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ABSTRACT

A field-based teacher education program that is designed to educate preservice teachers for careers in urban schools is described. In this program preservice elementary school teachers spend two semesters in the classroom with veteran teachers before the traditional student teacher semester. In the second semester of the program, the preservice teachers enroll in an integrated mathematics and science methods course in which they spend 2 days in the classroom with the public school teachers and 3 days with the university professor, who conducts the classes on the public school campus. Preservice teachers teach science classes while being observed by the university professor. Immediate feedback is available when this model is used. Program evaluation focused on 42 culturally relevant science lessons taught to urban students in one semester and 33 taught in another semester. The teaching model allows culturally relevant lessons to benefit the preservice students and the public school students. This field-based model allows preservice teachers to learn to use culturally relevant approaches with urban students. Figures illustrate a non-cultural inclusive or traditional lesson, a culturally inclusive lesson, and three whole information fact sheets. Contains 18 references.) (SLD)

A Model for Bringing Culturally Relevant Science To Urban Schools

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A Model for Bringing Culturally Relevant Science to Texas Urban Schools

Introduction: All the changes in science education, K-12, suggest the imperative of major shifts in programs designed to prepare new teachers as well as programs designed to assist inservice teachers to initiate and expand changes currently advocated. The Carnegie Foundation funded the American Association for the Advancement of Science (AAAS) with a major grant to study science in the liberal arts in colleges and universities. Many see the major problem slowing reforms in K-12 science education to be college science courses and teaching. College science professors fail to understand and/or to use the research arising from cognitive science studies of the last decade (Rhoton & Bowers, 1998).

Many secondary and elementary science methods courses are going through a reform of their own to aid the K-12 science education reform. Teacher education programs have begun to make visits to secondary and elementary public school classrooms an integral part of the methods courses before the traditional student teaching semester. Preservice secondary teachers in a Houston, Texas consortium completes 200 clinical hours in a public school classroom during a 12-semester-hour block along with their method courses before their 6 semester hours of student teaching (Skoog & Johnson, 1998). Yet, being in the field or in the public school is not always an advantageous position. One disadvantage results from the neglecting of science in many urban elementary schools. Two reasons for this neglect are state driven proficiency testing and elementary teachers feeling that they are not prepared well enough to teach science (Raizen & Michelsohn, 1994). Hence, one of the natural interest of adolescents, science, is withheld from those students who need it the most.

Prior to 1999, elementary science was not one of the mandated tests in many states and therefore wasn't taught. Coupled with this fact, preservice teachers possess a fear of not being adequately prepared to teach science. Thus, preservice science training for teacher preparation is a great concern of preservice teachers and educators in general. Teaching in urban schools drastically impacts this and raises more concerns. Models of teacher preparation programs could address these concerns and better prepare preservice teachers.

Models: Traditionally teacher preparation programs followed the Model A format where student teachers are placed in public school classrooms their last semester of training. These preservice teachers usually followed the schedule and habits of their supervising teacher. A second model, Model B, places the students in the public classroom earlier than the student teaching semester. The students are assigned observations in a public school classroom for a designated number of hours per course or semester. Preservice students usually observe the classroom and supervising teacher but may or may not actually teach the students. The third model, Model C, is a more practical model for the preservice students. The preservice students are taught in a public school classroom throughout the entire teacher preparation program. They observe professors and veteran teachers teaching public school students and they also teach public school students each semester including the final student teaching semester.

Urban schools are currently being aided by Model C or field-based teacher preparation programs that collaborate with public schools. Design and implementation of programs occur in a partnership model, and the delivery of substantial parts of professional education is in the field. In Model C, real-life experiences with public school students, teachers, and school personnel are integrated into each education course, and prospective teachers spend much of their time in Pre K-12 schools. University faculty teaches education courses in public school classrooms, and form teams with public school teachers to prepare future educators. With this model, university students immediately see the relationship between theory and practice (Hallman, 1998). But this particular field based teacher education program educates preservice teachers for careers in urban schools.

In this particular field based teacher education program, preservice elementary teachers spend two semesters in the classroom with veteran teachers before the traditional student teacher semester. This gives them more time to acclimate to the urban schools. Specifically in the second semester of the program, preservice teachers enroll in an integrated math and science methods course. They spend two days in the classroom with the public school teacher and three days with the university professor. In this model, the university professor conducts all classes on a public school campus. The preservice teachers are instructed to teach science lessons with the public school students while being observed by the university professor. This not only gives the preservice teachers an opportunity to model science lessons for the university professor but also for the public school veteran teachers. Immediate feedback is readily available with this model. Thus, this program helps to introduce science lessons each semester to a population of urban elementary students that might not otherwise, have these science experiences. This study reviews this collaborative model which not only enhances science education but delivers culturally relevant science lessons to several Houston urban schools.

Since the spring 1996 semester, preservice teachers in this program have been assigned to teach science lessons in public school classrooms to gain practical experiences and demonstrate acquisition of concepts and methods demonstrated by the college professors. They were instructed to address the culture of the students in the lessons because they were teaching in classrooms that were either predominantly Hispanic or African American. By doing this they also met state and/or local mandates concerning multiculturalism. Adding the multicultural perspective has been demonstrated to enhance the interest and achievement of students of color (Lara-Alecio, Irby, & Morales-Aldana, 1998; Barba, 1997; Banks & Banks, 1995; Key, 1995; Banks, 1994).

Banks (1994) defines the inclusion of cultural elaborations or examples from various cultures and groups to illustrate key concepts, principles, and theories as the "Additive Approach". The Additive Approach is one of six approaches for multicultural curriculum reform (Banks, 1994). It is merely the addition of role models, elaborations, heroes, and special days to traditional lessons (see Fig. 2). The Additive Approach is recommended by this author as a strategy for teachers learning how to integrate cultural inclusive lessons into their traditional lessons or curricula (see Fig. 1). Along with the elaborations, teachers should desire to include culturally sensitive learning strategies and the "Decision-Making and Social Action" approaches

(Banks, 1994). The Decision-Making and Social Action approaches add the dimension of a second voice and solicit a commitment from students and teachers (see Fig.2, Makah Indians).

Results: In Spring 1996, twenty-six culturally relevant science lessons were taught to urban students. Thirteen of those lessons were converted to science fair projects. The topics and concepts taught for science fair projects were chosen by the students which showed their increased interests in the science lessons previously taught by the preservice teachers. Eight projects won ribbons in their building fairs and five won in the district fair.

In the Fall 1996 semester, forty-two culturally relevant science lessons were taught to urban students. Many of those lessons were extended into science fair projects. Spring and Fall 1997, all culturally relevant lessons related to space science. This author had obtained funding to help increase the interest of students of color in space science activities and careers. Sixty-six lessons were taught to urban students in the spring and sixty-six were taught in the fall. Many of those lessons were extended into science fair projects. The perceived awareness and interest of these students increased ninety percent.

In the Spring 1998 semester, thirty-three culturally relevant science lessons were taught to 220 urban students by eleven preservice teachers. Many students began to use extra time for science activities; asked more questions about scientists of color and science careers; began to talk more about science projects, books, TV shows; asked to do extra work related to science; and discussed science lessons with the teacher more often. Eleven of the lessons were extended as science fair projects, for this year projects were done by classes rather than by individuals.

This teaching model allows culturally relevant lessons (see Fig. 3) to benefit the preservice students and the public school students. The culturally relevant lessons help meet the needs of all students and especially students of color. Equity pedagogy used by preservice students makes use of ethnic culture, devote little attention to class, and lists cultural characteristics (e.g. learning styles, teaching styles, and language) to help teachers build on the cultural strengths of ethnic students. Content integration allows teachers to use culturally relevant examples, data, and elaborations with their pedagogy (Banks & Banks, 1995).

Conclusion: The preservice teachers related that the culturally relevant lessons appeared to have made the students attend to the lesson more, remember more of the content, learn culturally relevant information, and anticipate the next science lesson with positive attitudes. Some comments from preservice students concerning the cultural inclusive lessons were:

> "Students were overall more interested in the culturally inclusive lesson".
>
> "Instructors gained the student's respect by showing interest in their culture".
>
> "There was some improvement in academic achievement".
>
> "The children were more excited and interested in the cultural inclusive lesson. However, it was not clear if this excitement was due to the multicultural aspect or to the repetition of the lessons".
>
> "The interest level of all the students increased during the second lesson which included the culturally relevant element".
>
> "The students seem to listen better and were more attentive during the multicultural inclusive lesson".
>
> "Although the students performed their activities well in both lessons, there was more interest and participation in the discussion during the second lesson".
>
> "I read a multicultural book to some students and they noted on their rubric that it was their favorite part of the lesson".

Cultural inclusion emphasizes the pedagogy and exemplars that invite students of color to participate in the learning process. Through this model of a field based teacher education program more than 400 science lessons have been brought to approximately 2,000 elementary urban students. They have been exposed to many science concepts and different cultures. Many of these students were winners in their building and district fair. For several of these students this was not only the first time to complete a science project but also the first time to receive a ribbon or a trophy.

Through this process the preservice students learned how to begin the process of multiculturalizing their science lessons. Inclusion of cultural factors enhance student achievement and considering changes in the student demographics in Texas and the state assessment, this change should be grasped readily. This collaboration shown between the urban schools and this urban teacher training program exhibits a model to enhance science achievement, share diversity in urban classrooms, and prepare more competent teachers. This model allows professors to use the research from cognitive science studies and apply it to help instill competency instead of fear in the teaching of elementary science. There is no perfect model, program, or solution for the dilemma of science education in urban schools. Nor is there a perfect way for teachers to begin the process of "multiculturalizing" their lessons but this field based model offers more benefits than other traditional models.

References

Banks, J., & Banks, C. (Eds.). (1995). *Handbook of Research on Multicultural Education,* New York: Macmillan.

Banks, J. (1994). *Multiethnic Education: Theory and Practice.* Boston: Allyn and Bacon.

Baptiste, P. & Key, S. (1996). Cultural Inclusion: Where does your program stand? *Science Teacher*, 32-35.

Barba, R. (1997). *Science in the Multicultural Classroom.* Boston: Allyn and Bacon.

Bunderson, E. & Bunderson, C. (1996). Implications of teachers' recollections of topics selected by boys and girls for science fair projects. *Journal of Elementary Science Education, 8* (2), 21-31.

Gay, G. (1993). Building cultural bridges: A bold proposal for teacher education. *Education and Urban Society, 25* (3), 285-299.

Hallman, P. (1998). *Field-Based Teacher Education.* Texas State Board for Educator Certification.

Katz, L., & Raths, J. (1982). The best intentions for the education of teachers. *Action in Teacher Education, 4*(1), 8-16.

Key, S. (1995). African-American eighth grade students perceived interest in topics taught in traditional and nontraditional science curricula. *Dissertation Abstracts International 56* (5), 1725.

Key, S. (1998). Using culture to enhance African-American students' interest in science. An accepted chapter in a future monograph on multicultural science education.

Lara-Alecio, R., Irby, B. & Morales-Aldana, L. (1998). A mathematics lesson from the Mayan civilization. *Teaching Children Mathematics, 5*(3), 154-158.

Martin, D. (1997. *Elementary Science Methods: A Constructivist Approach.* Boston: Delmar Publishers.

Raizen S. & Michelsohn, A. (1994). *The Future of Science in Elementary Schools: Educating*

Prospective Teachers. San Francisco: Jossey-Bass.

Rhoton, J. & Bowers, P. (1996). *Issues in Science Education.* Arlington: National Science Teachers Association.

Skoog, G. & Johnson, M. (1998). Connecting to Improve Methods Courses. *Restructuring Texas Teacher Education Series.* Austin: Texas State Board for Educator Certification.

Stuessy, C. & Thomas, J. (1998). *Elementary Teachers Do Science: Guidelines for Teacher Preparation Programs.* Columbus: Eric Clearinghouse for Science, Mathematics, and Environmental Education.

Valverde, L. (1993). Introduction. *Education and Urban Society, 25*(3), 227-230.

Fig. 3

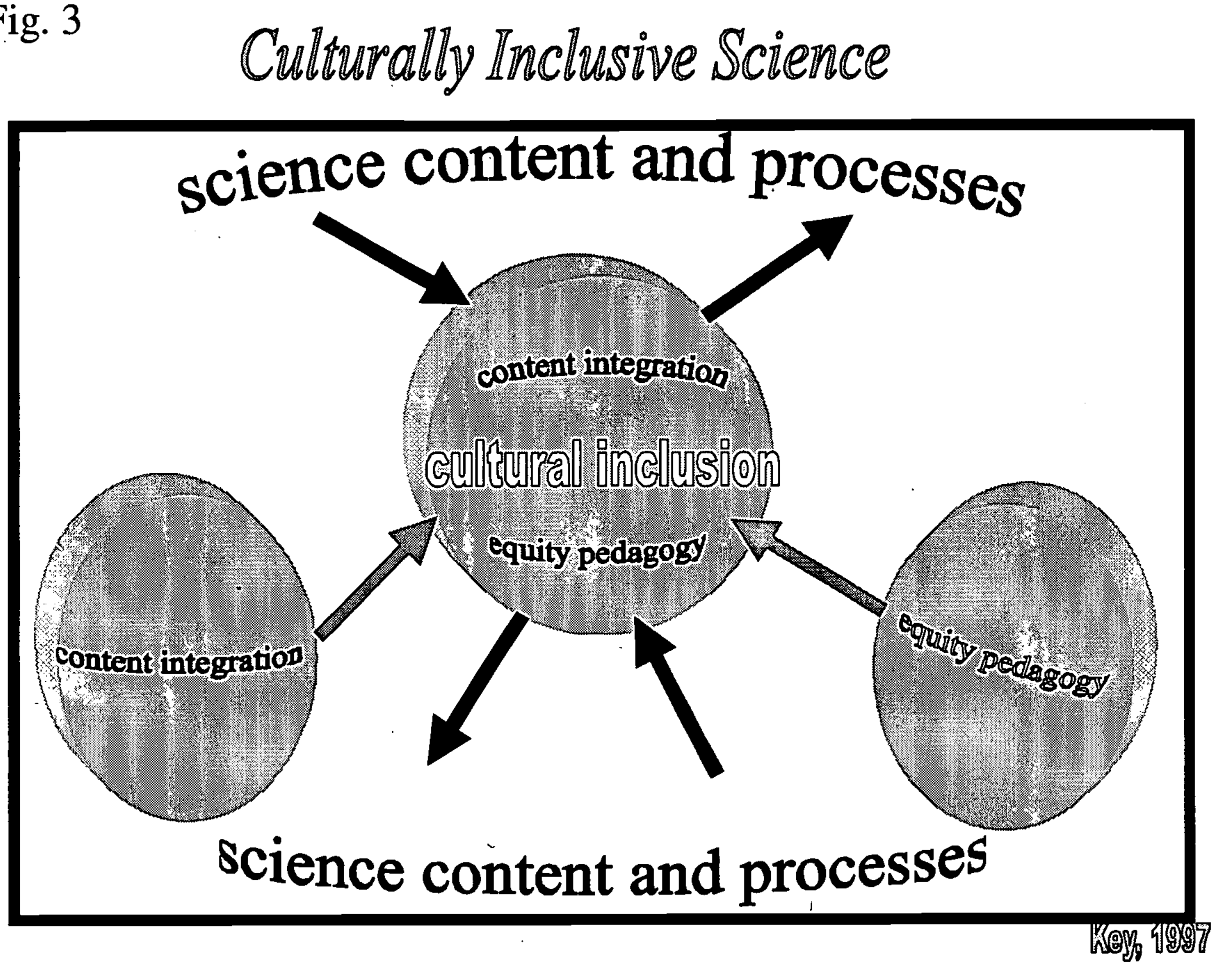

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Figure 1: Non-Cultural Inclusive or Traditional Lesson

Sizing up a Whale (4th grade)

National Science Education Standards
Life Science Content Standard C: As a result of activities in grades K-4, all students should develop understanding of (1). the characteristics of organisms and (2). organisms and their environments.

"Are all whales the same length?"

After students have been introduced to whales, oceanic explorations, and oceanographers, they will discover some characteristics of different whales.

Objectives: The students will view pictures of various whales and estimates their lengths, compare the whales to each other, and express the size of one whale to another in a ratio. The students will predict how many and what type of whales could be found in the same location.

Materials: pictures of whales; meter stick; ball of yarn; wall chart; note cards on oceanographers; plastic bags (with a different type of whale picture in each bag)

Teaching Procedure: 1. Place students in cooperative groups.

2. After various reading resources and videotapes, allow the students to review oceanographers, oceanic expeditions, and types of whales. Ask them to **predict what type of whales** Mr. Scoresby and von Kotzebue may have seen on their expeditions. (*William Scoresby (1789-1857), An English whaler and scientist. He made many surface and deep observations of the seas off the coast of Greenland. Otto von Kotzebue (1787-1846) A Russian admiral, made two circumnavigation's in 1815-1818, and 1823-1826, primarily for scientific purposes*).

3. Ask the students to use their prior knowledge and **estimate the size of the whales** they believed were seen by Mr. Scoresby and von Kotzebue.

Students will then use materials in their plastic bags to measure the size of the designated whale found in their bag to help them verify and clarify their estimations.

ivity:

1. Whales are obviously larger than they appear in pictures and diagrams. On the wall is a chart with various pictures of different whales. Predict the length of the six whales.

Blue whale:______ Sperm whale: _____ Gray whale: _______
Humpback whale: _____ Orca (Killer whale): _____ Beluga whale: ______

2. Inside your plastic bag are a ball of yarn and a picture of one of the whales seen by the oceanographers. What is the type of whale found in your bag? ________________

3. The size of the whale in meters is written on the whale.

What is the size of the whale found in your bag? ______________________

Write it on the wall chart beside the picture of your whale.

4. Now, you are to measure and then cut that amount of yarn and show how long your designated whale is.

5. Tape your yarn around the room to demonstrate the size of your whale.

6. How did your group's estimation compare to the actual measurement?

____

____

7. Which was the longest whale that could have been seen by the oceanographers?

____

8. Which was the shortest whale that could have been seen by the oceanographers?

____

9. Which whale is twice as long as your whale? ____________________________

10. Is there any whale that is three times as long as one of the whales? (The size is 3:1)

____

11. Use the Whale Fact Sheets and other resources to compare 2 characteristics of your assigned whale with 2 other whales.

Figure 2: Culturally Inclusive Lesson

Sizing up a Whale

National Science Education Standards
Life Science Content Standard C: As a result of activities in grades K-4, all students should develop understanding of (1). the characteristics of organisms and (2). organisms and their environments.

"Are all whales the same length ?"

After students have been introduced to whales, oceanic explorations, and oceanographers, they will discover some characteristics of different whales.

Objectives: The students will view pictures of various whales and estimates their lengths, compare the whales to each other, and express the size of one whale to another in a ratio. The students will predict how many and what type of whales could possibly be found in the same location.

Materials: pictures of whales, meter stick, ball of yarn, wall chart, note cards on oceanographers, plastic bags (with a different type of whale picture in each bag)

Teaching Procedure: 1. Place students in cooperative groups.

2. Allow them to review oceanographers, oceanic expeditions, and types of whales. Ask them to **predict what type of whales** Mr. Scoresby and von Kotzebue may have seen on their expeditions. (*William Scoresby (1789-1857), An English whaler and scientist. He made many surface and deep observations of the seas off the coast of Greenland. Otto von Kotzebue (1787-1846) A Russian admiral, made two circumnavigation's in 1815-1818, and 1823-1826, primarily for scientific purposes. Introduce Dr. Forde, Dr. Carmen Aguilar, and Dr. Miguel A. Goni. Discuss the Makah Indian tribe in Washington.*

***Dr. Forde** is an African American oceanographer who currently works for NOAA in* North America (http://www.aoml/.noaa.gov/od/people/forde).

Dr. Goni is a Hispanic oceanographer who currently teaches at the University of South Carolina. He has worked as an oceanographer for the Woods Hole Oceanographic

Institution in Massachusetts. His research involves the transformation and fate of organic matter in marine and aquatic environments (http://129.252.79.23/goni/gonicv.htm).

Dr. Aguilar is a female and a Hispanic aquatic scientist at the Center for Great Lake Studies. Her research focuses on abiotic and biotic factors that determine aquatic structures in both ocean and freshwater environments (http://tiger.toano.wjcc.k12.va.us/public/)

The Makah Indian tribe wishes to resume their tradition hunting whales. They stopped whaling in the 1920s after commercial whaling decimated the gray-whale population. The Makah have received federal support for a plan to take 20 whales through 2002, a maximum of five per year (Andersen, P. 1998. http://www.abcnews.com/section/science).

Allow the students to research the Makah whaling traditions, and decide whether the Makah should be allowed to continue their traditions. Assign them the job of writing a letter to the appropriate officials expressing their points of view.

4. Ask them to predict what type of whales would they expect Dr. Forde, Dr. Gonti, and Dr. Aguilar to see and study.

Allow the students to **predict the size of the whales** they believed were seen by Mr. Scoresby, von Kotzebue, and Dr. Forde.

Students will then use materials in their plastic bags to measure the size of the designated whale found in each bag.

ivity:

1. Whales are obviously larger than they appear in pictures and diagrams. On the wall is a chart with various pictures of different whales. Estimate the length of the six whales.

Blue whale:______	Sperm whale: _____	Gray whale: _______
Humpback whale: _____	Orca (Killer whale): _____	Beluga whale: ______

2. Inside your plastic bag are a ball of yarn and a picture of one of the whales seen by Dr. Forde. What is this type of whale seen by Dr. Forde? ________________

3. The size of the whale in meters is written on the whale.
What is the size of the whale found in your bag? ______________________

Write it on the wall chart beside the picture of your whale.

4. Now, you are to measure and then cut that amount of yarn and show how long your designated whale is.

5. Tape your yarn around the room to demonstrate the size of the whale seen by Dr. Forde.

6. How did your group's estimation compare to the actual measurement?

____

____

7. Which was the longest whale that could have been seen by Dr. Forde?

____

8. Which was the shortest whale that could have been seen by Dr. Forde?

____

9. Which whale is twice as long as your whale? ____________________________

10. Is there one whale that is three times as long as one of the other whales? (The size is 3:1)

____

11. Use the Whale Fact Sheets and other resources to compare 2 characteristics of your assigned whale with 2 other whales.

Whale Information Fact Sheet 1

Blue whale:	The largest living animal on Earth. Swims in oceans all over the world. Toothless. Eats by straining small plants and animals through its baleen. Up to 90 feet (27.5 m) in length.
Sperm whale:	Mature females growing to about 39 feet (12 m) in length. Mature males growing to about 59 feet (18 m) in length. Feed on fishes and particularly on large deep-water squid.[1] Get their name from the oily fat—called *spermaceti*—contained in their large heads.
Gray Whale:	Recognized by their mottled skin, encrusted with patches of barnacles. Often seen playing in shallow coastal waters of the Pacific Ocean. Medium-size whale.

[1] "Sperm Whale," *Microsoft® Encarta® 96 Encyclopedia*. © 1993-1995 Microsoft Corporation. All rights reserved.

Whale Information Fact Sheet 2

Gray Whale: May attain lengths of up to 49 feet (15 m). The skin is mottled black, gray, and white, and this distinctive color pattern can be used to identify individuals. The whales are usually covered with barnacles and whale lice.[2]

The diet of gray whales consists mainly of invertebrates.

Humpback whale: Known for its "song".

Feed on invertebrates and fish.[3]

Up to 50 feet (15.2 m) in length

Classified as an endangered species.[4]

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[2]"Gray Whale," *Microsoft® Encarta® 96 Encyclopedia*. © 1993-1995 Microsoft Corporation. All rights reserved.

[3]"Humpback Whale," *Microsoft® Encarta® 96 Encyclopedia*. © 1993-1995 Microsoft Corporation. All rights reserved.

[4]"Humpback Whale," *Microsoft® Encarta® 96 Encyclopedia*. © 1993-1995 Microsoft Corporation. All rights reserved.

Whale Information Fact Sheet 3

Orca (Killer whale): Has teeth.
Eats fish and marine mammals.
Found in all seas but common in cold waters.
Up to 33 feet (10.1 m) in length.

Beluga whale: Inhabits the cold seas and oceans.
The largest living mammals.
Toothed whale, closely related to the dolphin.

Males can attain a maximum length of 23 feet (7.0 m and a weight of 1 metric ton.

Females are somewhat smaller.

Travel in schools.

Feed on fish, octopus, crabs, snails, and squid. Common to the Arctic Ocean and travel as far south as the state of New Jersey in the United States and the Rhine River in Europe.[5]

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[5]"Beluga," *Microsoft® Encarta® 96 Encyclopedia*. © 1993-1995 Microsoft Corporation. All rights reserved. © Funk & Wagnalls Corporation. All rights reserved.

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