of Ground Water and Drinking Water, oversees the implementation of the Clean Water Act and the Safe Drinking Water Act by working with local government, states, tribes, and other partners to educate the public about the water supply and insure its quality. www.epa.gov/ow/ www.epa.gov/safewater/

U.S. Geological Survey collects and analyzes water data from around the nation and generates maps, reports, and software with information pertaining to ground water, surface water, stream flow, and water use. The Learning Web provides projects for K-12 students and lesson plans for teachers, as well as additional science education resources. water.usgs.gov

H2Ouse offers tips for water conservation in every room in your house and on your lawn, including suggestions about purchasing water-thrifty appliances and a discussion of greywater systems. www.h2ouse.org

WATERSHEDS & RIVERS

Water Alliance connects and supports local Baykeeper, Riverkeeper, and Waterkeeper programs that work to protect their communities' waterways and water quality. Waterkeepers research and advocate on behalf of their watersheds. www.waterkeeper.org

Center for Watershed Protection provides local governments, activists, and watershed organizations with the technical tools for protecting lakes, rivers, and streams and is focused on protecting small watersheds from the effects of sprawl. www.cwp.org

Clean Water Network helps you identify and investigate your watershed, including state-by-state fact sheets on water quality. Their Help Center identifies useful websites to help you work with the media on water-related issues, to find policy and legal tools, and to write

letters to the editor and to elected officials. Its "member's links" webpage connects you to organizations working in your state. www.cwn.org

The National Watershed Network is a registry of locally led watershed partnerships that you can search to identify groups that have faced issues similar to yours in their watershed. www.ctic.purdue.edu/KYW/nwn/nwn.html

National Wetlands Conservation Alliance supports wetland conservation, enhancement, and restoration with technical assistance and funding programs to help landowners become better stewards of their lands. users.erols.com/wetlandg/

America's Clean Water Foundation (ACWF), is a not-for-profit organization based in Washington, DC, that promotes youth education, public involvement, and technical program exchange for clean water. www.acwf.org/

NATIONAL ADVOCACY

Campaign for Safe and Affordable Drinking Water is an alliance of consumer, environmental, and public health organizations working to educate the public about drinking water and advocating on the federal level for safer drinking water. Provides tips on how to interpret annual "right to know" water statements, www.safe-drinking-water.org, 202/895-0420 ext. 135

World Water Monitoring Day: From September 18 to October 18, citizens throughout the world community will have an opportunity to monitor the quality of their local watersheds and enter the results of their efforts into an international database. Then, on October 18, we will celebrate World Water Monitoring Day together. www.worldwatermonitoringday.org/

Clean Water Action is a national citizens organization with 700,000 members that organizes grassroots groups and coalitions, and oversees campaigns to elect environmental candidates and solve communities' environmental problems. www.cleanwateraction.org, 202/895-0420

Public Citizen's Water for All campaign works to protect universal access to clean and affordable drinking water in the U.S. by keeping it in public hands. The campaign offers information on the issues and major players in the battle against privatization. www.citizen.org/cmep/water/

National Defense Resources Council, one of the nation's leading environmental organizations, advocates on behalf of legislation designed to protect fresh and ocean waters. NRDC also produces reports that inform the public on water issues, including "What's on Tap? Grading Drinking Water in U.S. Cities," which evaluates drinking water quality in 19 urban areas. www.nrdc.org/water/

American Rivers monitors federal legislation and the actions of federal government, oversees a dam removal campaign, tracks river-related news, and serves as a gateway to organizations around the country working to preserve rivers. American Rivers publishes "America's Most Endangered Rivers," an annual report of troubled rivers that identifies crucial decision makers and points out opportunities for the public to take action on behalf of each river. www.americanrivers.org

River Network is designed to support grassroots river and watershed conservation groups by offering assistance in fundraising, organizational development, and small grants. The website includes a directory of 3600 grassroots, conservation, river and watershed groups, local and federal agencies, and an online course on how to use the Clean Water Act to protect your local river. www.rivernetwork.org

Trout Unlimited staff and volunteers testify before Congress, publish a quarterly magazine, intervene in federal legal proceedings, and work with 500 national chapters to conserve, protect, and restore North America's trout and salmon fisheries and their watersheds. www.tu.org

BOOKS

Blue Gold: The Fight to Stop the Corporate Theft of the World's Water, by Maude Barlow and Tony Clarke, lays out the case against privatizing water in a clear and forceful manner, and suggests some ways to fight back. New Press, 2002.

Cadillac Desert: The American West and its disappearing Water, by Marc Reisner, is one of the classic texts on water in the American West. A work of both investigative journalism and historical inquiry, it explores the devastating effects of human attempts to manage and profit from water in the arid West. (Viking, 1986.) The book has been turned into a four-part video, "Cadillac Desert," Home Vision Select, 1997.

Every Drop for Sale, by Jeffery Rothfeder, an investigative journalist, explores the turmoil over the world's growing water scarcity and suggests water will be the flashpoint for future conflict. Tarcher/Putnam, 2001.

The Gift of Rivers: True Stories on Life on the Water, edited by Pamela Michael, is a collection of river stories that serves as an introduction to some of the world's leading authors who write about water. Travelers' Tales, 2000.

My Story as Told By Water, by David James Duncan, is an engaging series of essays in which the author celebrates water and watersheds and issues a call to action for their protection. Sierra Club Books, 2001.

Pillar of Sand: Can the Irrigation Miracle Last? by Sandra Postel, is one in a series of books by a leading water expert. In this book she takes up the crucial and increasingly imbalanced relationship between irrigation, food production, and population growth. Norton, 1999.

Plan B, by Lester R. Brown, tackles the major environmental challenges facing the world, including water scarcity, and proposes a global cooperative effort to preserve the world's resources. Norton 2003.

Red Delta: Fighting for Life at the End of the Colorado River, by Charles Bergman, tells the story of the Mexican delta where the Colorado River empties into the Gulf of California, an area that represents some of the best restoration and conservation opportunities on the continent. Defenders of Wildlife, 2000.

The Riverkeepers: Two Activists Fight to Reclaim Our Environment as a Basic Human Right, by John Cronin and Robert F. Kennedy, Jr, narrates the successful personal and legal battles undertaken by environmentalists and fishermen to restore the Hudson River and to hold polluters accountable for its near destruction. Scribner, 1997.

Rivers for Life, by Sandra Postel and Brian Richter, explains the importance of rivers and the benefits of keeping them free of dams. With case studies from Australia, South Africa, and the United States. Island Press, 2003.

Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters, by Robert Glennon, argues that Americans are spoiled by excessive groundwater pumping and that our habit of draining groundwater reserves faster than they can be replenished amounts to an ecological disaster. Island Press, 2002.

Water: The Fate of Our Most Precious Resource, by Marq de Villiers, provides a history of human water projects and a thoughtful overview of water conflicts and scarcity worldwide. Houghton Mifflin, 2000.

Water Wars: Drought, Flood, Folly, and the Politics of Thirst, by Diane Raines Ward, examines the history of water projects around the world, and outlines the dangers that face a water-scarce present and future. Riverhead Books, 2002.

Water Wars: A Story of People, Politics and Power, by Honey Rand, is an insider's look at the dispute over public water in west central Florida. Rand focuses on local activists and policy makers as they worked for consensus. Xlibris, 2003.

Water Wars: Privatization, Pollution, and Profit, by Vandana Shiva, argues that the world's most important conflicts are rooted in struggles over water and she identifies the human cost of dams and privatization and the droughts they cause. South End Press, 2002.

The World's Water: The Biennial Report on Freshwater Resources, 2002-2003, by Peter Gleick vol. 3, outlines a decentralized and efficient water management plan to meet the global water crisis. Gleick also reports on climate change, dams, and privatization. Island Press, 2003.

YOUTH & TEACHERS

Adopt A Watershed uses a local watershed as a living laboratory in which K-12 students engage in hands-on activities. Curriculum is designed to build over a course of years and to serve as part of the core science curriculum. The program combines classroom learning and field work. www.adopt-a-watershed.org

Catalysta.org is an online educational nonprofit that connects students and schools world wide for cross-cultural study and service-learning on global issues. It offers student forums and teacher resources for assignments, local service-learning projects, and a 10-week web-delivered curricula modules on water and globalization. The "Our Water" module is also available on CD-ROM. www.catalysta.org/pub/index.html

EcoSchools' Water Systems on School Grounds lists resources to help students and teachers identify and understand the water systems on their school grounds and to help them start related projects of their own. Case studies of water projects are available. www.ecoschools.com/Water/Water_wSidebar.html

Educating Young People About Water has a database of 151 water-related curricula that includes materials to develop community-based youth programs and to link educators with key community members in partnerships for water education. www.uwex.edu/erc/eypaw/

Give Water a Hand is a national watershed education program. Their youth Action Guide and the Leader Guidebook (for youth leaders and teachers) are easy-to-follow, illustrated guides about how to organize and carry out effective action-oriented local projects. www.uwex.edu/erc/gwah/

Groundwater University, sponsored by the Groundwater Foundation, is an annual three-day adventure at an educational center along the Platte River in Nebraska for youth ages 12 to 15. Students and teachers learn from national groundwater experts. www.groundwater.org/KidsCorner/GU.htm

Project WET (Water Education for Teachers) promotes stewardship of water resources through the dissemination of classroom-ready teaching aids and the establishment of internationally sponsored Project WET programs. www.projectwet.org

Water Recycling in Schools, the Triangle School in North Carolina reclaims wastewater on the school site through a constructed wetland, a greenhouse containing soil filters, and an aquatic ecosystem. The on-site treatment facility recycles water. A case study of the projects is available. www.waterrecycling.com/index.htm

Father Water, Mother Woods: Essays on Fishing and Hunting in the North Woods, by Gary Paulsen, is a series of autobiographical essays by a well-known author, who regularly seeks adventure in water and the wilderness. Ages 9 to 12. Delacort, 1994.

River of Words: Images and Poetry in Praise of Water, edited by Pamela Michael, is the result of an annual contest held by River of Words that invites students, ages 5 to 19, from around the world to submit poetry and art related to the topic of watersheds. Thousands of submissions are culled down to 100, which are published each year in a book. Heyday Books, 2003. www.riverofwords.org

Environmental Protection Agency, Educational Resources website. Contains material K-12, curriculum, activities, and technical documents. www.epa.gov/epahome/educational.htm

Surf your Watershed, Watersheds are those land areas that catch rain or snow and drain to specific marshes, streams, rivers, lakes or to groundwater. Locate your watershed by entering your zip code. www.epa.gov/surf/

Arkansas Watershed Advisory Group (AWAG), Arkansas specific information, website links, calendar, current projects, contacts, newsletters, and statewide citizen-based watershed groups in Arkansas. www.awag.org

Glossary

Absorption	the process by which a substance is taken into and included within another substance, i.e., intake of gases, water, nutrients, or other substances by plants.
Adsorption	the attachment of a substance to the surface of a solid or liquid.
Algae	aquatic plant-like, photo synthetic organisms, mostly microscopic and single-celled. Included among the algae are kelps and other seed weeds.
Algal Bloom	a heavy growth of algae in and on a body of water, usually caused by high nitrate and phosphate concentrations. Phosphates and nitrates are naturally occurring and found in detergents and fertilizers.
Aquaculture	the commercial production/raising of fish.
Aquifer	porous layers beneath the surface which contain groundwater. Surface water and groundwater are interconnected.
Bacteria	single-celled micro-organisms that lack chlorophyll. Many bacteria break down organic matter in the air, water and soil. Some are capable of causing disease.
Best Management Practices (BMP's)	a management activity that eliminates or prevents environmental effects of pollution.
Biomagnification	the process that occurs when toxic substances are passed up the food chain, i.e., from soil and water to plants and grazing animals to human beings.
Carcinogen	substance known to lead to or cause cancer.

Clear Cutting	the felling and removing of all trees in a forest area.
Coliform Bacteria	bacteria found in the intestines of warm blooded animals; used as indicators of fecal contamination in water quality analyses.
Conservation farming	management of farm activities in order to reduce or eliminate adverse environmental effects of pollutants and conserve soil, water, plant and animal resources.
Contamination	the introduction of a substance to a water supply that reduces the usefulness of the water to humans and other organisms in nature.
Copper	an essential component of several enzymes in plants.
DCE	organic compound; dichloroethylene; a carcinogen (see definition above).
Discharge	water that is released, as from a pipe.
Dissolved Oxygen (DO)	oxygen gas (O2) dissolved in water.
Drainage Water	surface and subsurface water from irrigated areas that may be co-mingled with precipitation, surface runoff, and groundwater flow from non-irrigated fields.
Ecosystem	organisms and their environment, seen as a unit.
Effluent	the outflow from sewage or industrial plants, etc.
Environmental Protection Agency (EPA)	US agency responsible for managing federal efforts to control air and water pollution, solid

	waste disposal radiation and pesticide hazards, and other environmental concerns.
Erodible Land	land with soils which are particularly susceptible to erosion.
Erosion	the wearing away of the land surface by running water, wind, ice or other geological agents. Accelerated erosion is wind or water erosion at a more rapid than normal or geological rates, usually associated with human activities.
Eutrophication	naturally occurring changes that take place in a water body over time, but accelerated by pollution with unwanted nutrients. The “aging” process of a water body.
Feces, Fecal	waste excretions from the bowels.
Fertilizer	any organic or inorganic material of natural or synthetic origin which is added to a soil to supply certain elements essential to the growth of the plants.
Fish Kill	the sudden death of fish due to the introduction of pollutants or the reduction of dissolved oxygen in a water body.
Flood Irrigation	water released from field ditches and allowed to flood over the land.
Furrow Irrigation	water applied to row crops in ditches made by tillage implements.
Grass Filter Strip	a strip or section of land in permanent vegetation, downslope from agricultural operations, which is used to control erosion and prevent the entry of pollutants into adjacent water bodies.

Groundwater	water that infiltrates and percolates into the earth and is stored in the soil and rock below the earth's surface.
Hazardous Waste	discarded solid, liquid or gaseous wastes that can harm humans or other animals.
Herbicide	chemicals that kill or inhibit the growth of a plant or weed.
Holding Pond	an animal waste treatment method which uses a shallow pond to temporarily store manure and other runoff for land application.
Inflitration	entry of water into the soil.
Inorganic	generally speaking, chemical compounds that do not contain carbon as the main element.
Insecticide	a chemical that destroys insects.
Intercrop	two or more crops grown together on the same piece of land at the same time.
Irrigation	the diversion of surface water or groundwater used to grow crops.
Landfill	a large, outdoor area for waste disposal; landfills where waste is exposed to the atmosphere are called open dumps which are currently against the law in the US; in sanitary landfills, waste is layered and covered with soil.
Leachate	the solution formed when water infiltrates soil and percolates downward, picking up soluble constituents from soil, landfills, etc.

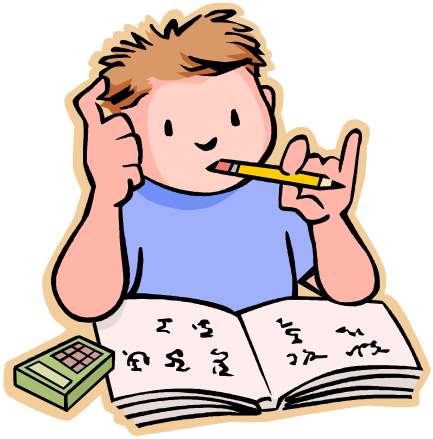
Leach/Leaching	the removal of soluble materials from a matrix (such as soil) when the substances are dissolved and move with percolation water.
Metals	electropositive elements, e.g. Na+ (sodium), Ca** (calcium), Al+++ (aluminum). Toxic metals include lead, copper, cadmium, zinc, mercury, nickel and chromium, if present in large enough quantities to be harmful.
Microorganism	an animal or plant of microscopic size, esp. a bacterium or protozoan.
Nitrate	the compound NO3-, formed when ammonium is oxidized.
Non-point Source Water Pollution	water pollution that cannot be traced to a specific point because it comes from many individual places or a widespread area.
No-till or Zero Tillage	a farming system in which a crop is planted in the residue from a previous crop without soil tillage, such as plowing.
Nutrient	element or substance that contributes to an organism's growth and health. Some nutrients are essential to completion of the life cycle.
Open Dump	an unprotected, unauthorized, open area used to dispose of loose garbage on the land's surface.
Organic	of or designating carbon compounds; derived from living or once-living organisms. Examples are oils, plant tissues, feces or wood.
Organic Fertilizer	organic material that releases or supplies useful amounts of a plant nutrient when added to a soil.

Pathogen	disease causing organism.
PCB	polychlorinated biphenyl; a chlorinated hydrocarbon; carcinogenic.
PCE	perchloroethylene; a chlorinated hydrocarbon; carcinogenic.
Percolate/Percolation	the downward movement of fluid through a medium such as soil, dissolving, and transporting soluble material.
Pesticide	any chemical or biological agent that kills plant or animal pests; herbicides, insecticides, fungicides, rodenticides, etc. are all pesticides.
Point Source Pollution	pollution that can be traced to a single point source, such as a pipe or culvert.
Pollutant/Pollution	a negative or unwanted presence or change in the character of air, water or soil that can affect the health, survival, or activities of human and other organisms in nature.
Pollution Prevention	the use of processes, practices, or products that reduce or eliminate generation of pollutants and wastes including those which protect natural resources through conservation or more efficient utilization of resources.
Precipitation	water in the form of rain, sleet, hail or snow that falls from the atmosphere onto land and water bodies.
Protozoa	microscopic organisms.

Reservoir	a body of water collected and stored for future use in an artificial or natural lake.
Riparian area	an aquatic or terrestrial ecosystem that is associated with bodies of water, such as watercourses, lakes, or wetlands.
Runoff	water that runs off the soil surface instead of infiltrating.
Sanitary Landfill	waste disposal site where waste is spread in thin layers, compacted, and covered with a fresh layer of soil each day.
Sediment	insoluble material suspended in water that consists mainly of particles derived from rocks, soil and organic materials and is a major non-point source pollutant; other pollutants may attach to sediment.
Selective Cutting	the timber harvesting practice where only selected trees are cut and the rest are allowed to remain.
Septic Tank/Septic System	a domestic wastewater treatment system into which wastes are piped directly from the home into the ground; consists of a septic tank and drain field; wastewater is exposed to bacteria that decompose the organic waste, dead bacteria and sediment settle to the bottom of the tank, and treated effluent flows out into the ground through drain pipes.
Sewage	liquid and solid waste material and debris.
Silviculture	the science and art of cultivating forest crops based on the study of the life history and characteristics of forest trees.

Sludge	solid material left after wastewater treatment of sewage.
Soil	unconsolidated mineral and organic material located on the surface of the earth that serves as a natural medium for the growth of plants.
Soil Solution	the liquid phase of the soil and its solutes.
Soluble	a material dissolved in a solvent to form a solution.
Solvent	a liquid capable of dissolving another substance.
Strip-cropping	a technique to reduce soil erosion in which the ground is left bare or a row crop is grown in conjunction with grass or a legume hay crop.
Surface Water	precipitation which does not soak into the ground or return to the atmosphere by evaporation or transpiration, and is stored in streams, lakes, wetlands, and reservoirs
TCE	an organic solvent; trichloroethylene; carcinogenic
Topsoil	the layer of soil moved in cultivation on the soil surface. Also designated as the plow layer.
Toxic Chemicals	any chemical that causes death or damage to humans, animals or plants.
Upstream	in the direction of increasing flow or head.
Urban	pertaining to areas with human population of more than 2,500.
Velocity	rapidity or speed.

Virus	various submicroscopic disease-causing organisms.
Wastewater	water used in various processes, then discarded. Sometimes used synonymously with effluent, the outflow from sewage, industrial plants, etc.
Water Cycle	the movement of water from the atmosphere to the earth and back to the atmosphere through precipitation, runoff, infiltration, percolation, storage, evaporation, condensation, and transpiration.
Water Pollution	any contamination of water that reduces its usefulness to humans and other organisms in nature.
Watershed	the total land area that contributes to a particular site.
Water Table	upper surface of the zone of saturation of groundwater, upper boundary for groundwater.
“Wildcat” Dumping	illegal or unauthorized disposal wastes.



The "Point & Name" Disease

By Petey Giroux (Georgia Project WET)

Do you have it? Chances are, if you don't, you know someone who does, for the disease is in epidemic numbers and spreading. It has found its way across southeastern school campuses and into the hearts and minds of parents and teachers everywhere. It is quite debilitating, keeping teachers indoors for days on end.

The disease preys on the brain and affects the psychomotor movement. The dreaded student question, "what is the name of the flower, tree or shrub?" seems to ignite the fever. Another symptom is the desire to LABEL everything in the outdoor learning area creating a museum/botanical garden, NOT an environmental education discovery area. Labels are often visually intrusive in a natural area and are red flags for vandals. Labels, quite frankly, impede environmental education and are the mistaken antidote for the "Point and Name" disease. If you must have labels to get well, then make a map, a diagram, or a discovery path notebook that can be kept as a reference in a media center. Let your students create it and do the research. You can sink a small section of PVC pipe, fill it with concrete and number it for a vandal proof label, if you must.

If you really want to get well, BELIEVE that you, as the teacher, are not responsible for knowing the names of all the plants and animals in the natural

world. Also BELIEVE that the name is not the most important thing to know about a tree. Much more important are the things like how the tree works, how it cleans the air, is a habitat for wildlife, how its bark feels, the shape and texture of its leaves, etc. The student, in exploring these details, forms a long lasting relationship with the plant. My fourth grade teacher assigned a report to me on a tree with no name. I had to find out everything I could about this tree and then make up my own name for it. I called it the "dancing giraffe tree." To this day I am prone to dash across creek beds or stop my car and run to the Sycamore tree that needs a hug.

Students will learn and remember what they see, touch and hear. Feeling the hairy underside of a leaf, touching the rough bark of the pine, and counting the needles in a bundle are marvelous lessons to knowing a plant. Keeping a Discovery Journal, drawing and writing about discoveries will further impact the learning. Seeing a tree labeled stops the learning process and is quickly forgotten. If a student wants to know the name, they can research it in a field guide. Learning to use field guides is an important lesson itself. Media centers can provide field guide sets for outdoor discoveries. If a student has taken the time to learn through sensory exploration, the student will truly know the plant and be able to recognize it anywhere. If a student has looked at a labeled plant, they may not be able to recognize the plant again in its varied forms.

Non-Point Sources of Pollution

Urbanization:

The urbanization and concentration of people in areas that are largely covered with imperious surfaces (buildings, driveways, roads, sidewalks, and parking lots) and the pollutants that result from their lifestyle harm our waterways. The combination of people, pollutants and pavement produces urban runoff that can carry a greater pollutant load than municipal sewage.

The amount of pollutants carried in urban runoff with storm water or snowmelt is influenced by the following factors: traffic density, littering, fertilizer and pesticide use, construction site practices, animal wastes, soil characteristics, topography of the area, percentage of impervious surfaces, atmospheric deposition, and amount of precipitation.

Pollutants transported in urban storm sewer systems to nearby waters include nutrients, bacteria, litter, soil, toxic chemicals and organic (oxygen-consuming) materials.

Construction Sites:

Construction activities can harm nearby waters in three ways. The first occurs when natural land cover is disturbed during excavation and grading operations. Soil stripped of its protective vegetation can be easily washed into nearby surface waters.

Second, storm water runoff often carries materials used on the site, such as oil, grease, paints, glues, preservatives, acids, cleaning solutions, and solvents into nearby lakes or streams. And third, inadequate planning (failure to design and construct projects with water quality factors in mind) such as peak runoff and flow routing can accelerate runoff.

Septic Systems:

Many homes are not connected to municipal wastewater treatment systems and rely on septic tanks and field lines for sewage treatment. If they are well designed, installed, and maintained, septic systems will safely treat wastewater for 20-50 years. Improper design, installation, or operation of septic systems or holding tanks can lead to pollution in surface or ground water by releasing bacteria, nutrients, and household toxic chemicals. A recent US EPA report stated that most waterborne diseases are probably caused by old or poorly designed and operated septic systems.

Septic systems use natural decomposition to treat wastes. Holding tanks do not treat wastes, but simply contain them on site. Both septic systems and holding tanks must be periodically pumped out or cleaned. Care must be taken in disposing materials removed in this cleaning. Solids cleaned out of septic systems can be land-spread since they are partially treated, but continuous spreading on a single site of land should be avoided. Wastes removed from holding tanks need additional treatment since they generally have not undergone much decomposition.

De-icing Materials:

Keeping roads safe in the winter requires the use of de-icing materials, but the stockpiling and application of these materials (primarily sand & salt) can harm surface and ground water.

Runoff from inadequately protected stockpiles of salt or sand and salt mixtures has contaminated both surface and ground water. One study estimated that if all stockpiles were covered, most of the reported cost of the environment from use of the de-icing materials would be eliminated.

Frequent or highly concentrated road salt application can cause surface water quality problems, particularly in small lakes or streams. Shallow ground water contamination may be caused by the use of de-icing materials, particularly in areas of sandy soils or karst topography (where there are direct connections, such as sink holes, between surface and ground water).

Croplands:

Storm water and snow melt runoff from croplands can carry sediments, nutrients, bacteria, and organic contaminants into nearby lakes and streams. Nitrates and pesticides can seep from agricultural lands and contaminate underlying ground water supplies. By volume, sediment is the pollutant entering waters in the largest quantity. Cropland erosion is the most significant source of sediment.

Good water quality and soil erosion management practices by individual land managers is the key to stopping valuable soil loss. This also protects water quality by preventing the movement of sediment and other pollutants from croplands to waters.

Livestock Operations:

Animal feedlots are defined as lots and buildings used to confine animals for feeding, breeding, raising, or holding purposes. This definition includes open ranges for feeding and raising poultry, but does not include pastures.

Poor or inadequate feedlot management can allow storm water runoff to carry pollutants from accumulation manure into surface and ground waters. The national trend has been toward the construction and operation of fewer, but larger and more specialized livestock and poultry farms.

Feedlots can create significant pollution problems. Pollutants coming from animal feedlots include nutrients, oxygen-demanding materials, and pathogens that may affect humans and animals. High nitrate levels in ground water have been associated with improper storage of animal manure.

Fertilizers:

Nitrogen, phosphorous, and potassium are the three primary nutrients applied to crops, gardens, and lawns as fertilizers. Phosphorus and nitrogen entering water bodies in runoff from over fertilized areas can cause nuisance conditions, such as heavy algal blooms and excessive weed growth, making lakes unsuitable for swimming, waterskiing, and other uses.

The presence of nitrates in rural well water presents a risk to infants under six months old whose formula is prepared with nitrate-contaminated water. Young infants lack the ability to handle high levels of nitrate and may develop methemoglobinemia (blue-baby syndrome), a disease impairing the ability of blood to carry oxygen throughout the body. Studies have indicated

that nitrogen in fertilizers and manures is a probable source of elevated nitrate concentrations in rural ground water supplies.

Pesticides:

Pesticides are used to control undesirable plants or animals. They include herbicides, insecticides, fungicides, and rodenticide. Pesticides are used on agricultural lands, on urban and suburban lawns and gardens, as aquatic nuisance controls in lakes, and in forest management.

Pesticide application can lead to ground water contamination. Surface waters can be contaminated by drift from pesticide spraying and by runoff from pesticide-treated soil. Both surface and ground waters are vulnerable to contamination by storm water runoff flowing from storage, mixing, loading, and spray-tank cleaning areas.

Mining Activities:

Mining activities can cause dramatic changes in surrounding watersheds. Lakes, streams, and ground water can be polluted by sediment, tailings, dust, chemicals, and wastes from open pit, strip and underground mines.

Regulations to control mining activities have been instituted at both US Federal and State levels. The National Pollutant Discharge Elimination System (NPDES) permit program administered by state agencies regulates discharges from industries into state waters and is used as a tool to regulate pollution from mining.

Forest Practices:

Waters in forested areas usually are of very high quality, so pollution, when it does occur, is likely to harm a valuable and relatively sensitive ecosystem. Forestry activities that can transfer pollutants from land to water are road construction, clearing land for fire breaks, stacking and loading operations during harvest, medical site preparation, controlled burning for site preparation, and application of pesticides and herbicides.

Many large forested areas are managed by the US Forest Service and state agencies. These agencies have authority to protect water quality by regulating forestry practices on public lands. Establishing effective forest management practices on private land is the primary concern for continued water quality protection from forestry activities.

Source: Tennessee Valley Authority Teacher/Student Water Quality Monitoring Network Fall Workshop Teacher Guide, TVA, Norris, Tennessee, 1992.

At Your Fingertips...

To check out all of the Project WET materials, publications, and programs available go to www.projectwet.org

Kids In Discovery Series (KIDS)

These colorful, 16-page activity booklets are designed for upper elementary and middle school-aged students. Creative and hands-on investigations, stories, games, and experiments stimulate understanding of each booklet's water-related topic. These informative, inexpensive booklets make excellent handouts to complement school curriculum or public education efforts. The series currently includes over **twenty unique titles**, with three booklets available in **Spanish**.

Discover a Watershed

The Discover a Watershed series is for anyone interested in learning and teaching about the watershed in which they live. Educators guides in this series include the general **Watershed Manager Educators Guide** as well as guides that are specific to watersheds in North America and Mexico (**Colorado**, **Missouri**, **Rio Grande/Bravo**). Each guide contains activities and reference material covering hydrology, plant and animal communities, water management systems, basin economy, priority issues, cultural history, and more.

Healthy Water, Healthy People

The Healthy Water, Healthy People program offers innovative, easy-to-use materials designed to make complex water quality concepts understandable and relevant for both teachers and students. The testing kits and publications were developed by teachers working with water quality experts and appeal to beginning and advanced educators alike. In addition

to the **Educators Guide and Testing Kit Manual**, we offer a variety of **water testing kits** – including the new **MacroPac Macroinvertebrate Investigation Kit**.

Project WET Kits

WET activities are now available as kits. The WET Kits save time, energy, and money by supplying all necessary activity materials in one convenient package. For example, the **Incredible Journey Kit** contains everything needed to teach students about the journey of water molecules as they travel through the water cycle. The WET Kits make it easy to give a professional presentation that conveys universal concepts about water with great visual impact.