

Hydromania

Science Curriculum



INTRODUCTION

In 1992, Bonneville Power Administration (BPA) and the U.S. Department of Energy (DOE) began a collaborative pilot project with the Portland Parks and Recreation Community Schools Program and others to provide summer science camps to children in Grades 4-6. Camps run two weeks in duration between late June and mid-August. Sessions are five days per week, from 9 a.m. to 3 p.m. In addition to hands-on science and math curriculum, at least three field trips are incorporated into the educational learning experience.

The purpose of the BPA/DOE summer camps is to make available opportunities for fun, motivating experiences in science to students who otherwise would have difficulty accessing them. This includes inner city, minority, rural and low income students. Public law 101-510, which Congress passed in 1990, authorizes DOE facilities to establish collaborative inner-city and rural partnership programs in science and math. National studies have shown that by the 7th grade, nearly half the children no longer have an interest in science. That means we must start at an earlier age to let children know science and math can be fun!

A primary goal of the BPA summer hands on science camps is to bring affordable science camp experiences to students where they live. It uses everyday materials to engage students' minds and to give them a sense that they have succeeded through a "fun" hands-on learning environment. The philosophy of giving students hands on experiences in science is powerful. Students learn science by doing science, experiencing nature and experimenting directly with natural phenomena.

The 1992 pilot project used prepackaged kits from Hands On Science Outreach, Incorporated, which is based out of Rockville, Maryland. The camps met with resounding success. In 1993 BPA incorporated curriculum materials on the importance of water, electricity and salmon to the Northwest. That theme will be continued and expanded upon in future years.

The 1993 curriculum was titled "*Hydromania*." BPA would like to especially thank two science teachers from the Portland metropolitan area--**Joan Moura**, a teacher from the West Linn/Wilsonville School District, and **Rod Swerin**, a teacher from the Beaverton School District. Through their hard work and dedication, these two teachers researched and put together the lessons contained in the 1993 "*Hydromania*" program. The 1993 camps could not have succeeded without their efforts.

The "*Hydromania*" activities and experiments are simple, yet they introduce students to the amazing world of science. Parents have praised the curriculum. Said one, "*(Child) came home wide-eyed about the experiments and was so eager to share.*" From another parent, "*This was a marvelous experience for my young budding scientist. What an*

exceptional opportunity." Another commented, "H₂O science projects during the school year were not creative enough to tap into his enthusiasm. I hope 'Hydromania' will help him realize it's not the subject that's boring, but how it's taught."

One of the teachers who helped to deliver the 1993 summer science camp program made this comment:

"The curriculum is a classroom teacher's dream come true--Hands-On! It has been a long time and many classroom sessions since I have witnessed such excitement, accomplishment and smiles/fun on a child's face while learning. I saw the joy on each child's face at four different camp sites this summer. Every activity was complete and thorough, allowing the students to be successful. Even when an activity 'messed up,' it still opened the door to exploration, questions and discovery. . . .

"Before exposing myself to the hands-on approach, I was reluctant to venture too far from the textbook materials. Now, the textbook is a supplemental resource in my classroom. I feel, I think, and I know science is fun and exciting to teach and learn. I will integrate the Hydromania curriculum into my regular classroom science program this next year."

These are but a few of the positive comments received. We're sure you'll agree as you conduct these lessons and experiments with young children. If you have questions or would like more information, please contact BPA's Education Coordinator, Phyllis Evans, at 503-230-5341, or by email at pnevans@bpa.gov.



Charles F. Clark, Assistant Administrator

ACKNOWLEDGMENTS

Many people and organizations had a hand in contributing to the "*Hydromania*" summer science camps. First and foremost, BPA owes a debt of gratitude to **Rod Swerin** and **Joan Moura**. They painstakingly researched, designed, and wrote the activities, bringing the curriculum to life. We would also like to extend a special thanks to many others who contributed to making the camps a success.

Brant Crabbe, BPA "Hydromania" Project Officer
Rita Owen, Education Program Officer, BPA, Office of Engineering
"Hydromania" Camp Staff:

Camp Coordinator: Dave Milam
Teachers: Rod Swerin, Lolita Darby, and Pamela Bannister
Assistants: Amanda Cross, Freda Franklin, Holly Geiger,
Robert Hoffman, Diarmuid Houston, Alena Makua,
Ben Price, Yolanda Smith, Seraphina Uuludong

Michael Addis, Portland Parks and Recreation Community Schools Program
Sonicray Bonnell, Portland Public Schools, Indian Education Act Project
La'Shea Capers, BPA, Office of Engineering Education Staff
George Chaney, Illustrator of Hydromania Poster
Chuck Clark, BPA, Assistant Administrator for Engineering
Roby Clark, Portland Public Schools, Indian Education Act Project
Jim Clapp and Personnel at Ridgefield Wildlife Refuge, U.S. Fish and Wildlife
Debra Coleman, BPA, Office of Engineering
Carol Craig, Columbia River Inter-Tribal Fish Commission
Lillian Cunningham, BPA, Office of Engineering Education Staff
Ken Dragoon, BPA, Office of Energy Resources
Shelli Drinkwater, BPA, Office of Engineering Education Staff
Jeff Elsasser, Multnomah County ESD Living Lab
David Etherly, BPA, Media Services Branch
Jeff Gottfried, Oregon Museum of Science and Industry
John Haner, BPA, Office of Engineering,
Kathy Hay, BPA, Office of Engineering
Craig Kurath, Portland Public Schools
Sheila McCartan, U.S. Bureau of Fish and Wildlife
Michael Paiya and Personnel at Warm Springs Fish Hatchery
Don Ruff, BPA, Office of Engineering
Linda Sato-Juras, Teacher, West Linn/Wilsonville Public Schools
Jeanne Thomas, Tour/Educational Coordinator, Warm Springs Museum

Special Thanks To:

Ron and Peg Marson, TOPS Learning Systems

BPA would like to extend a special thanks to TOPS Learning Systems. For more information about TOPS, please refer to the order form at the end of the "*Hydromania*" curriculum.

Sponsors and Contributors:

U.S. Department of Energy, Washington, D.C.

Bonneville Power Administration, Office of Engineering

Portland Parks and Recreation Community Schools Program

Department of Agriculture, Federal Lunch Program

Portland Public Schools, Indian Education Act Project

Portland Public Schools Blanchard Education Services

Alpenrose Dairy

Fred Meyer Stores - Hollywood, Beaverton, Walker Road

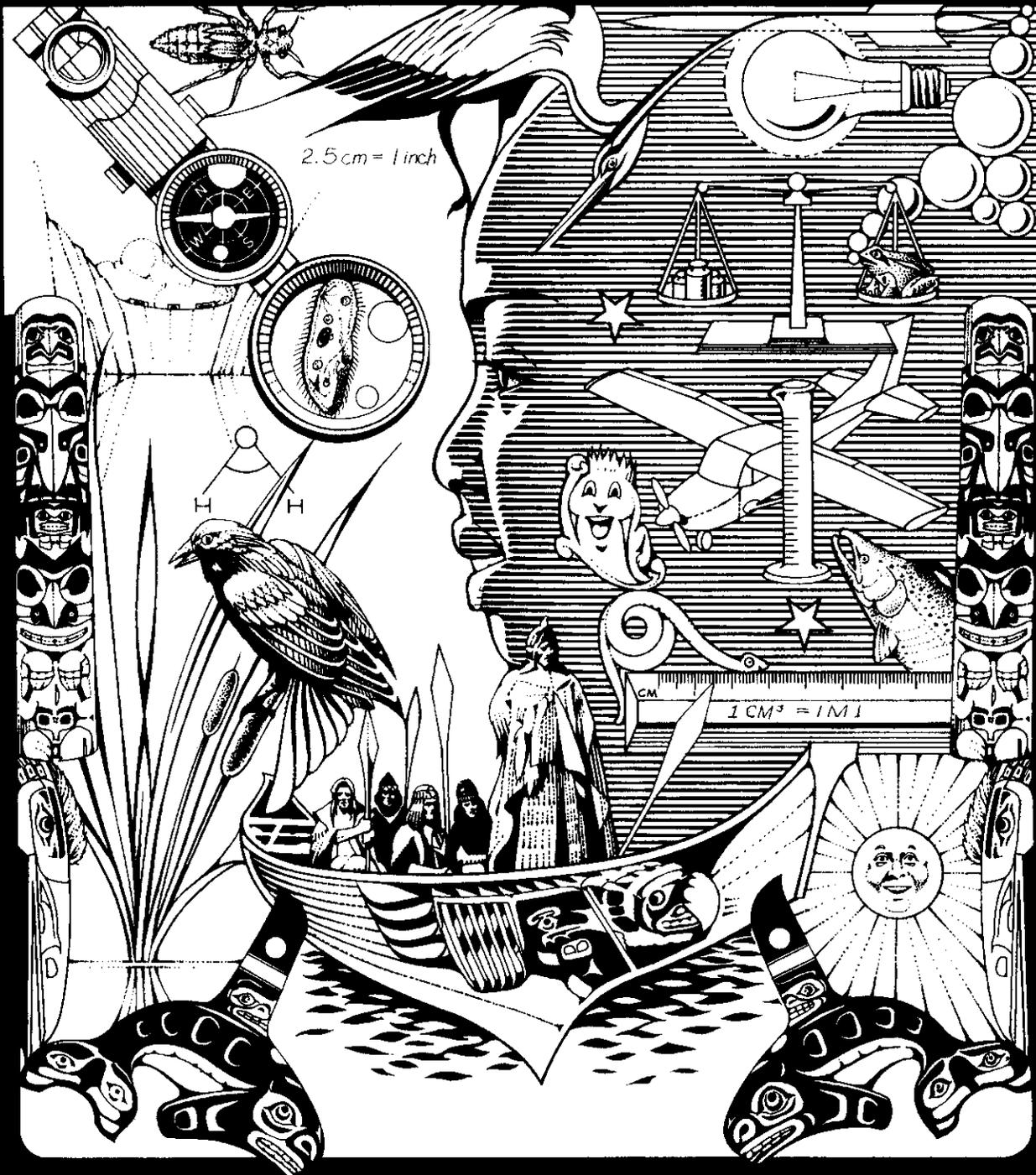
Hollywood Day Care Center

Payless - Beaverton Mall

Photo Machine Stores - Clackamas Town Center, Beaverton Town Square

Picture Perfect-1 Hour Photo, Beaverton

Suburban Photo, Beaverton



HYDROMANIA II

Journey of the Oncorhynchus

INTRODUCTION

The Hydromania II curriculum was written for the third in a series of summer science camp experiences targeting students in grades 4-6 who generally have difficulty accessing supplementary academic programs. The summer science camp in Portland is a collaborative effort between Bonneville Power Administration (BPA), the U.S. Department of Energy (DOE), and the Portland Parks and Recreation Community Schools Program along with various other cooperating businesses and organizations. The curriculum has also been incorporated into other summer programs and has been used by teachers to supplement classroom activities.

Camps are designed to make available, affordable learning experiences that are fun and motivating to students for the study of science and math. Inner-city, under-represented minorities, rural, and low-income families are particularly encouraged to enroll their children in the program. The science camps are two weeks long and generally run between the hours of 9:00 a.m. to 3:00 p.m., Monday-Friday. Four field trips were included in the 1994 camps with explorations to Oxbow Park, Fort Stevens on the Oregon Coast, Mt. St. Helens and Toutle Fish Hatchery, and Metro's Zoo.

The first summer science camp in 1992 utilized pre-packaged curriculum materials purchased from Hands on Science Outreach, Incorporated in Rockville, Maryland. In 1993, BPA produced its own science camp curriculum entitled, "*Hydromania*." The focus of this curriculum connected to Northwest regional issues of salmon, electricity, and water. The 1994 curriculum, "*Hydromania II*" is a continuation of the themes of "Hydromania," however providing a primary focus on the Pacific Salmon, its habitat and life cycle. Two area teachers, Joan Moura and Rod Swerin, were instrumental in putting together both of the "Hydromania" curricula.

"Hydromania" activities are of uncomplicated design utilizing common household materials to facilitate duplication in the classroom. Parents, teachers, and students alike have praised both curricula for the hands on and fun nature of the activities. The following comment from one of the camp counselors is particularly telling:

"As an African American male growing up in northeast Portland, I have seen many children fall through the cracks of our educational system. Hydromania II gave the kids, who may have fallen...the opportunity to develop the foundation needed to compete regardless of socio-economic impacts present today. It was amazing to see how much influence a positive experience and positive relationships have in such a short period of time." Parents of students shared similar comments about the camps and the curriculum.

If you have questions or would like to receive a copy of either curriculum, please call 1-800-622-4520 for information.

ACKNOWLEDGMENTS

Hydromania III science camp activities, organization, and production involved many agencies, schools, and individuals who provided their resources, creativity, or effort to make this program successful. An exceptional staff made the activities come alive and they definitely affected many children over the course of the camps. The tours and support provided by participating agencies were outstanding. The Hydromania science camp program is clearly a collaborative effort which provides for a fun and rewarding experience for all concerned. Thank You, to All!

We hope that we did not inadvertently miss the name of a contributor of the Hydromania III science camp program as noted below:

Shelli Drinkwater	BPA	Gary Sparks	Experimental Aircraft Association
Derrol Johns	BPA	Steve Mahoney	Experimental Aircraft Association
Terri Bull	BPA	Elbie Mendenhall	Experimental Aircraft Association
Kathy Hay	BPA	Bill Kenny	Experimental Aircraft Association
Joan McNamara	BPA	Elwood Hedberg	Experimental Aircraft Association
Karen Houser	BPA	Dan Delano	Experimental Aircraft Association
Vince Ripley	BPA	Ken Scott	Experimental Aircraft Association
Terry Erickson	BPA	John Neumann	Hillsboro School District
Sherry Lind	BPA	Liza McQuade	KATU TV
Nick Christmas	BPA	Craig Sklar	KOIN TV
Linda Holling	BPA	Darrell Slater	Laidlaw Bus Service
Bob Heimes	BPA	Antoinette Saunders	Lead Teacher
David Etherly	BPA	OJ Biber	Lead Teacher
Scott Hoyle	BPA	Elizabeth Moore	METRO
Judy Heintz	BPA	Deb Scrivens	METRO
Jan Portner	BPA	Freda Sherburne	METRO
Milt Brown	BPA	Tom Wyatt	Metro Central Station
Vickie VanZandt	BPA	Penny Jordan	Milton-Freewater Camp Director
Erica Jensen	BPA	Nanette Nelson-Furman	Mt. Scott Community Center
Andy Thoms	BPA	Sue McCormick	Oregon Department of Fish & Wildlife
Ken Dragoon	BPA	Mel Eldridge	PGE
Eric Main	BPA	Roberta Andrus	PGE
Dennis Bush	BPA	Bruce Ruminski	PGE
Kevin Rockwell	BPA	Dave Knab	Portland Parks Bureau
Rod Swerin	Camp Director	Mike Addis	Portland Parks Bureau
Barbara Bair	Camp Director	Jack Bierwirth	Portland School District
Meg Neil	Cole & Weber	Dorothea Fleskus	Portland School District
Sharon Chin	Counselor	Lolita Darby	Portland School District
Annemarie Basick	Counselor	Peggy Murphy	Portland Water Bureau
Angela Moore	Counselor	Ken Ames	PSU
Shannon Rowlett	Counselor	Lori Johnson	Siletz Tribes
Freda Franklin	Counselor	Lisa Parks	Substitute Teacher
Amanda Cross	Counselor	Virginia Parks	U.S. Fish & Wildlife Service
Mandy Stanley	Counselor	Bruce Wiseman	U.S. Fish & Wildlife Service
Jeanine Jim	Counselor	Jim Clapp	U.S. Fish & Wildlife Service
Laura Bartroff	Counselor	Donna Allard	U.S. Fish & Wildlife Service
Lisa Arakelian	Counselor	Brian Ensign	U.S. Fish & Wildlife Service
Ben McCraw	Counselor	Jon Dore	U.S. Forest Service
J. Rion Bourgeois	Experimental Aircraft Association	Suzie Lewis	U.S. Forest Service
Don Wentz	Experimental Aircraft Association	Lee Jenkins	Univ. Park Community Center
Carl Hay	Experimental Aircraft Association	Corps of Engineers	Visitors Center
Brent Ohlgren	Experimental Aircraft Association	Rick Zenn	World Forestry Center
Scott Rider	Experimental Aircraft Association		

Introduction

The Bonneville Power Administration (BPA) in collaboration with the Portland Parks Bureau Community Schools Program conducted the fourth summer science camp program July 3 - August 11, 1995. BPA's science camp program is designed to serve under-represented minority kids living in the inner city. A tailor-made curriculum of fun hands-on activities and field trips coupled with individual instruction have made the science camps successful and popular among participants.

The program offers a free 2-week summer science camp experience to students entering grades 4-6. A total of 6 camps, 30-35 students each, are held at various locations within the inner-city. Camps operate during typical school hours (9 a.m. - 3 p.m.). The camps feature individualized attention within groups of 4-6 students for each instructor. Instructors include certified teachers, college, and high school students. Each camp provides 4 field trip opportunities for participants during the course of the camp. Field trips in the 1995 Hydromania III science camps included fishing, hiking, boating, flying, and organized tours of area facilities.

Typical comments from parents were as one parent wrote: "My child just loved this camp, have never seen him so excited! Thank you!" Principal objectives for the camp are to: 1) Provide activities which communicate the need to conserve our resources and provide an understanding of the region's cycle of water and energy needs; 2) Present opportunities to integrate multicultural experiences into science activities; 3) Provide hands-on, exploratory, and fun activities for students in grades 4-6; 4) Furnish activities which identify, construct, and enhance basic science concepts and processes; and 5) Provide enrichment activities, such as field trips, where students can apply classroom learning to their community and region.

While the science camp program is sponsored by BPA and the Portland Parks Bureau, it is conducted with the collaboration of over 10 businesses, state, federal, and regional agencies. It is the diversity of collaborators which make the Hydromania camps a quality experience for participants. Activities provided herein reflect the variety of sources who contributed to the summer science camp program. If you would like more information about the Hydromania science camps please contact BPA's Engineering Services Office at (503) 230-7389.



Vickie R. VanZandt

Vice-President, Engineering Services

HYDROMANIA III **SUMMER SCIENCE CAMP**

PROGRAM GOALS

- Provide young women, minorities, and those students in low-income, low-achieving neighborhoods with a program which will increase their interest in science and mathematics.
- Through the unique design of the camps, teaching staff (certified teachers, college and high school students) will work in a team environment and explore new approaches to teaching science education. This in turn, will have a positive impact on the staff's future teaching methodology and/or curriculum design, particularly for teachers returning to the classroom.
- Increase science literacy in grades 4-6 children.
- Through a fun and exciting learning environment, deliver activities which build self esteem, so that all students feel they have succeeded.
- Expose students to cultural awareness, so they will learn to celebrate diversity at an early age.
- Through games, science experiments, and field trips, children will have a better understanding of the Pacific Northwest water issues as they relate to energy needs and the environment.
- Long-term goal- to attract women and minorities to careers in science, math, and engineering, which have traditionally been under-represented in these career fields.

CURRICULUM OBJECTIVES

The curriculum was designed to:

- Present activities which communicate the need to conserve our resources and provide an understanding of the region's cycle of water and energy needs.
- Provide activities which identify, construct, and/or enhance the science concepts and processes appropriate for grades 4-6.
- Provide enhancement activities, such as field trips, where students/staff can apply what they learned to their local, regional, and global communities.
- Provide opportunities to integrate multicultural experiences into science activities.
- Provide hands-on, exploratory, and fun activities for students in grades 4-6.