

# Dragonfly Gazette

## OLSEN on the OCEAN

**M**argaret Olsen is the Education Specialist for the Southeast Center for Ocean Sciences Education Excellence (COSEE SE). The mission of COSEE SE is to "spark and nurture collaborations among scientists and educators to advance ocean discovery and make known the vital role of the oceans in our lives."

Margaret's career spans more than 30 years, much of it spent in the classroom captivating students with her passion for the mysteries of the sea. She created activities that helped her and many other teachers bring the ocean alive, even when it was hundreds of miles away. The Coastal Resources Division of the Georgia Department of Natural Resources published her curriculum: *Georgia's Wetland Treasures* and the Sapelo Island National Estuarine Research Reserve published her curriculum *Sapelo Island: Georgia's Coastal Treasure*.

Margaret led the charge for improving how ocean sciences are taught in K-12th grade by serving as president of the Georgia Science Teachers Association (GSTA) and the Georgia Association of Marine Educators (GAME). Through her leadership, GSTA developed a program that trains teachers to conduct science workshops for other teachers in their communities, and GAME initiated annual conferences for marine educators.

Today Margaret participates in cutting edge research of marine ecosystems with some of the field's leading scientists. She develops opportunities for classroom teachers to experience the work first-hand through COSEE SE training events such as the Ocean Sciences Education Leadership Institute.



Margaret Olsen, Education Specialist for tGOSEE

Earlier this year, the Environmental Education Alliance of Georgia honored Margaret's long time contributions to marine education with the Dr. Eugene Odum Lifetime Achievement Award. Like Dr. Odum, who spent more than forty years educating others about Georgia's environment, Margaret is committed to sharing her passion with others.

In this interview, Margaret explains why and how Georgia's teachers should connect their students to the Atlantic Ocean.

### 1. Describe one of your best memories teaching students about marine ecosystems. What were you doing and how did the students react?

We always had aquariums in my classroom and the students were responsible for their care. I had students who would come in everyday to check on their fish and then they brought in friends and the friends brought in friends and before I knew it, I was having a class before school even started. A parent of one of the students that I didn't even teach told me that I had turned her son around and he (who had been a severe behavior problem both at home and at school) had begged for his own aquarium and then went on to major in marine science!

### 2. If you could ensure that every citizen in Georgia understood one thing about the ocean, what would that be? What do you think is the most important thing teachers can share with their students about the sea?

That everything that they put into the water where they live eventually gets to the sea. Whether it is the soap they use to wash their cars or the fertilizer a farmer uses on his crops, or the millions of gallons of oil that run off our highways after every rain.

Continued on Page 10

### EDITORS NOTE

**This issue of the Dragonfly Gazette features a number of resources to help teachers teach about the Atlantic Ocean.**

**Page 3** - Georgia Project WET Facilitator Workshop on the Coast; SCAME and GAME Conference

**Page 4-7** - How to Read A Fish - Lesson Plan

**Page 10** - Activity Books for Students

**Insert** - How do water use and land activities upstream affect coastal ecosystems? - Make the Georgia Connection Part 1

**Insert** - The Georgia Performance Standards and Marine Education - Make the Georgia Connection Part 2

For more information visit the Dragonfly Gazette section of the Georgia Project WET Web site, [www.gaprojectwet.org](http://www.gaprojectwet.org).

## Congratulations to the Georgia Students Honored in 2006 River of Words Youth Poetry & Art Contest!

The results are in for the 2006 River of Words Youth Poetry and Art Contest. Congratulations go to the 14 Georgia students honored through the International River of Words program and the 40 students who received State River of Words awards. Over 18,000 entries were received from around the world for the International contest and 3,000 of those were from Georgia!

### National Grand Prize in Art

Kieran McElvaney, 9, High Meadows Elementary in Alpharetta, Georgia, teacher Brenda Major, from Category II (Grades 3-6) is one of eight National Grand Prize Winners honored April 22 at a public ceremony at The Library of Congress in Washington, DC. The national art winners are chosen by children's book author and illustrator Thacher Hurd. Winning art from children around the world—including this year's International Prize, awarded to an 11-year-old girl from Hong Kong—was displayed in the San Francisco Public Library's Fisher Children's Center throughout the month of April.

### The following Georgia students were named National Finalists in Poetry:

Ting Gou, age 16, Parkview High, Lilburn, Teacher- Mary Huie // Cherishma Patel, age 13, South Forsyth Middle, Cumming, Teacher- Molly Hembree // Ann Fowler, age 16, North Gwinnett High, Suwanee, Teacher- John Bush // Taylor Volkman, age 17, North Gwinnett High, Suwanee, Teacher- John Bush // DeZaun Olive, age 16, North Gwinnett High, Suwanee, Teacher- John Bush

### The following Georgia students were named National Finalists in Art:

Andrew Christie, age 8, Pharr Elementary, Snellville, Teacher- Staley Smith // Jennie Lee, age 14, Fayette Co High, Fayetteville, Teacher- Peggy Paladino // Zach Pitcher, age 10, Bel Air Elementary, Evans, Teacher- Camille Spires // Mary Van Wert, age 14, Rising Starr Middle, Fayetteville, Teacher- Debbie Barrett // Julie Swerdlow, age 17, Druid Hills High, Atlanta, Teacher- Betsy Eppes // Vincent Owens, age 17, Druid Hills High, Atlanta, Teacher- Betsy Eppes // Maia Wells, age 17, Druid Hills High, Atlanta, Teacher- Betsy Eppes // Alex Jones, age 17, Druid Hills High, Atlanta, Teacher- Betsy Eppes

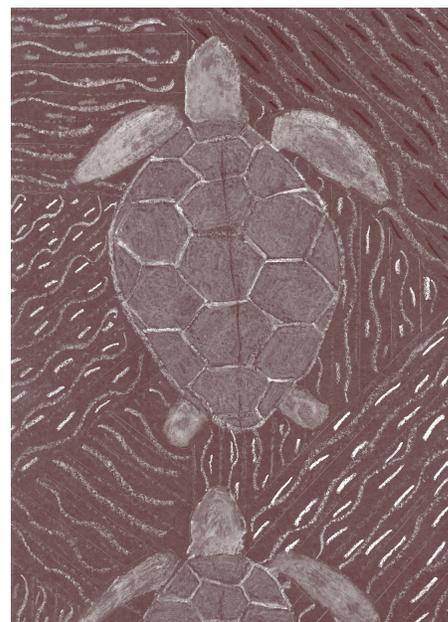
Entries from Georgia were judged again for the State River of Words contest and the students were honored in a ceremony held in May at the Chattahoochee Nature Center in Roswell. The winning Georgia state and national entries will be reproduced in a printed journal and displayed in 2 traveling exhibits. One exhibit is managed by the Georgia Center for the Book and sent to libraries throughout the State. The second exhibit is available for free checkout to educators, festivals, conferences, nature centers, and other interested parties.

### The following Georgia students were named State Winners in Poetry:

Megan Evnson, Grade 2, Ocee Elementary, Alpharetta, Teacher-Ann Scott Hanks // Laura Kemp, Grade 2, High Meadows, Roswell, Teacher- Christine Robie // Lillian Shoji, Grade 2, High Meadows, Roswell, Teacher- Christine Robie // Jacob D. Spivey, Grade 1, Mansfield Elementary, Mansfield, Teacher- Jennifer Jones // Shuchi Goyal, Grade 5, Shakerag Elementary, Duluth, Teacher- Linda Thomas // Katie Murphy, Grade 5, Queen of Angels Cath. Sc., Roswell, Teacher- Peggy DeGance // Larissa Romanow, Grade 6, JC Booth Middle, Peachtree City, Teacher- Jennifer Ritter // Sara Adams, Grade 6, JC Booth Middle, Peachtree City, Teacher- Jennifer Ritter // Christiaan Vanderlinde, Grade 5, Big Creek Elementary, Cumming, Teacher- Susan O'Malley // Taylor Lovell, Grade 5, Columbia Co. 4-H, Martinez, Teacher- Shirley Williamson // Zac Hendrix, Grade 3, Upson Lee South, Thomaston, Teacher- Sheryl Farr // Samantha Bostick, Grade 4, Armuchee Elementary, Rome, Teacher- Marsha Lindsey // Amanda Smith, Grade 7, Mt. Pisgah Christian, Alpharetta, Teacher- Melinda Willis // Lauren Anderson, Grade 8, JC Booth Middle, Peachtree City, Teacher- Jennifer Ritter // Charlotte Cook, Grade 7, Mt. Pisgah Christian, Alpharetta, Teacher- Melinda Willis // Amie Delong, Grade 9, Maranatha Christian Academy, Oakwood, Teacher- Lyndrid Patterson // Andrew Mistretta, Grade 12, Chamblee High School, Chamblee, Teacher- Diana Lynn Farmer // James Sullivan, Grade 11, Alpharetta High School, Alpharetta, Teacher- Carol Graham // Kristen Clayton, Grade 12, Chamblee High School, Chamblee, Teacher- Diana Lynn Farmer // Brett Bennett, Grade 10, Holy Innocents' Episcopal School, Atlanta, Teacher- Renee Gracon

### The following Georgia students were named State Winners in Art:

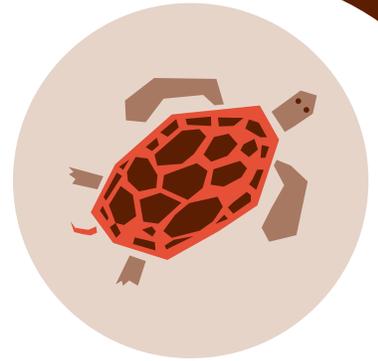
Samhitha Cinthala, Grade 2, Shakerag Elementary School, Duluth, Teacher- Linda Thomas // Graham Daker, Grade 1, Casa Montessori School, Atlanta, Teacher- Hedwig O'Brien // Ariel Diaz, Grade 2, Shakerag Elementary School, Duluth, Teacher- Linda Thomas // Bhaavya Sinha, Grade 2, Shakerag Elementary School, Duluth, Teacher- Linda Thomas // Nora Wichmann, Grade 5, Fernbank Elementary School, Atlanta, Teacher- Jill Brown // Maliya Wells, Grade 5, High Meadows Elementary School, Roswell, Teacher- Brenda Major // Tyreek Morrison, Grade 6, Luella Middle School, Locust Grove, Teacher- Judith Beekman // Kai Huggins, Grade 4, Fernbank Elementary School, Atlanta, Teacher- Jill Brown // Allison Bachner, Grade 6, The Davis Academy, Atlanta, Teacher- Michelle Stein // Rachel Tadesco, Grade 8, J.C. Booth Middle School, Peachtree City, Teacher- Jennifer Ritter // Hilary Cole, Grade 8, West Coffee Middle School, Douglas, Teacher- Donna Gower // Kelly Jones, Grade 9, Fayette County High School, Fayetteville, Teacher- Peggy Paladino // Amanda Kidd, Grade 9, Pinewood Christian Academy, Bellville, Teacher- Diane Hathaway // David Patterson, Grade 9, Maranatha Christian Academy, Oakwood, Teacher- Lyndrid Patterson // Laura Katherine Davey, Druid Hills High School, Atlanta, Teacher- Betsy Eppes // Terry Keys, Grade 12, Druid Hills High School, Atlanta, Teacher- Betsy Eppes // Chris Mayer, Druid Hills High School, Atlanta, Teacher- Betsy Eppes // Zach Grimes, Grade 10, Holy Innocents' Episcopal School, Atlanta, Teacher- Renee Gracon, Wendy Jackson Megan Maller, Grade 11, Chamblee High School, Chamblee, Teacher- Kimberly Landers Tyler Anderson, Grade 12, Holy Innocents' Episcopal School, Atlanta, Teacher- R.Gracon, Judi Jacobs



Turtle Tagalong, Nora Wichmann, grade 5, Fernbank Elementary School, Atlanta, teacher: Jill Brown, State Winner

# WET WORKSHOPS

VISIT THE [www.EEinGEORGIA.org](http://www.EEinGEORGIA.org) CALENDAR FOR THE LATEST INFORMATION ON AVAILABLE WORKSHOPS.



## PROJECT WET ON THE COAST FACILITATOR WORKSHOP

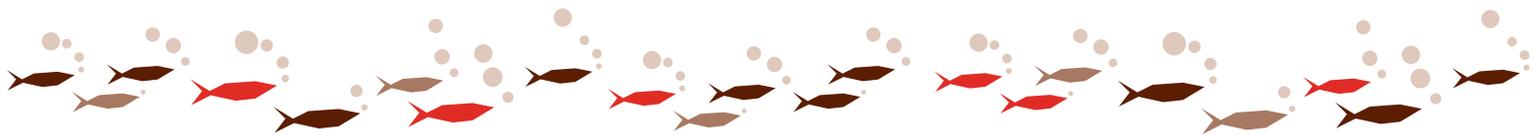
**November 1-3, 2006**

University of Georgia Marine Extension Service  
Marine Education Center and Aquarium, Skidaway Island, Savannah, Georgia

Become a Project WET Facilitator, and help K-12th grade teachers bring more than 90 innovative, interdisciplinary activities correlated to the Georgia Performance Standards to the students in your community. The workshop will certify participants as Project WET facilitators to conduct training for adults. Facilitators lead at least one Project WET workshop for teachers each year.

Join the Project WET staff of the Georgia Department of Natural Resources (DNR) Environmental Protection Division (EPD) at this ocean-themed training and get submersed in marine education resources. Co-hosts for the event include the Center for Ocean Sciences Education Excellence SouthEast, DNR Coastal Resources Division, and the University of Georgia Marine Extension Service.

Registration materials will be available in August. For more information visit [www.projectwet.org](http://www.projectwet.org) or contact Petey Giroux at [Petey\\_Giroux@dnr.state.ga.us](mailto:Petey_Giroux@dnr.state.ga.us) or 404-675-1638 .



## South Carolina Marine Educators Association and Georgia Association of Marine Educators Association Joint Conference

**October 20-22, 2006**

Seabrook Island, SC

<http://oceanica.cofc.edu/scmea/conf2006fall.htm>

The Conference will include hands-on workshops, presentations and a keynote address on marine turtles by Dr. David Owens, Director of the Graduate Program in Marine Biology, College of Charleston. Attendees are invited to join in plenary and concurrent sessions, guided field trips to local marine habitats, planned and unplanned social activities and a generally informative, social and fun weekend.

# HOW TO READ A FISH

By Margaret Olsen, COSEE SE Education Specialist

Adapted from an activity of the same name written for the Ocean Society Fish Curriculum.

## Grade Level: 5-12

### National Standards:

Grades 5-8: Life Science Content Standard C: Regulation and Behavior;  
Diversity and Adaptations of Organisms

Grades 9-12: Life Science Content Standard C: Behavior of Organisms

Purpose/Focus Question: How are fish adapted to living in their environment?

Objective:

To predict where a fish lives and feeds by studying the adaptations of its body.

### Materials:

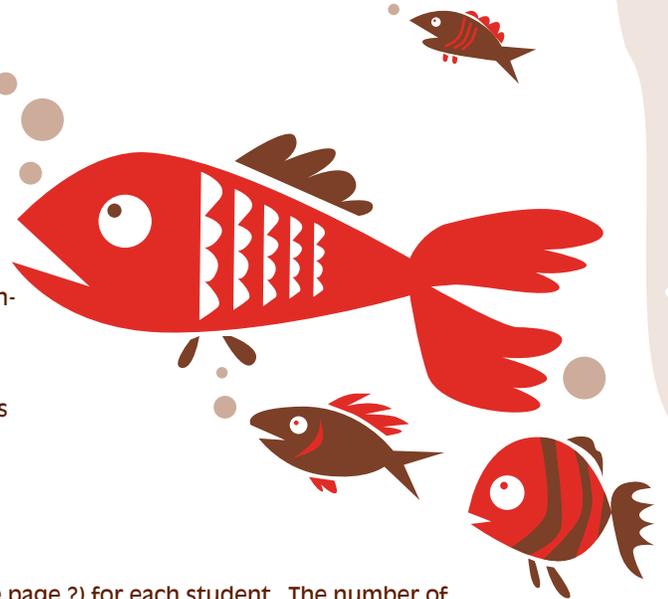
- Preserved fish specimens, fish models, or fish pictures
- Background Information for "How To Read A Fish" – see page ?
- Several copies of the Student worksheet for "How To Read A Fish" (see page ?) for each student. The number of copies will depend on how many specimens or pictures the students are to identify.
- Fish identification guides may also be helpful

### Where to Obtain Fish Specimens!

1. Local fish markets usually have a good variety of fish. If you tell them that you are a teacher and what you will be using the fish for, they may give them to you free.
2. If you live near the coast, ask a local shrimper to save you a variety of fish specimens from his by-catch.
3. If you like to fish or know someone who does, catch your own fish from area lakes, rivers, or streams.
4. Visit the Dragonfly Gazette section of the Georgia Project WET Web site, [www.gaprojectwet.org](http://www.gaprojectwet.org), for sixteen illustrations of fish by Marsha Ward. Use fish keys to color them prior to the activity. Cut each drawing out and laminate them.
5. Some art supply companies carry plastic or rubber fish models (check with your art teacher for a catalogue).

### Background Information:

Fish are members of the phylum Chordata and they, like humans, have backbones. There are five major characteristics that all fish have in common. Most have backbones, are aquatic, breathe through gills, and are cold-blooded. Fish also have several features that enable them to survive in their environment. They are all covered with scales and mucus, which serve as a protective outer covering. Fins enable the fish to swim, turn, stop and remain upright in the water. Fish have adapted well to their environment, and this is seen through their body shapes, camouflage, mouth positions and various behaviors. By observing a fish's body shape, its behavior, mouth position, fin position and swimming style, one can describe where the fish probably lives and how, and sometimes what it eats.



**Fins:** Fins give fish mobility, stability and maneuverability. They are used in swimming, turning (steering), stopping (braking), and perching. Each fin is moved by a set of muscles. Some fish have developed special uses for fins. There are two types of fins: paired (two) and unpaired, or median (one) fins.

**A.** The dorsal fins are unpaired median fins that have spiny or soft rays. They act as keels and prevent the fish from spinning or rolling. They keep fish upright in water or stabilized so they can swim straight. Some fish use their dorsal fins to swim. Some fish will have only one dorsal fin while others may have two or three. The front part of the dorsal fin is generally thicker than the rear part, which is thinner and without spiny rays. Some fish like the triggerfish undulate the dorsal fins for swimming power. The dorsal fin of remora is modified into a suction disk for attachment to larger fish.

**B.** The caudal fin or tail fin is an unpaired median fin. The caudal fin helps to propel and maneuver fish. It is most often used to generate swimming power and to assist in braking, turning, or stopping. Caudal fins appear in a variety of shapes, and the shape determines how fast a fish can swim. Caudal fins with lobes of equal size are HOMOCERCAL and caudal fins with lobes of unequal size are called HETEROCERCAL and give lift to the fish. The CAUDAL PEDUNCLE is where the tail is attached to the body. If the caudal peduncle is narrow and the caudal fin is forked, the fish is a fast swimmer.

**C.** The anal fin is an unpaired median fin that is located near the tail. The anal fin is a stabilizing fin.

**D.** The pectoral fins are paired fins (there are two of them). They work like arms and legs and are used for turning and braking. Some fish have unusual adaptations for their pectoral fins. The Searobins use them to crawl. Skates and rays use them to swim and flying fish use them for gliding through the air.

**E.** Pelvic fins are also paired fins. They are used for stabilizing and braking. Some fish have special adaptations for pelvic fins. Some fish use their pelvic fins for walking or perching. Male skates use their modified pelvic fins for mating. Pelvic fin is absent from fish like eels, enabling them to swim through tight places.

**Body Shape:** Fish tend to have body shapes that are most suited for where they live and feed. Each shape is advantageous for a different lifestyle.

**A.** The fusiform body shape is rounded or torpedo shaped and streamlined which is an ideal shape for fast continual swimming. Fish with this body shape are well adapted for feeding and survival in open water because the fusiform shape creates minimal drag as the fish swims through the water.

**B.** The compressed body is flattened from side to side allowing the fish to turn easily and move quickly. Fish with a compressed body shape rely on quickness and agility rather than speed or camouflage to capture prey and avoid predators. This body shape is well suited for schooling, maneuvering around obstacles and coral reefs, and living around wrecks, rocks, or pilings.

**C.** Fish with a depressed body shape are flattened from top to bottom. This body shape is good for living on the bottom.

**D.** Fish that have an elongate or attenuated body shape are long and thin. This body shape allows fish to hide in holes and burrows, in plants and crevasses. Fish with elongate bodies are quick action, lie-in-wait predators.

**E.** Other: Some fish have body shapes that do not fit the above descriptions:

1. Fish with a square body or truncate body shape are slow swimmers. They rely on camouflage and other special adaptations to capture prey and avoid predators.

2. Fish with round bodies have a globiform body shape. These fish are also slow swimmers relying on camouflage and other special adaptations to capture prey and avoid predators.

**Mouth Position:** How and where a fish eats is determined by the position of the mouth.

**A.** Fish with a terminal mouth position have a mouth at the end of the head (middle). These fish either chase their food or feed on what is ahead of them. They are usually aggressive, fast swimmers. If they are fast swimmers they may be a predator. Those that can maneuver quickly are probably grazers or pickers.

**B.** The superior mouth position is when the mouth is upturned or near the top of the head. Fish with this mouth position feed on food that is above them and are either a predator or a strainer.

**C.** If a fish's mouth is down-turned or on the bottom of the head, it is in the inferior position. These fish usually feed off the bottom and are either predators or bottom dwelling scavengers or grazers.





**Color and Pattern:** The color and pattern of designs on the fish's body creates camouflage, which provides protection from predators.

- A. Striped: lines run from tail to head
- B. Banded or barred: colors run around the body
  - banded: colors run completely around the body from top to bottom
  - barred: colors run part way around the body from top to bottom
- C. Spotted or Speckled:
  - Spotted: large spots
  - Speckled: small spots
- D. Marbled: The colors all run together with no particular pattern, but they are not solid.
- E. Countershading: Many fish are dark on the top and light on the bottom. This serves as a good camouflage. When looking down on the fish it blends with the darker deeper water, and when looking up, the fish blends with the light from above.
- F. Brightly colored reef fish blend in with the coral.

**Swimming Style:** Fish have developed swimming styles to aid them in feeding, escaping from predators and in moving around in their habitats.

- A. Carangiform is the most common swimming style. The tail makes wide sweeps through water and is used by fast, strong swimmers in open pelagic water. Most fish with the carangiform swimming style are active predators.
- B. Fish that swim with the ostraciform swimming style keep their body rigid while vibrating the tail. They are usually slow swimmers relying on camouflage or spines for protection.
- C. A fish that uses the anguilliform swimming style moves like a snake through the water. This swimming style is typical of elongated fish and fish with small fins.
- D. Some fish do not fit into the above categories of swimming styles. Some fish use fins other than the caudal fin for swimming. These fish use precise maneuvers and usually feed off stationary food. Burrfish row with their pectoral fins. Triggerfish and angelfish undulate their dorsal and anal fins to swim. Seahorses vibrate their dorsal and pectoral fins.

**Habitats:** The fish in a particular habitat will not all look or act alike. However, they will exhibit the body structures, swimming styles and behaviors that are advantageous to living in their particular habitat. When attempting to determine where a fish lives, one must consider the combination of body shape, mouth position, and swimming style, as well as fin shape and placement.

- A. In the pelagic zone or open water, fish must rely on speed to capture prey and escape predators. They must be capable of swimming continuously and producing high speed with quick acceleration. The typical body shape of the pelagic zone is fusiform. Schooling fish typically possess a somewhat compressed body. Pelagic zone fish usually have a forked or lunate tail and swim in carangiform style. The mouth position of predators is usually terminal and upturned if the fish is a plankton eater.
- B. Fish that live around underwater structures such as wrecks, rock, reefs, or pilings must be able to maneuver around obstacles. Maneuverability is much more important to these fish than speed. The most common body shape is compressed and the swimming style either ostraciform or with fins other than the tail. The mouth is usually in the middle of head because these fish are mostly grazers and pick food off of underwater structures.
- C. Bottom or benthic dwelling fish either rest on or swim close to the bottom. If they rest on bottom, their body shape is usually depressed and they rely on shape, coloration, and camouflage to escape predators and capture food. Bottom feeding fish typically have a mouth in the down-turned position. If a benthic fish feeds off animals swimming above it, its mouth will probably be upturned. There are, of course exceptions; drums have compressed bodies which may be slightly flattened on the ventral side with mouths set low on the head, usually in a down-turned position. Flounders have a compressed body and mouths in the center of their head (they lay on their sides on the bottom).

### Procedure:

1. If you are using the fish drawings, enlarge them, then color and laminate them prior to using.
2. Number each specimen, picture, or model and place them around the room.
3. Students should move from specimen to specimen and answer the questions on the student worksheet for each fish.

## STUDENT WORKSHEET FOR "HOW TO READ A FISH"

*Directions: Answer all the questions below for each of the preserved fish specimens, models, or fish pictures provided by your teacher. (You will need enough sheets to answer the questions for all specimens or for the number assigned).*

**Specimen # \_\_\_\_\_ Specimen # \_\_\_\_\_ Specimen # \_\_\_\_\_**

### 1. Color and Pattern:

- Are there signs of counter shading? If so, describe it.
- Is the coloration striped, banded, bared, spotted, or speckled? Describe how. If none of the above is present, describe the coloration
- Explain how the fish's color is an adaptation for it's habitat or in what habitat does the fish probably live?

### 2. Fins:

- How many dorsal fins are there?
- Is the caudal fin forked or unforked?
- Describe the caudal peduncle.
- Describe anything you notice that is extraordinary about the fins.
- Is there an anal fin? If so describe it.
- Describe the pectoral fins.
- From the fin descriptions, would you say that this fish was a fast or slow swimmer?

### 3. Body Shape:

- Is the body shape fusiform, compressed, depressed, elongate, truncate or globiform?
- Describe the body shape in words.
- What is this fish's body shape probably adapted for?

### 4. Mouth Position:

- Is the mouth located in the terminal, superior or inferior position?
- Where does this fish probably feed?

### 5. Predict from the above features of each fish:

- It's swimming style and speed (fast or slow).
- It's habitat: Pelagic (open water), underwater structures (wrecks, pilings, reefs) or benthic (bottom).



*Conclusions: In your own words, explain how the adaptations of a fish's body (its coloration, body shape, mouth position, fin positions, and swimming style), determine where it lives and feeds.*

# Soaking Wet

This section of the Dragonfly Gazette recognizes Project WET Facilitators, Teachers and Schools and provides a place for them to share their ideas and accomplishments.

## Award-Winning Facilitator, Teacher, and School

On Saturday, March 18 at the Georgia Environmental Education Awards Ceremony at the Environmental Education Alliance of Georgia's annual conference, Georgia Project WET presented the Facilitator of the Year award to Dawn Hudson for her leadership in Paulding County. Ken Suttles received the WET Teacher of the Year award for giving his students life-changing water education experiences, and Armuchee Elementary School's commitment to "Using the Environment as an Integrating Context for Learning," specifically local water resources, earned it recognition as the Project WET School of the Year.

## Georgia Project WET Facilitator of the Year — Dawn Hudson, Paulding County Schools



In November 2005, Dawn, the Science Specialist for Paulding County Schools, organized an event that has never been done before in Georgia. She coordinated an intensive two-day facilitator training for over 30 teachers using all three of the Projects – Learning Tree, WET and WILD. In the last issue of the Dragonfly Gazette (Winter 2006), Dawn explained why and how she coordinated this training. Below, she elaborates on her plan for teachers in Paulding County Schools to USE the Project WET Curriculum and Activity Guide.

### 1. What are your expectations for implementing WET throughout Paulding County?

Establishing a teacher who is a facilitator and a user of the materials in his/her own classroom sends a message to the teachers at the school. The message is that environmental education is pertinent, "real life" (what could be more real?), GPS-based, easily facilitated through inquiry, and most importantly, cross-curricular. Another advantage of having the trainer on the school grounds is to have the resource close by. If teachers feel timid or feel they did not have enough time in training to quite feel comfortable with the material, they have a resource down the hall.

When the redelivery of Projects WET, Wild and Learning Tree occur in the 2006-2007 school year in Paulding, the trainers can gear it toward their local school schedule. For example, one school may have local in-service days in the fall where they choose to redeliver the training whereas another school decides they want to all meet on a couple of Saturdays.

### 2. Now that over 30 teachers have been trained as WET facilitators in Paulding, how do you plan to motivate them to do workshops at their schools?

Motivation for the curriculum is not an issue. Many teachers have already heard about the courses, and I had more than enough teachers volunteer their time to become state trainers. The books themselves are motivation for teachers to come to the classes. In fact, in Paulding the trainers only received books, free substitutes to cover their classes during their training period and lunch. We did not pay a supplement, although we did give PLU credit.

### 3. Do you plan to offer any incentives to facilitators in Paulding to conduct workshops?

By having teachers volunteer to be trainers, it was not a "forced issue" and the teacher trainers already have buy-in. Also, when they volunteered, I made it clear that my expectation was for them to redeliver the training at their own school the following year. Since we have three levels of trainers - elementary, middle and high they can pick and choose activities and units that are specific to the GPS in science at their own level and differentiated for learners at their specific schools.

### 4. Is there a time frame you have in mind for implementation of the workshops at the schools?

We have received word from the Department of Education that our Math Science Partnership grant was funded for the 2006-2007 year. A portion of the funds will be used to buy a full set of books (PLT, WET, WILD and Conserve Water) for EVERY teacher in EACH school. The trainers agreed to provide training for the teachers in their schools in the following school year.

### 5. What do you expect the outcome of offering workshops in all the schools will be?

Have you taken time to look lately at the cost of Professional Learning Courses? On average, it costs a school system \$300 per day to train a teacher for a one-day workshop including materials, substitutes and a trainer. However, if you add up the cost of Projects WET, WILD, Project Learning Tree, Conserve Water, the additional modules in Project Learning Tree, and Aquatic Wild, it only costs \$90 plus a substitute! Teachers receive so many useful materials from this training that they literally cannot carry them in their arms.

The final outcome is to increase teacher content area knowledge and pedagogy in environmental education, aligned with state and national science standards for a resultant increase in inquiry and content test scores in science county-wide. And if more schools adopt this program and model, it will increase scores state-wide. Even more importantly, it will provide an awareness of environmental issues to students and create better citizens who react and reflect toward the world around them.



# Soaking Wet

## Georgia Project WET Teacher of the Year Ken Suttles, West Coffee Middle School



**K**en Suttles walks the talk for water. He also swims and boats. In 1997 he swam 140 miles of the Altamaha River to promote awareness of this Georgia treasure. In 1998 he swam 120 miles of the Mississippi River. He boated an additional 1000 miles and documented the problems he saw. He uses these slides to help his eighth-grade students compare and contrast the Mississippi and the Altamaha.

Mr. Suttles strives to instill in his students an appreciation of water, the need to protect and conserve water, and the knowledge and tools to accomplish their goal. His classes organize and present "RIVER DAY" each year. In 2006, 85 students set-up "stations" and teachers from nearby elementary schools brought 550 third graders to learn from the eighth graders about water science, water fun, water safety, and the history and geography of Georgia Rivers.

## Georgia Project WET School of the Year Armuchee Elementary School, Rome

**A**t Armuchee Elementary School, students have established the Green Tree Frog as the State Amphibian, and planted a grove of nearly extinct Chestnut trees on the Berry College campus. They have also made rain barrels and given them to community residents to conserve water. Students even built a river model on campus so teachers and students can learn about local water resources.

The model demonstrates how the Oostanaula and the Etowah Rivers converge to form the Coosa River in downtown Rome, and how the Coosa River flows into Lake Weiss in Alabama. To create the model, students moved three dump truck loads of dirt in wheelbarrows and made a mound 6 feet tall, 12 feet wide, and 25 feet long. Then they helped install the liners for the rivers. Earlier this year, the "Three Rivers Project" was completed with recycled water flowing in the "rivers" and through the "lake."



Continued from *Olsen on the Ocean...*

**3. With the change in the state curriculum from the Quality Core Curriculum, to the Georgia Performance Standards, what new opportunities are there for teaching about marine ecosystems?** Marine science is an interdisciplinary science and uses all the sciences - biology, chemistry, physics, geology, archeology, etc. So, even though there are some of the GPS that don't fit a marine theme directly, a creative teacher can use the ocean and marine ecosystems to teach just about any GPS.

**4. Most teachers cannot or do not take their students on coastal field studies. How should they bring something alive that students do not see, smell or touch?** Teachers can make their own collections of touchables when they go on vacation or they can get friends or their students to bring things back from their vacations. Shells, sand,

vacations. Shells, sand, preserved specimens, etc. There are also many, many really good classroom materials that can bring the sea "alive" in the classroom, including videos, CDs, on-line ocean explorations where the students can interact with the scientists onboard research vessels, posters, and lesson plans.

**5. How would you recommend that a teacher who has never taught about aquatic environments get started?** My first suggestion to them would be to attend a marine related conference. This year, the Georgia and South Carolina Marine Educators associations are joining together to hold a conference in October (See the News, Notes, and Upcoming Events section for more information).

## KIDs (Kids in Discovery Series)

**These colorful, 16-page activity booklets are written and illustrated for eight through twelve year olds. Creative and hands-on investigations, demonstrations, science experiments, educational games and stories stimulate understanding of each booklet's topic. These informative, inexpensive, award-winning booklets make excellent handouts to complement school curriculums or public education efforts.**

### Discover Bays and Estuaries

Learn how we all impact and depend on bays and estuaries. Students work their way through a food web, identify animals that live in the "mixing zone," and decide how to conserve, protect, and restore bays and estuaries by drawing pictures of Best Management Practices (BMP) throughout a watershed.

### Explore Oceans

Have you been asked why the ocean is blue, or why it is salty? Maybe your students want to know how storms build. Explore Oceans teaches the answers along with navigation concepts and watershed principles.

To order these materials, visit [www.projectwetusa.org](http://www.projectwetusa.org) or call Jo Adang at 404-675-1762 or Monica Kilpatrick at 404-362-6536, ext. 2 to receive an order form by mail or fax. Call Project WET USA at 866-337-5486 for information about quantity discounts starting at 1,000 copies.

# NEWS, NOTES AND UPCOMING EVENTS

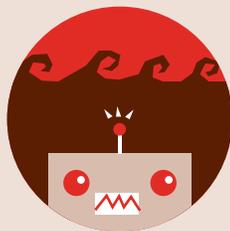


## Outdoor Classroom Symposium and Workshops Leaping into Green and Healthy Learning

**October 27, 2006**

Charlie Elliott Wildlife Center  
Mansfield, Georgia  
<http://www.eealliance.org>

Participants will enjoy hands-on sessions, shop for classroom resources, and view exhibits by program providers and outdoor classroom experts. They will be introduced to the Georgia Green and Healthy Schools (GGHS) program. The Georgia Green and Healthy Schools program begins with a pledge and is followed by up to three levels of advancement. To participate, students and teachers investigate their school sites. Students collect data, identify areas that could use improvement, implement changes, track progress, and share results.



## OCEAN ROBOTS

On April 27 and 28, at the Georgia Dome, 81 robotics teams from around the world participated in the FIRST-LEGO® League (FLL) World Festival's "Ocean Odyssey." Teams of students ages 9 to 14 had designed, built, and programmed LEGO® Mindstorms™ robots to undertake simulated aquatic challenges. The two-man team of Jonathan Knope (Dunwoody) and Matthew Roberts (Canton) represented Georgia at the event with their Mindstorms™ robot and a five-minute movie they made on the plight of the critically endangered North Atlantic right whale, Georgia's state marine mammal. Visit the Dragonfly Gazette section of the Georgia Project WET Web site, [www.gaprojectwet.org](http://www.gaprojectwet.org) to watch the movie on the right whale. For more information on FIRST-LEGO® League visit <http://www.firstlegoleague.org/>.

## Georgia Adopt-A-Stream Announces New Biological Monitoring Field Guide



Common Net Spinning Caddisfly Larva/Dragonfly Larva.  
Macroinvertebrate illustrations by Tommy Moorman.

The new field guide is more durable than ever before. It consists of a laminated quad-folded guide that will fit into your back pocket. The guide features all new illustrations of the macroinvertebrates, including sketches of the adult form for many of the species. The new guide divides the caddisflies into two categories, Caddisflies and Common Net Spinning Caddisflies, based on their tolerance to dissolved oxygen levels. Another change to the guide includes combining Dobsonfly/Hellgrammites with Fishflies, both in the order Megaloptera. The new format and species descriptions also make it easier for volunteer monitors to identify the macroinvertebrates in the field.

*The field guides can be downloaded at [www.georgiaadoptastream.com](http://www.georgiaadoptastream.com). The guides are also available in hard copy for Adopt-A-Stream QA/QC certified biological monitors. For information on how to become a QA/QC certified monitor, visit the Web site.*

## Georgia WET on the Web

[gaprojectwet.org](http://gaprojectwet.org)

The new Georgia Project WET Web site launched in July. The website contains a map of Georgia counties, that on a click, reveals the contact information for Project WET facilitators in any particular area. The up-to-date GPS correlations with Project WET are available for printing directly off the site. There are loads of information and links to related sites, as well as, printable workshop forms and a calendar. The state and national River of Words winners are showcased in galleries by year. Facilitators have restricted access to a message board, facilitator forms and event announcements. The Dragonfly Gazette will have a special link to further the learning started in the newsletter.

# SURVIVING

## Have you heard about the next planned Survivor show?

- \* Three businessmen and three businesswomen will be dropped in a middle school classroom for 6 weeks.
- \* Each business person will be provided with a copy of his/her school district's curriculum, and a class of 28 to 35 students.
- \* Each class will have five learning-disabled children, three with A.D.D., one gifted child, and two who speak limited English. Three will be labeled as severe behavior problems.
- \* Each business person must complete lesson plans at least 3 days in advance with annotations for curriculum objectives and modify, organize, or create materials accordingly.
- \* They will be required to teach students, handle misconduct, implement technology, document attendance, write referrals, correct homework, make bulletin boards, compute grades, complete report cards, document benchmarks, communicate with parents, and arrange parent conferences.
- \* They must also supervise lunch and monitor the hallways. In addition, they will complete drills for fire, tornadoes, and shooting attacks.
- \* They must attend workshops, (100 hours), faculty meetings, union meetings, and curriculum development meetings.
- \* They must also tutor those students who are behind and strive to get their 2 non-English speaking children proficient enough to take the Terra Nova and EPA tests.
- \* If they are sick or having a bad day they must not let it show. Each day they must incorporate reading, writing, math, science, and social studies into the program. They must maintain discipline and provide an educationally stimulating environment at all times.
- \* The business people will only have access to the golf course on the

weekends when their papers are all graded, but on their new salary they will not be able to afford it anyway. There will be no access to vendors who want to take them out to lunch, and lunch will be limited to 15 minutes taken while supervising their students lunch period.

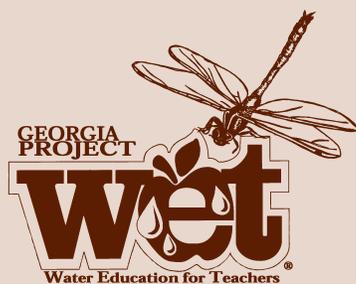
\* On some days the business people will be permitted to use the staff restroom as long as another survival candidate is supervising their class. They will be provided with one planning period per day, and will conduct all required phone calls, plan all lessons, and collect required materials, develop tests and quizzes, maintain grade books, clean and organize rooms, attend team meetings, and if time permits, breath.

\* On the rare occasion that the copier is operable, they may make copies of necessary materials at this time.

\* The business people must continually advance their education on their own time and pay for this advanced training themselves. This can be accomplished by moonlighting at a second job or marrying someone with money.

**The winner will be allowed to return to his or her job.**

**Source: Ann Landers published this from an elementary school teacher proposing a new TV reality show.**



Georgia Department of Natural Resources  
Environmental Protection Division  
Watershed Protection Branch  
4220 International Parkway, Suite 101  
Atlanta, GA 30354



## What's Inside this Issue?

Margaret Olsen on Marine Education

54 students honored through River of Words

Project WET Goes Coastal - Facilitator Workshop in November

How do water use and land activities upstream affect coastal ecosystems?

The Georgia Performance Standards and Marine Education

5th-12th Grade Lesson Plan: How to Read a Fish

Award Winning Facilitator, Teacher and School

Georgia Project WET on the web.