The Alaska Job Center Network would like to share the following list of Fisheries related educational curriculum with you. Our thanks and appreciation go to Adelheid Herrmann for her original compilation of the information used in creating this document.

Marine Fisheries Curriculum for a One Semester Marine Fisheries Course for High School Students:

Grade 9-12

Today, Bristol Bay students have incredible opportunities to enter the Bering Sea fisheries through the Community Development Quotas system (CDQs). For local people to take full advantage of those opportunities, a curriculum was designed to develop fisheries education. Although the curriculum was built around the Y-K Delta fishery, Mickelson's lessons would slip nicely into Bristol Bay school systems. But good educational framework and legislative fishing quotas are not the only factors for success. As Mickelson stresses, "the most important component for a school fisheries program is strong community support, together with the enthusiasm of students, teachers, administration, and school board."

The Marine Fisheries Curriculum classes are designed to train students for a variety of careers from Cannery Administrators and Fishing Boat Captains to Fish Biologists. The activities are designed to be interdisciplinary with language arts, science, math, and social studies so students can earn cross-credits. Gender equality, science, and local village knowledge is emphasized throughout the lessons. Since fishing is the nation's most dangerous occupation, water safety is also stressed. According to Mickelson, field trips "are the traditional Native way of learning and the core of marine and fisheries vocational programs." They are the ultimate in learning by doing. Therefore, field trips are included in the lesson plans to reinforce skills and make studies more realistic.

The Curriculum Framework provides a detailed list of 17 lesson plans for one semester. Each lesson plan provides information on the subject, applied credit, duration, objectives, background, vocabulary and terms, materials, resources, and procedures. For example, the lesson plan for Hooked on Fishing by Steve W. Hackett states that the lesson subject is Traditional Fishing with Hook and Line. It can be cross-credited with Social Studies and Language Arts. The class duration is one to two weeks, or five to ten class periods with one 3-4 hour outside activity. Objectives for the class state that a student will research, interview, and report on local traditional/historic methods of fishing both summer and winter using hook and line. And students will organize and sponsor a school-wide weekend or week-long fishing derby in which students fish during specific times, on weekends or before and after school.

The lesson describes the history of fishing by hook and line, basically explaining why it is important for students to learn about this fishing technique. An example of the vocabulary list includes "jig", "knots", "swivel", and "treble hook." Materials that are used in the class include fishline, jigging gear, string and twine to name a few. Resources included in the lesson are Fisheries of the North Pacific by Robert Browning and Developmental Yupik Language Program. Finally, the lesson plan provides a 12-step procedure list on how to teach the class. If fieldtrips are recommended in the lesson, the fisheries Curriculum Booklet provides suggestions, checklists and sample permission forms. Mickelson also provides teachers great suggestions for beginning a fisheries program, important teaching techniques, a contact list, a comprehensive bibliography, glossary, equipment list and other important post-graduation information.

CONTACT: Belle Mickelson, Lower Kuskokwim School District, in Bethel Alaska. Credit for development of this program goes to Harold Sparcks.

Yukon-Koyukuk School District Jimmy Huntington School (JHS) Fisheries Project, 1993

Grade K-12

The JHS Fisheries Project is an extension of a science integration project that began in 1991. Its purpose is to make science a culturally significant learning experience. The JHS Fisheries Project is a model which continues the development of other integrated science units.

Kindergarten/First Grade

Students learn about the primary environment, physiology and effect of pollution on whitefish; parts of the writing process

Kindergarten/First Grade (continued)

through the study of fish; problem-solving skills, use whitefish to learn counting and grouping of numbers; and use fish to develop artistic expression.

Second, Third, and Fourth Grade

Students learn about the environment, anatomy and physiology of Northern Pike. They utilize all phases of the writing

process and construct and analyze graphs.

Fifth and Sixth Grade

Students learn to explain the life process, anatomy and physiology of salmon. They learn how salmon is relevant to their culture. They utilize all phases of writing and improve math skills.

Junior and Senior High School

Social Studies/Alaska Studies- Students receive two assignments: First, they research and write a 5-page paper that is complete with bibliography and footnotes. Second, they compose 2 riddles in Athabascan that relate to fisheries.

Mathematics- Students collect data at fish research sites, write word problems, fraction problems, and percentages to analyze the data.

Vocational Education- Students learn the nutritional value of fish, prepare fish for cooking, prepare fish recipes, and preserve fish for future use.

Fisheries Science- Students learn the different techniques used in fishing and experience setting a fishnet under the ice, develop map skills and practice orienteering, learn tools used in the fishing industry, explore occupations which are related to the Alaska fishing industry.

Art- Create a tissue paper mosaic to accompany the language arts report on a fish.

Language Arts- Write letters to information sources, utilizing all parts of the writing process by writing a formal research paper on local fish, complete with a bibliography, practice group-editing skills.

Native American Literature- Editing and revising skills on research papers and reports, write poetry about fish in the limerick and haiku form, read the YKSD biography series to discover the role that fishing plays in their culture.

Physical Science- Students explore the role of light reflection, refraction, and diffraction in water to understand how it affects fishing techniques and fish camouflage.

Biology- Students compare and contrast fish with other types of vertebrates. They learn the external adaptations of fish to the water environment and the internal anatomy of fish, and compare it to human anatomy. Each student plans and completes an independent investigation into some aspect of fisheries. When the investigation is complete, students write formal reports based on the scientific method, and create displays for the Family Science Night. Students utilize local sources whenever possible.

Environmental Science- Students study environmental processes and problems to understand how fish habitats may be affected. Students plan an imaginary itinerary to a National Park to investigate fish resources there. Each student plans and completes an independent investigation into some aspect of fisheries. When the investigation is complete, the student writes a formal report based on the scientific method, and creates a display for the Family Science Night.

CONTACT: Michele Bifelt P.O. Box 69 Huslia AK 99746

Suggested Activities for Integrating Fisheries into Classrooms Grade 6-12

Organized for Southwest Alaska regional schoolteachers, this expanded perspective offers possibilities for integrating fish education into the classroom. For example, suggested activities include a visit to a cannery or a trip tagging fish with a biologist. Good premise but needs more development. May be useful for a local teacher brainstorming ideas for fishery

Suggested Activities for Integrating Fisheries into Classrooms Grade 6-12 (continued)

related lesson plans or field trips.

CONTACT: Bristol Bay School District in Naknek, Alaska

I Am Salmon: An Exploration of Salmon and Self Grade K-12

I Am Salmon is an educator's collection of resources and activities for the interdisciplinary study and appreciation of watersheds and people of the North Pacific Rim. I Am Salmon, however, is not intended to serve as a formal curriculum guide. Rather it is a collection of resources with which to mount your class's collective journeys. The materials come from an array of sources: books, public information documents, technical reports and observations, written and oral interviews. I Am Salmon organizers encourage teachers to add to, delete or modify the materials to suit the specific needs. For example, in Bristol Bay I Am Salmon lessons can focus on Yupik/Aleut/Athabascan culture instead of Tlingit and Northwest Coast cultures. (For an extensive list of books on the history, culture, and fishing societies of Bristol Bay and coastal Alaska see the following chapters in this resource guide.)

I Am Salmon is a broad assortment of suggested activities for students, both in the classroom and in the field. Designed to correspond to a phase of human development-Childhood, adolescence, adulthood, and elder years-I Am Salmon programs are divided into four parts: From Egg to Alevin teaches young students about science, social relationships, and humanities using the birth of the salmon as a focal point. From Fry to Smolt teaches students about ecology, storytelling and history using the salmon's life in the streams as a focal point. The Ocean Adventure teaches students, both physical and natural science, literature and economics using the migration of the smolt as a focal point. The Way Home teaches students survival skills and tests of endurance. They learn about the interconnectedness of the ecosystem. They read poetry written about life and death, and study traditional dance, art and music.

I Am Salmon is a non-traditional way of teaching. It is abstract, but if a teacher uses his/her imagination, it can be a very successful program for Bristol Bay. By following the cycle of migrating salmon, students can learn about the larger themes of life-birth, death, transformation-and an understanding of ones place in southwest Alaska and the world.

CONTACT: David G. Gordon, Science Writer Office of Marine Environmental & Resource Programs at the Washington Sea Grant Program University of Washington, Box 3555060 Seattle, Washington. Tel: (206) 685-8191, fax (206) 685-0380. Online at: **http://www.wsg.washington.edu** . Other contacts include Frank Hill and Nora Dougneuer.

Kodiak School District's Fisheries Science Curriculum Grade 10-12

The Kodiak High School plans to implement this plan over the next four years. The Kodiak Island School District owns a 42-ft. seiner, which they use as a floating classroom. Students who finish the program receive an Alaska Marine Safety Education Certificate.

Students who participate fully in the Fisheries Program are able to demonstrate competency in the following employability and leadership skills: technical reading and writing, identifying careers/employment opportunities, work ethic and job maturity, following verbal and written directions, transferable skills in computer literacy, effective problem solving, effective written directions, transferable skills in computer literacy, effective problem solving, effective written and oral communication, planning and organizing work. Specific program outcomes include: completing Coast Guard safety training, including First Aid and Adult CPR, demonstrating knowledge of business as it pertains to employment in maritime industries, completing the classroom portion of Coast Guard licensing requirements as applicable to the individual, basic boat handling and seamanship skills, knowledge of political, economics, and environmental issues as they relate to fisheries, and a basic understanding of vessel systems.

Classes include Marine and Wilderness Safety Training, Crewmanship/Seamanship, Fisheries Science, Marine Maintenance, Coast Guard Licensing, Fishing Business, Cooperative Work Experience, and Independent Studies.

CONTACT: Jane Maria Eisemann at Kodiak High School Fisheries Science 722 Mill Bay Road Kodiak, AK 99615

Lake and Peninsula School District Grade 9-12

This program was developed to teach students all aspects of the Commercial Fishing Industry. Classes teach students the commercial and noncommercial usage of local fish species. They learn the various types of commercial harvesting gear.

Lake and Peninsula School District Grade 9-12 (continued)

They study the history and the structure of fish processing such as transportation and canneries. They gain skills that will help them learn domestic and international marketing. Students are taught the elements of fisheries management such as research, escapement/harvesting and regulation. The are exposed to career opportunities in fishing, from processing, management to support services. They learn to fill out applications, gain skills in accounting and learn to assess the confusing tax system. Students are informed on future issues concerning new technology, habitat, and politics.

CONTACT: The Lake and Peninsula School District for more information.

Tlingit Moon & Tide: Native Science in Education by Dolly Garza Grade 1-6

The Moon & Tide curriculum combines Alaska Native science with ecological understanding for the classroom and shows teachers how to present local and ecosystem knowledge held by long-time inhabitants of Southeast Alaska. Their goal is to increase the self-esteem of Native students who traditionally perform low in science, and introduce students to this type of knowledge. It includes several activities for studying moon phases and tides, and addresses science teaching standards, inviting elders to the classroom, and Native languages and legends. With a little research and creativity, lesson in Moon & Tide can be adapted to Southwestern Native cultures.

CONTACT: University of Alaska Sea Grant University of Alaska Fairbanks PO Box 755040 Fairbanks, AK 99775-5040. Tel: (888) 789-0090.

Aquatic Project Wild Grade K-12

Projects wild is an interdisciplinary, supplementary conservation and environmental education program. The goal of Project Wild is to provide wildlife-based environmental education that fosters responsible actions toward wildlife and related natural resources. Project Wild will assist learners of any age in developing awareness, knowledge, skills, and commitment that will result in informed decision, responsible behavior, and constructive actions concerning wildlife and the environment.

CONTACT: Robin A. Dublin, Project Wild Coordinator, 333 Raspberry Road Anchorage, AK 99518. (907) 276-2168 or email: robin_dublin@fishgame.state.ak.us

Salmonids in the Classroom

Grades K-4

In this lower elementary level curriculum guide, kids learn about salmon and trout through the story of Chucky Chum (a knowledgeable salmon). Chucky takes students on a journey through his life cycle, from egg to spawning adult. Contains step-by-step teaching strategies, information on salmon biology, handouts, integrated student activities, science projects, and reference section.

Grade 4-8

This upper elementary/junior high level study of salmonids is divided into three units based on the life cycle (biology and habitat), harvesting and enhancement. Also includes relevant background information, student activities and handouts, integrated activities, science projects and reference section.

CONTACT: BC Teachers Federation #100-550 W. 6th Ave. Vancouver, Canada V5Z 4P2. Tel:(604) 871-2283. BC Teachers Federation also has a catalog that describes their other excellent salmonid materials.