



Marine  
Resource

# Bulletin

VOL. XV, NO. 2

AUGUST, 1983



**Special Marine Education Issue**

Virginia Sea Grant at VIMS/College of William & Mary

# MARINE EDUCATION in VIRGINIA

by Frances L. Lawrence



Special workshops for teachers, termed "seashops," are held by members of the VIMS Sea Grant Marine Education staff. Here, Marine Education Specialist Frances Lawrence, right, oversees a fishprinting exercise.

**PERHAPS MARINE EDUCATION** in Virginia all started with Captain John Smith in 1607 when he wrote:

*"The land was beautiful, and one of the most pleasant in the whole world for large and useful navigable rivers. Heaven and earth never agreed better to frame a place for man's habitation..."*

Now, 374 years later, some three million people live, work and play in coastal Virginia, enticed to stay and sustained by the environment described by Captain Smith. The region is still beautiful and productive, but progress has brought problems. Now some rivers and brooks carry toxic wastes,

and the land erodes where it has been stripped of trees and meadows. The navigable rivers carry heavy commercial and recreational traffic, and the finfish, crustaceans and shellfish support a multi-million dollar government-regulated commercial fishery. Many of the fair meadows and marshes have been converted into housing developments.

The task of wise resource management becomes more complex daily, as increased demand is placed upon the Bay and surrounding area. Preparing Virginia citizens to make informed decisions about such marine resources is the task of today's marine educators.

Until relatively recently, Virginia's school children had little opportunity to learn about marine resources. Few textbooks contained

information in this area of study; teacher training programs characteristically stressed other environments. During the last decade, however, Virginia teachers have been able to turn to the Virginia Sea Grant Program at Virginia Institute of Marine Science (VIMS) for assistance. VIMS provides teaching materials, audiovisuals, information, field trips, courses and workshops for teachers.

Through ongoing and cooperative efforts of VIMS/Sea Grant, the Virginia Department of Education and organizations such as the Mid-Atlantic Marine Education Association, teachers across Virginia now have dependable access to information, teaching materials and special educational opportunities.

Meetings, conferences, workshops and courses offer teachers the chance to obtain current information. Recently, more than 500 teachers attended a major marine education teachers conference in Norfolk, sponsored by the Department of Education. Virginia science teachers and other educators interested in the marine environment attended lectures by marine scientists, shared teaching ideas, sampled unusual seafoods and went for an educational cruise on a VIMS research vessel.

VIMS/Sea Grant Program coordinated three two-day marine life instructional sessions for a special teachers' environmental education course sponsored by the Virginia Resource Use Education Council. The classes are presented each summer at the College of William and Mary, Longwood and Virginia State University.

Last year, recognizing the need for marine education in Virginia, the Virginia Department of Education launched a special grant program designed to encourage innovative and effective marine education projects in Virginia schools. The grants are available to school systems or consortia of schools, and have made possible unique learning experiences for many of Virginia's school children.

Reflecting the statewide importance of Virginia's marine resources, marine education projects are active in both coastal and inland school systems.

In Dinwiddie County, for instance, teachers in all grades used marine topics as a special theme during the '82-'83 school year. Working with resources from the VIMS/Sea Grant Marine Education Center, the teachers added a new marine dimension to their lessons.

Carol Collins, Dinwiddie Secondary Supervisor, initiated the project to provide county teachers and students with some exciting and motivating educational experiences. Even parents became involved in the project when the Dinwiddie County Community Education program presented a series of family marine education special events.

For the last three years, high school students in Nelson County in the Blue Ridge Mountains have learned about coastal resources and management through a special one-semester marine-oriented social studies course. The course is unusual not only in its content, but in the types of learning experiences it provides. Many of the lessons require students to do serious thinking about opposing viewpoints on management of marine resources. For example, one set of lessons focuses on a hypothetical erosion problem in a resort area. Students must decide what should be done after hearing arguments from opposing points of view about the site, costs and the politics of the area.

In Gloucester, York and Poquoson schools, some 1,300 seventh graders enjoyed the benefits from a Virginia Department of Education grant during the Spring '83 semester. The three school systems, working together as a consortium, developed a course on marine communities. Using what they learned in a special marine science course at VIMS, seventh grade science teachers from the three counties wrote and taught a series of lessons about marine communities, then took their students to York River State Park to see for themselves where and how beach and marsh animals live.

In all three geographical areas of Virginia--tidewater, piedmont and mountains--marine education is now a familiar term to many educators and students alike. A foothold has been gained through persistent effort on the part of marine educators. The challenge for the future is to acquaint succeeding generations of students with the fascinating world of the sea and our responsibility to use it wisely.



*Back in her own school, a teacher passes on information and techniques gained in a seashop to a student.*



# Neptune's Library

by Susan C. Gammisch

**TEACHERS HAVE COME TO** know it as "Neptune's Library," a 2,000-document store of printed materials and visual aids available at the Virginia Institute of Marine Science (VIMS) Marine Education Center. Together with the Marine Education Materials System (MEMS), the Center offers just about anything an educator could wish for to add marine emphasis to a lesson plan. MEMS is a national system, headquartered at VIMS, for the collection, storage, retrieval and dissemination of marine education materials.

The scope of the Center and MEMS collection includes 16mm color films, film loops, filmstrips, slide programs, overhead transparencies, records and study prints, as well as written documents designed for use by both educators and small fry. Except for the 16mm films, all materials available from Neptune's Library may be borrowed free of charge. The materials focus on the oceans, estuaries and Great Lakes, and include lesson plans, units, activities, field guides, coloring books, flash cards, worksheets, laboratory exercises, film lists and conference proceedings. Materials in MEMS and the Marine Education Center have been gathered from all over the United States as well as overseas. All documents are reproduced onto microfiche (provided permission from the author/publisher has been granted.)

For quick access to the comprehensive document collection housed in MEMS and the Center, a literature search can be conducted by computer according to subject, grade

*The Marine Education Materials System (MEMS) uses computers and microfiche to store and disseminate more than 2000 marine-related documents. Marine Education Specialist Susan Gammisch, shown conducting a computer search, coordinates Education Center activities.*



level, author, geographic location, type of document or year of publication. Any one or combination of these parameters will provide the user with an extensive bibliography of materials available, custom designed to the user's needs.

For instance, a home economics teacher may request a bibliography on the nutritional aspects of seafood or recipes; an English teacher might check on teaching aids available to study the literary classics of the sea; our maritime heritage could easily be incorporated into social studies; and of course, science classes can study the concepts of life cycles, photosynthesis, food webs, plate tectonics, the processes of erosion and deposition, animal behavior, marine communities and the effects of the ocean on our environment, even in landlocked areas such as Kansas and Colorado.

The process skills of observing and inferring, classifying, investigating, hypothesizing and identifying variables, measuring, defining, developing concepts, communicating and reading are easily adapted for use with marine objects, thus providing a motivational incentive for students. After all, there aren't many people, regardless of age, who don't find some fascination with the sea and its creatures.

The VIMS Sea Grant Marine Education Center is open to interested teachers Monday through Friday from 8:00 a.m. to 4:30 p.m. It is advisable to schedule an appointment with the coordinator of the Center and MEMS in order to provide individual consultation to discuss class needs and interests. Literature searches are available through the mail for those unable to visit in person.

For the marine educator outside Virginia, many MEMS centers have been established throughout the continental United States and in Hawaii, Puerto Rico and the West Indies. Each center houses a collection of the MEMS materials on microfiche, enabling the user to view the materials at a site closer to their home port. Location of these centers is available from the MEMS coordinator, along with information on running literature searches of the marine education materials collection.

"Educators are constantly seeking ways to trigger student self-motivation, to discover new methods and materials in teaching, and to maintain relevancy in what is taught. They already realize that few subject areas have the appeal of those involving the oceans, and that marine subjects can enliven and enhance the entire education process if properly planned and used..." Harold L. Goodwin (a pioneer in marine education effort) 1976. 🐙

# NATIONAL MARINE EDUCATION ASSOCIATION

THE NATIONAL MARINE EDUCATION Association (NMEA) is a non-profit organization which provides a focus for marine and aquatic education efforts in the United States and Canada. Its diverse membership includes aquarium, museum and zoo educators; college and university personnel; representatives from marine research facilities, private industry and government; and others simply interested in the world of water. There are 14 regional chapters in NMEA, among which is the Mid-Atlantic Marine Education Association (MAMEA).

According to current MAMEA President Elect Susan Gammisch of the VIMS Sea Grant Marine Education staff, the organization fulfills one of its primary objectives by providing opportunities for continuing professional development as it assists educators in meeting the needs of their students.

Through *Current: The Journal of Marine Education*, regional newspapers and other publications, NMEA stimulates communication among persons interested in the aquatic environment, and provides a forum for the exchange of educational materials, ideas and resources. Equally important, members feel, NMEA represents marine education interests throughout the nation and provides members opportunities to take active roles with colleagues in the marine education process.

Persons desiring more information about NMEA or who are interested in joining MAMEA should contact Susan Gammisch at the Sea Grant Marine Education Center, VIMS, Gloucester Point, VA 23062, (804) 642-2111, Ext. 111.

Benefits of membership in MAMEA include membership in the national organization, a subscription to *Current: The Journal of Marine Education*, a subscription to *The Masthead*, the newsletter of MAMEA, advance notices of regional and national marine education conferences, and the opportunity to make and renew friendships with people who share similar interests.

**MOST ADULTS REALIZE** that water is an essential resource, that it is fundamental to all life. Young people know that water is fun, but often do not grasp the tremendous importance of its resources, nor how it affects their lives. To put the fun and the "mental" parts together, to capitalize on the natural appeal of water while developing an awareness of its nature and its value, a two-week summer camp, "Water is FUN-DAMENTAL," was sponsored by the Commonwealth Girl Scout Council of Virginia. Thirty Girl Scouts, ages 13 to 17, participated in programs and activities designed by the Virginia Sea Grant Marine Education Program at Virginia Institute of Marine Science (VIMS).

This camp, held July 3 through July 15 at Camp Kittamaquand in Burgess, was the second in a three-year series. The first, offered in July of last year, was initiated to complement the national Girl Scout theme for the year, "The Gift of Water." Next year the camp will be designated as one of the nineteen unique Girl Scout Wider Opportunity Camps. This special camp will be open to outstanding Scouts nationwide who show an interest in and an aptitude for the marine area of study.

A major objective of the VIMS Sea Grant Marine Education Program is to provide not only Scouts but other students and educators an opportunity to learn by interacting with the marine environment. For example, there is no way for one to truly appreciate the beauty and productive nature of a marsh without standing ankle deep in the rich organic mud, observing the diversity of organisms and the interactions between them. The Girl Scouts at Camp Kittamaquand stood ankle deep, sometimes deeper, in the mud to collect and identify organisms and observe other components of this ecosystem. They observed firsthand all the things that make up a marsh, one of the most interesting habitats in the marine environment.

The girls made field excursions to a number of different habitats throughout Tidewater. At Grandview they studied life on a Chesapeake Bay beach. On a VIMS research vessel trip they examined environmental and biological conditions of the York River estuary. Using genuine scientific equipment such as bathythermographs, secchi discs and conductivity meters, the Scouts measured salinity, water clarity, temperature and other physical parameters. They also observed the operation of a trawl net, and made hands-on examinations of the catch.

It was a first for many of the girls...their first boat ride and their first time to see and handle fish, crabs, sea squirts and other inhabitants of the estuary. Another first for many was the canoe trip through the wetlands at York River State

Park, led by the park's interpretive staff. During their visit to VIMS the Scouts learned how and why professional scientists study such marine habitats.

The girls also learned that the Chesapeake is an important ecosystem whose resources are vital to Virginia's economy, and of significance nationwide. They learned that the Bay is a resource under continued and growing stress from human use and abuse, and saw the need for continued scientific study to determine the wisest use of such valuable water resources. The Scouts were shown that the Bay is more than an object of scientific study, that it has played an important role in our

## Scouting to Marine Env



*"Is that crab really soft?" Girl Scout Karen Parker, Mechanicsville, VA (left) and camp counselor Linda Messner, Columbia, MD definitely found the "Water is FUN-DAMENTAL" Camp a unique hands-on marine experience.*

history, and continues to play an important role in terms of fisheries, transportation and recreation.

The campers participated in a number of activities planned to show another aspect of the Bay, namely that there is a certain character, a certain atmosphere, that surrounds Chesapeake Bay because of the unique blend of history, present day use and the nature of the people who live and work on it.

A trip to a fossil pit, led by Scott Hardaway, VIMS geologist, introduced the Girl Scouts to the geologic history of the area. While visiting an underwater archaeology site on the York River,

*by Mary E. Sparrow*

# ne vironment

the girls learned of the Bay's role in the development of a new nation and its fight for independence. An introduction to the transportation and seafood industries was provided by a tour of Hampton Roads harbor and the Shackelford/Thomas Seafood processing house.

The Scouts learned that the watermen who work on the Bay are an inseparable part of its character, and that no study of the Bay would be complete without a look at their lifestyle. With the assistance of Mike Oesterling, VIMS Sea Grant Marine Advisory Service (MAS) fisheries specialist, the Scouts saw how hard a waterman's work really is. Mike taught the girls how to make crab pots and how to fish them. Phil Cahill, VIMS MAS gear specialist, instructed the girls in the art of hanging and fishing a gill net. Of course, no one can be a successful waterman without certain skills of seamanship. Knot tying, chart reading and navigating were practiced under the watchful eye of VIMS geologist Robert Gammisch. Water safety, including a session on hypothermia, was taught by VIMS marine recreation and trades specialist Jon Lucy. The Girl Scouts also visited the Yorktown Watermen's Museum, a tribute to the watermen of the Chesapeake Bay. To combine these bits and pieces into a cohesive picture of the waterman's life, the Scout campers visited Tangier Island. There is no place quite like Tangier in which to experience the personality of a small rural fishing community.

It may sound improbable, but there was plenty of time for recreation during the busy two weeks of camp. The Scouts participated in such purely pleasurable activities as swimming, sailing,

canoeing, fishing and line-crabbing. They also learned about two marine art forms: Gyotaku is a Japanese technique of fish printing; and seaweed is used in paper marbling. To top it off, the Scouts took part in a sing-along of sea chanties, led by the Sea Scouts of Sea Explorer Ship 38.

The VIMS Sea Grant Marine Education staff selected materials and designed activities for the camp that reflect the accepted principles and teaching techniques of marine education. What the Scouts saw, smelled, heard, tasted and touched created long-lasting impressions that hopefully will enhance the chances of their remembering the "facts" they learned. The field activities provided by the camp served up that necessary sensory perception opportunity any practical education demands. The young Scouts who participated in the marine camp soon will be voters and leaders in our communities. The instructors recognize that the activities and programs in which the Scouts participated at camp do not provide all they need to know to make wise decisions about using the marine environment, but rather that this type of program can expand their interests and motivate them to learn more. 🐟



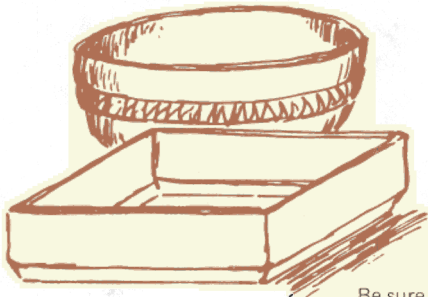
*The deck of a VIMS research vessel becomes a tableau of fish, hands, jellyfish and wet sneakers as enthusiastic Girl Scouts close in to examine the fruits of a bottom trawl.*

## Smoked Fish

Smoked fish is a gourmet item within the reach and budget of just about anyone, providing they do the smoking themselves. Right now bluefish and gray trout are plentiful in the Chesapeake Bay area, and happily, both species are excellent candidates for the family smokehouse.

Scaled (not skinned) filets from 2-4 lb. bluefish and trout are ideal. Be sure to remove all slime and blood. After marinating in an appropriate brine in the refrigerator, the filets are gently rinsed, patted dry and left on paper toweling, skin-side down, to air dry. (Note: Do not use wooden or galvanized containers for marinating). Next, one simply starts the smoker, racks the filets (uniformity of size is important) and check the temperature and time. Depending upon size of the filets, the fish will be properly smoked in 4-6 hours at a temperature of approximately 165 degrees F.

Brine recipes vary with individual taste, but here are a few to get you started if you haven't already developed a preference.

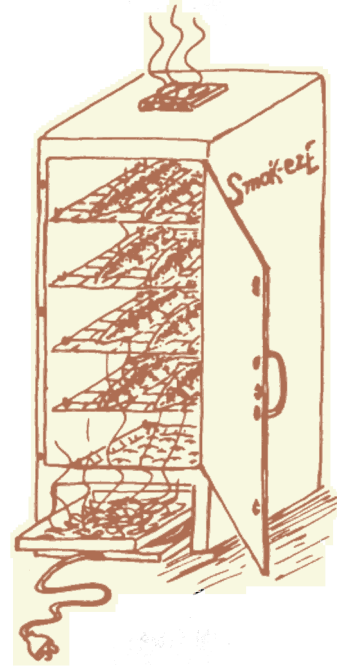


Be sure to brine fish in glass, crockery or plastic containers.

### MERMON'S HONEY BRINE

1 cup non-iodized salt per gal. water  
1 cup brown sugar per gal. water  
1 cup honey per gal. water  
1 pint or 8 oz. can of apple juice per gal. water  
1/2 cup lemon juice

Blend ingredients together in 2 cups of warm water in a small pitcher, then pour into larger container and mix with the remainder of the water (cold). Brine is now ready for use. Marinate fish in refrigerator 8-12 hours. Use hickory, apple or alder to smoke.



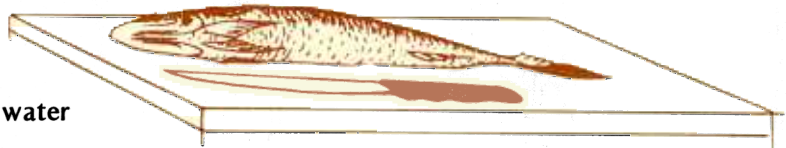
"LITTLE CHIEF" SMOKED FISH\*  
(for oily fish with a stronger flavor)

2 qts. water  
1 cup non-iodized salt  
1/2 cup brown sugar  
2 T. lemon concentrate or 1/4 c. lemon juice  
1/4 t. garlic powder  
1/4 t. onion powder

Use small fish or filet of large fish. Mix all ingredients and stir until dissolved. Brine fish 4 or more hours. Rinse and dry. Rack and load. Use 3 to 5 panfuls hickory, apple or alder. Keep in the smoker 4 to 10 hours, depending on the size of the fish pieces.

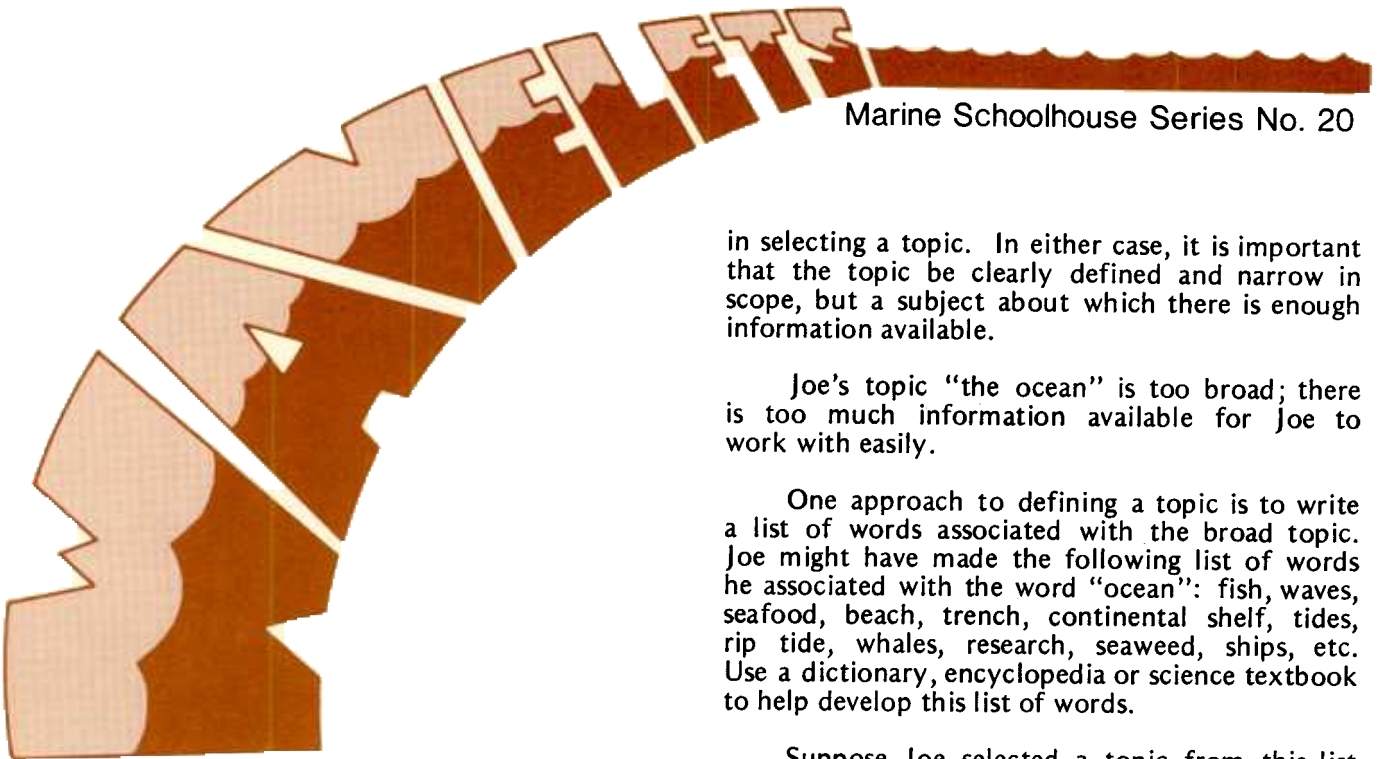
\*From the Luhr-Jensen book "Home Electric Smoker."

Filets from 2-4 lb. bluefish or trout are ideal for smoking.



For more information on smoking various food items, plus a list of available equipment and fuels, contact: Luhr-Jensen and Sons, Inc., Hood River, OK 97031; and the Coleman Company, P. O. Box 1762, Wichita, KS 67201.





by Mary E. Sparrow

# FISHING for Information

“DEAR SIRs: PLEASE SEND ME everything free you have on oceanography and the oceans. I am doing a report for school. Thank you, Joe Smith.”

Joe mailed his request for information a week before his report was due. Joe made several mistakes in his efforts to do this assignment. One, he assumed someone else would do his research for him. Two, he assumed that the agency to which he wrote would send him exactly what he needed to do his report, and that he would receive it in time. Three, his information request was poorly written. Four, his topic was too general.

Knowing where to look for information is an important skill. When mastered, it will prove useful throughout your school career, in your job and even in your personal life. This *Wavelets* is designed to show students how to go about finding needed information and how to write a request for information.

**Selecting a Topic.** Sometimes your teacher will make an assignment for a report or project on a specific topic, or perhaps you will have a choice

in selecting a topic. In either case, it is important that the topic be clearly defined and narrow in scope, but a subject about which there is enough information available.

Joe’s topic “the ocean” is too broad; there is too much information available for Joe to work with easily.

One approach to defining a topic is to write a list of words associated with the broad topic. Joe might have made the following list of words he associated with the word “ocean”: fish, waves, seafood, beach, trench, continental shelf, tides, rip tide, whales, research, seaweed, ships, etc. Use a dictionary, encyclopedia or science textbook to help develop this list of words.

Suppose Joe selected a topic from this list and found that there was not enough information available. He could go back to his list and put the words that represent similar ideas together under a broad heading. For example, Joe might have listed words such as current, wave, tide, rip tide, etc. under the broader heading of physical characteristics of the ocean or physical oceanography. His report on physical oceanography would then include information about all of these subtopics. After selecting a topic, it is important to discuss it with your teacher, explain why you selected it and get the teacher’s approval.



**Finding Information.** Joe never should have assumed that the agency to which he wrote would send him all of the information he needed and send it immediately. Requesting information from an agency, organization or individual is a good idea, but never rely on this as your only source. Make a list of the types of books in which you might find information about your topic (see Table 1). Such books might be found at home, in the classroom, or any of several libraries.

TABLE 1. TYPICAL INFORMATION SOURCES

Encyclopedias	Manuals
Dictionaries	Field guides
Atlas'	Abstract indices
Almanacs	Yearbooks
Periodicals	Bibliographies
(magazine indices)	Text books
Card catalogs	Newspapers
Handbooks	Microfilm indices

How can you tell if these books or sources of information include something on your topic? Sometimes you can tell by the title. You should look also at the table of contents, the index, appendices, glossaries, chapter headings, keys, charts, graphs, tables, footnotes, cross-references and bibliographies.

Knowing how to use a card catalog in the library is very useful. If you don't know how to use it, ask the librarian. The librarian also can tell you of other possible sources of reference information on your topic, such as *Books in Print* and periodical indices (magazine articles).

As you find sources of information about your topic, record the author's name, and the title, date, publisher, number of pages and call number (if present). Be sure to include the date, volume and issue number of magazine articles. This will help you in writing your report. It provides you with the necessary information for quoting someone, writing footnotes and developing a bibliography, all of which are part of a well written report. It will also help you find a reference if you need to use it again. This bibliographic information (author's name, title, date, etc.) can be easily recorded on individual index cards. Give each one a number or symbol. Then as you take notes from each source, you can quickly record what facts or bits of information were taken from each source. On the back of each reference card you can also write "clues." Under this heading, write words, bibliographic references and key ideas, and authors' names that are referred to in that source. This will give you other topics or sources that are related to your report subject.

After you have collected information from the sources you have selected and before you actually begin writing your report, you must make an outline. This will help you keep your ideas in order as you write your report. And after doing all of your information research, you should know enough about your subject to produce an outline. After writing your outline, group your information obtained from the sources you selected together according to the parts of your outline. Now you are ready to write your report. Remember to use tables, graphs and illustrations whenever

necessary to clarify the written information

We mentioned before that Joe had not written a good request for information. How should you write such a request and to whom? The first thing to remember is something mentioned before, but is so important it should be said again. Do NOT RELY SOLELY ON A REQUEST FOR INFORMATION to provide you with all needed information. You must do some research on your own. Realizing this, follow the procedure below if you need or wish to make an information request.

1. Define your subject as described earlier.
2. Give a deadline date by which you need the information. Mail your request as early as possible.
3. Identify the kinds of information you need. Do you need general information or something more specific? Written information or statistics (numbers)? Do you need graphs, charts, diagrams or illustrations?
4. Include your grade level and the type of course for which you are doing your report.
5. Give a brief list of the types of resources you have already searched.
6. If you ask for free materials, also ask to be made aware of other low cost materials that might be useful.
7. Be sure to include your address in the letter.
8. While you are doing your research, make notes of individual names, institutions, government and private agencies and wildlife organizations you may wish to contact.
- 9 Write clearly
10. Express your appreciation for their help.

Most of us make finding information much harder than it really is. The procedure mentioned here may seem like a lot of work, and there is no doubt that it does take time, but in the long run an orderly, logical method for finding information makes report writing and project making much easier. ☺



# PUBLICATIONS

Helpful to Teachers

(available upon request)

THE VIMS SEA GRANT Marine Advisory Service Office receives a high number of requests from teachers and other educators for the publications listed below. This popularity demonstrates their usefulness in an instructional setting. Order publications from: Sea Grant Marine Advisory Service Publications Office, Virginia Institute of Marine Science, Gloucester Point, VA 23062. Make checks payable to: VIMS Sea Grant.

## WAVELETS SERIES (1 page - Free):

- Adventures in Inner Space. Parts 1 and 2
- Aquarium Fishes of Chesapeake Bay
- Sediments and Sea Level
- Tidal Wetlands - Salt Marshes
- Tidal Wetlands - Brackish Marshes
- Tidal Wetlands - Freshwater Wetlands
- How Indians Lived in Tidewater
- Homemade Oceanographic Equipment: The Beach Seine
- Steps to a Better Science Fair Project. Parts 1 and 2
- Beachcomber's Guide
- Aquarium Worksheet
- The Clam Clan Caper
- How High is Your Shark IQ?
- Circle-Spin Puzzle--Flounder
- Incredible Edibles From the Sea. Parts 1 and 2
- Squid: The Super Mollusk

## MSM (Marine Science Methods for the Classroom) 1 page. Single copies free.

- MSM 1 Observing and Inferring
- MSM 2 Classifying
- MSM 3 Investigating
- MSM 4 Hypothesizing and Identifying Variables
- MSM 5 Measuring
- MSM 6 Defining
- MSM 7 Developing Concepts
- MSM 8 Communicating
- MSM 9 Reading

**BOATING SAFETY INSTRUCTION: COURSES TEACHING MATERIALS, GUEST SPEAKERS.** Leaflet. Single copies free.

**HANDLE WITH CARE: MID-ATLANTIC MARINE ANIMALS THAT DEMAND YOUR RESPECT.** Jon Lucy, Educational Series No. 26, 13 pages. \$1.00.

**TIDAL WETLAND PLANTS OF VIRGINIA.** Gene M. Silberhorn. Educational Series No. 19, 85 pages. \$3.00; \$2.00 each for 25 or more copies.

**MARINE RESOURCE BULLETIN.** A free subscription to this quarterly newsletter may be obtained by written request. Recent back issues are available.

**A GUIDE TO THE IDENTIFICATION OF MARINE PLANTS AND INVERTEBRATE ANIMALS IN VIRGINIA.** Virginia B. Niemeyer and Dorothy A. Martin. Educational Series No. 13, 82 pages. \$2.00.

**FIELD TRIP GUIDE IN VIRGINIA FOR THE MARINE EDUCATOR.** Sue Gammisch. 10 pages. 25 cents.

**AUDIOVISUAL AIDS AND PUBLICATIONS AVAILABLE FROM THE SEA GRANT MARINE EDUCATION CENTER.** Sue Gammisch. 40 pages. \$1.00.

**DEVELOPING CRAB CREEK: FIFTEEN POINTS OF VIEW ON ECONOMY AND ECOLOGY IN AN ESTUARY.** (High School). Frances L. Lawrence. Educational Series No. 27, 32 pages. \$2.00.

**FISHY ACTIVITIES FOR YOUR SMALL FRY.** Mary E. Sparrow, Frances L. Lawrence and Ronald N. Giese. Educational Series No. 28, 36 pages. \$2.00.

**NONTRADITIONAL MARINE EDUCATION ACTIVITIES: A PLANNING GUIDE.** Elizabeth A. Cornell. Educational Series No. 32, 10 pages plus Marine Science Method (MSM) series inserts. \$1.50.

**SENSING THE SEA: A CURRICULUM GUIDE FOR GRADES TWO-THREE.** Ellen Odell-Fisher and Ronald N. Giese. Educational Series No. 21, 53 pages. \$2.00.

**SENSING THE SEA: A CURRICULUM GUIDE FOR GRADES KINDERGARTEN AND ONE.** Ellen Odell-Fisher, Ronald N. Giese and Mary E. Sparrow. Educational Series No. 23, 44 pages. \$2.00.

## FISH PROMOTIONAL LEAFLETS: (Free)

- Spring Resource. . . . . THE AMERICAN SHAD
- Summer Bounty. . . . . THE BLUEFISH
- Offshore Delight. . . . . THE BLACK SEA BASS
- Mid-Summer Treat. . . . . THE SPOT
- Bottom-Dwelling Delicacy. . . . . THE FLOUNDER
- Summer Special. . . . . THE SEATROUT
- Nearshore Staple. . . . . THE CROAKER
- Chesapeake King. . . . . THE BLUE CRAB
- Pearl of the Chesapeake. . . . . THE AMERICAN OYSTER
- Bountiful Bivalve. . . . . THE HARD CLAM
- Succulent Seafare. . . . . THE SOFT-SHELL CRAB
- Poor Man's Lobster. . . . . THE MONKFISH
- Making the Most of Your Catch. . . . . THE BLUEFIN TUNA

# UPCOMING MARINE EDUCATION EVENTS

**Let's Get Together - The School/Museum Partnership:** A one-day in-service conference designed to show educators how to use museums, nature centers and other community sites as effective teaching resources. Saturday, October 1, 1983. Christopher Newport College, Newport News, VA. Sponsored by Smithsonian Institution's Office of Elementary and Secondary Education and Peninsula Museum's Forum, Inc. College or recertification credit available. For details contact Joe Gutierrez, The Mariner's Museum, Museum Drive, Newport News, VA 23606.

**1983 Mid-Atlantic Marine Educators Annual Conference:** The theme "Barrier Islands and People" of this year's Mid-Atlantic Marine Education Association (MAMEA) will feature speakers who are well known to barrier island enthusiasts. In addition to invited speakers and contributed papers, look for live demonstrations of basketry with native plants, nature photography, edible wild plants and decoy carving. Field trips to beaches, maritime forests, eelgrass beds and fossil deposits will be conducted at sites near the North Carolina Marine Resources Center/Bogue Banks, Atlantic Beach, NC on October 21, 22 and 23, 1983. For more information contact Mark Joyner at the Center. (919) 247-4003.

**Chesapeake Bay Conference:** A major three-day conference on the Chesapeake Bay will be open to the public on December 7, 8 and 9 at George Mason University in Fairfax, VA. The conference will

provide a forum for discussion of problems, facts and proposed solutions to specific problems and will encourage public participation in developing and supporting policy for the future of the Bay. The conference has the support of both Governor Charles Robb of Virginia and Governor Harry Hughes of Maryland. For further information contact: Frances Flanigan, Conference Manager, Citizens Program for the Chesapeake Bay, Inc., Baltimore, MD. (301) 377-6270.

**1985 National Marine Education Association Annual Conference:** The College of William and Mary in Williamsburg has been selected as the site of the 1985 NMEA conference, scheduled for July 28 - August 3. This meeting will be sponsored by the Virginia Sea Grant Program at VIMS, The College of William and Mary and the Mid-Atlantic Marine Education Association. Plan now to be there! Call Sue Gammisch (804/642-2111, Ext. 111) for details.

**Oceanography For Landlubbers:** A series of free informal programs on marine-related topics of general interest presented by scientists, staff and guest speakers at Virginia Institute of Marine Science. This film and lecture series is offered on the first Wednesday of each month from 7:30 - 8:30 p.m. in the VIMS Byrd Hall Conference Room. For details, call the Sea Grant Marine Education Program, (804) 642-6131 or (804) 642-2111, Ext. 298.

## Marine Resource Bulletin A Sea Grant Advisory Service

VOL. XV, NO. 2      AUGUST, 1983

Dr. Frank O. Perkins . . . . . Dean/Director,  
Virginia Institute of Marine Science

Dr. William Rickards . . . . . Director,  
Virginia Sea Grant

Dr. William D. DuPaul . . . . . Head,  
Advisory Services

The Marine Resource Bulletin is a quarterly publication of the Marine Advisory Service of the Virginia Sea Grant Program, which is administered by the Virginia Graduate Marine Science Consortium, with members at William and Mary, Old Dominion University, University of Virginia and Virginia Polytechnic and State University. Subscriptions are available without charge. Address all inquiries and comments to the editor.

Dick Cook . . . . . Editor

## Cover Note

Youthful curiosity finds a fertile and rewarding area of investigation aboard a VIMS marine research vessel. Maybe it's the tang of salt air, or the roll of the deck beneath one's feet; in any event, such Sea Grant sponsored educational programs have always had a strong appeal to teachers and students alike.

Virginia Institute of Marine Science  
Gloucester Point, Virginia 23062

Address Correction Requested

Non Profit  
Organization  
U.S. POSTAGE PAID  
Gloucester Point, VA  
Permit No. 6