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**THE
NEW YORK CITY
WATERFRONT**
An Interdisciplinary
Discovery Curriculum

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by Harry Reese & Sue Jackson

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Harry Reese
Sue Jackson

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Statue of Liberty on Liberty Island, seen from Jersey shore.

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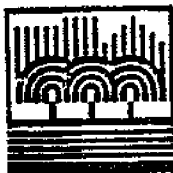
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The Parks Council



80 Central Park West, New York, N.Y. 10023 212 799 6000

April 1979

The Parks Council is pleased to help sponsor this curriculum guide and its companion learning materials. We hope that New York City teachers and their students will discover the vitality, diversity, rich history and beauty along the city's 578 miles of waterfront.

These materials illustrate the importance of the urban environment, thus presenting to city schoolchildren a new source of neighborhood pride. The suggested class activities explore the many aspects of city life that can be witnessed along the waterfront; through these means we hope to awaken new constituents for all the environmental issues.

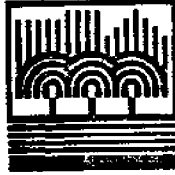
The Parks Council thanks those persons and institutions who helped make possible this curriculum and the earlier editions on which it is based: I.S. 162 in the South Bronx; the Bicentennial Corporation; New York City Board of Education; International Longshoremen's Association; New York State Sea Grant Institute; and especially Eugenia M. Flatow, who combines vision with persistence and has helped us all to see the extraordinary potential of the city's waterfront.

Barbara J. Fife
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The Parks Council is recognized as one of the leaders in the field of environmental education for all ages, but particularly for school children. Jamaica Bay, Alley Pond and Inwood programs grew out of models stressing environmental centers, park wardens, teacher training and outdoor classrooms.

This emphasis, however, on wildlife and natural settings, though admirable in itself, is only one phase of the urban environmental ecosystem. Much of the literature and audio-visual aids stress the beauty of nature to the detriment of the urban environment and present many school children with few sources of neighborhood pride.

The Parks Council, casting about for a model within which to present a more dramatic and balanced picture, was persuaded by its Waterfront Committee that an integrated curriculum on New York City's waterfront would offer an exciting opportunity to awaken new constituents for all the environmental issues. The BiCentennial focus on the waterfront heightened this approach.

The final consideration was to seek an intermediate school in an impacted neighborhood where there could be equal emphases on opening up new career options and building educational skills through motivational techniques. I.S. 162, in the South Bronx, with an enlightened administration and a team-teaching concept, provided the laboratory. Parks Council provided cameras and film, tape cassettes, wading boots and other supplies, and the program was developed by the teachers. The BiCentennial corporation recommended it to the Board of Education, which sponsored two teachers for two weeks during the summer of 1974 to begin writing the curriculum; the work was finished during the fall on the teachers' own time so that the material would be available to other teams who are continuing the program.

Parks Council had the original curriculum typed and the International Longshoremen's Association, long a patron of waterfront projects, contributed the first printing. This revised edition is funded by New York State Sea Grant.

We are happy to provide this copy in the hope that you, too, will discover the rich opportunity and beauty that awaits the student in this island metropolis.

ABOUT THE AUTHORS

Harry Reese has taught science at I.S. 162 in District 7 in the South Bronx since 1966, and has been the acting chairman of the Science Department since 1973. He has served as a consultant to several book publishing companies to evaluate textbooks. He also served as a science and environmental education consultant in both the public and private sectors.

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The authors originally chose the waterfront motif as a convenient vehicle for interdisciplinary activities. The on-site discovery learning approach was a tremendous motivating factor, witness the fact that the average increase in reading comprehension grade equivalent scores each year was 2.6.

ACKNOWLEDGMENTS

We would like to thank the following people for their support, expertise, and encouragement: Eugenia Flatow and Lynn Gray and his education staff at the New York Urban Coalition; Norman Cohen and Jeannette Bamford of the Parks Council; Joe Ketas of the Department of City Planning; Karen Hensel at the New York Aquarium; Linda O'Dierno at the New York Sea Grant office; Frank Mifsud from J.H.S. 73 in Queens; Rick Raymond, Marine Education Consultant; Sam Holmes, Education Director at Gateway National Park; Harvey Goldenberg, Principal of I.S. 162 in the Bronx; and Joyce Selig, photographer.

Special thanks to our typist, mentor, and proofreader, Mavis Simmons, and to our patient and understanding families who have had to live with our project for so many years.

INTRODUCTION

It has been an accepted historical fact that the waterfront was the key to New York City's growth and economic development. Unfortunately, for more than a decade, much of the waterfront land has been abandoned or misused. To date, 57 of the 220 straight-line miles of waterfront land lie vacant, deserted, or underutilized. The New York City Planning Commission, in its 1971 report on the waterfront, admitted that "the waterfront is now the city's most extensive, underdeveloped, and promising natural resource."¹

Lately there has been a dramatic increase in interest in the New York City waterfront because of changes in land-use patterns and a new awareness and concern for the physical and social environment of our city. In fact, New York City selected the waterfront as the theme for its celebration of the U.S. Bicentennial in 1976.

A multitude of city agencies and private groups are focusing their energies on waterfront study and planning activities. The schools must play an active role in this awakening of interest and concern. The following curriculum guide has been developed to enable teachers to educate and involve the school community in the study of this invaluable resource.

The curriculum will be guided by several unique considerations:

1. The emphasis will be on discovery learning and application of concepts rather than fact assimilation.
2. The package is designed for an interdisciplinary approach. The waterfront as an urban system defies traditional subject compartmentalization. The problems of the waterfront will be studied from many

¹New York City Planning Commission, The Waterfront. New York: January, 1971, p. 5

points of view. While the major study will be performed by the social studies and science teachers, support activities have been designed for math and language arts teachers. Although a team approach would be ideal, the curriculum can easily work in a self-contained or traditional classroom as well.

3. The curriculum suggests that the New York City waterfront be used as a classroom. The emphasis is on on-site learning activities where students discover for themselves problems and solutions rather than just reading about them in books. An extensive list of resource experts, agencies, and places of interest is provided to guide the teacher in the use of New York City's waterfront resources. A field trip guide with background information and worksheets accompanies this curriculum.
4. The curriculum suggests a multimedia approach as opposed to the traditional lecture-textbook method. Not only will a list of commercial multimedia resources be included, but suggestions as to how to encourage and teach students to develop their own multimedia presentations will be emphasized. An audio-visual kit of slides, photos and transparencies accompanies this guide.
5. The curriculum encourages evaluation of learning experiences on the part of the student in order to foster greater social awareness and self-concept and to provide a continuing improvement tool to revise and adapt the curriculum.

We strongly encourage all participating classes to complete one or more of the following enrichment activities:

A. Photography Exhibit

Encourage students to take pictures on all field trips. After developing the photographs, arrange them on a felt display board or in a glass display case. Have students write original captions for each photo. This exhibit can be displayed in the school, in community libraries, in subway platforms, in local banks, or other public places

B. Television or Radio Documentary

Have students write a radio or TV script describing their waterfront unit. Tape the finished project (use videotape if available). The documentary can be shown at a school assembly, a community meeting or on Channel 25 TV.

C. Models and Dioramas

Have students build a mini "marine gallery" of model ships and a diorama of a section of the New York City waterfront at a certain date. Students can visit the marine gallery at the Museum of the City of New York for ideas and pointers. The finished exhibit can be donated to the school or community library.

D. Written Reports

Students choose another waterfront city to compare with New York City. Suggestions include Venice, Italy; Amsterdam, the Netherlands; Hong Kong; Copenhagen, Denmark; Stockholm, Sweden; and San Francisco, U.S. Emphasis should be placed on aspects and solutions that could be adapted by New York City.

E. Pamphlet File

Students are told at the beginning of the unit to cut out all newspaper and magazine articles relating to the waterfront. At the end of the unit, these are placed according to chronology or subject, put into a folder or manila envelope, and donated to the vertical file of the school or local library.

OBJECTIVES

A. Understandings

1. to understand the role of the waterfront in the city's historical development;
2. to understand all the ways that the waterfront is presently being used;
3. to understand the impact of urban growth on New York's water resources;
4. to understand the interrelations of the various water systems;
5. to understand the need for coordinated long-term planning for the effective utilization of the waterfront.

B. Skills

1. to identify problems and draw conclusions, make hypotheses about the waterfront from an analysis of maps, data, and concepts;
2. to recognize and draw casual relationships about the impact of the city on its water resources;
3. to relate facts and concepts learned about the waterfront to personal experience;
4. to test hypotheses about water quality through experimentation;
5. to evaluate waterfront learnings and activities.

C. Attitudes

1. to enhance self-concept and image through student participation in discovery learning;
2. to gain an appreciation for the complexity of waterfront problems;
3. to gain an awareness of the importance of citizen involvement in waterfront planning.

D. Outcomes

1. Students will know which governmental agencies to contact in order to have input into waterfront planning.
2. Students will be able to locate the city's major waterways.
3. Students will know the waterfront factors which influenced New York City's growth.
4. Students will know how to make a multi-media presentation dealing with a waterfront theme.

5. Students will know how the city's water supply reaches them.
6. Students will know the effects of pollutants on the city's water resources.
7. Students will have an enhanced sense of community awareness through analysis of waterfront resources in their neighborhood.
8. Students will be able to do simple analyses of water samples.
9. Students will know the importance of cooperative planning for the development of the city's waterfront.
10. Students will be able to postulate possible solutions to waterfront problems.
11. Students will know how the waterfront influenced New York City's cultural heterogeneity.
12. Students will be able to identify and survey major types of water ecosystems.

THEME I:

HOW HAS THE WATERFRONT AFFECTED NEW YORK CITY'S GROWTH?

A. Introduction and background

SS activity: Filmstrip on New York City Growth

Show motivating filmstrip that outlines New York City growth. An excellent sound filmstrip for this purpose is "New York: Growth of a City" (Eye Gate House). Generate discussion of following topic questions:

- (1) Who first inhabited the New York area?
- (2) What did the New York harbor look like as a Dutch settlement in 1626? (frame 2)
- (3) Describe the favorable characteristics of the New York harbor. (frame 12)
- (4) What effect did the Erie Canal (frame 15) and the railroads (frame 16) have on New York City growth?
- (5) What effect do you think the immigration wave of the 1840's had on New York City growth? (frame 19)
- (6) Why did New York City organize into five boroughs? (frame 31)
Name the boroughs.
- (7) Name some of the important points of interest in New York City that are located along its waterways. (frames 40, 44, 45)
Can you think of any others?

Summary: The filmstrip you have just seen outlines the growth of New York City. What role did the waterfront play in its development? (This can be in the form of a written homework assignment or an oral discussion.)

B. Geographical Factors

1. New York is an Island City

SS activity: Map Study - New York City

Have students identify and label the five boroughs and major waterways on a map of New York City. Reproduce an outline map of New York City (to be found in most encyclopedias, New York history texts, or Hagstrom's guide). Ask students to label the five boroughs, the Hudson River, the East River, the Harlem River, Lower New York Bay, Upper New York Bay, the Narrows. (Optional. Also label Kill Van Kull, Arthur Kill, Raritan Bay, Gravesend Bay, Flushing Bay, Little

Neck Bay, Eastchester Bay, and the Long Island Sound.) Save map for future reference.

Generate a discussion of the following topic questions?

- (1) How many of the boroughs are islands? How do you know they are islands? List the island boroughs. Name the borough(s) that is (are) not an island.
- (2) How many major rivers are there? List the names of the rivers.

Summary: New York is called an island city because four of its five boroughs are surrounded by water. Note, three rivers surround Manhattan Island.

For homework, write a paragraph answering the following question: Why do you think Manhattan Island was the first borough to be developed?

SS-LA activity: Circle Line Tour of Manhattan

(See Field Trip Guide)

2. The Hudson River Provided Easy Access to the Interior States.

The Opening of the Erie Canal (1825) Provided Even Greater Access.

SS activity: Map Study - Hudson River

Point out the strategic location of the Hudson River. Use thermo-faxed copies of the map that follows or a standard wall map. Trace the route taken by trading ships and barges from the Atlantic Ocean to Albany and across the Erie Canal. Generate a discussion of the following questions:

- (1) Looking at your map, why do you think New York City was such a strategic trading center?
- (2) Prior to the opening of the Erie Canal in 1825, goods had to be shipped to Buffalo by land. What advantages can you think of that water transportation had over land transportation? (Note: larger bulk goods can now be transported where before only whiskey and furs were traded.)

Summary: The Hudson River opened up the interior U.S. as a source of goods for export and a market for imports. This made New York City a strategic trading and distributing center.

For homework, write a paragraph answering the following question: Why was the Hudson River so important in the growth and development of New York City?

SS-LA activity: Day Liner Cruise up the Hudson River

(See Field Trip Guide)

Math activity: Shipping Costs

Have students solve several problems related to shipping costs from New York to Buffalo.

e.g. #1: Before 1825, it cost \$100/ton to carry goods from New York City to Buffalo. After the Erie Canal opened in 1825, it cost only \$6/ton. How much would it have cost to ship 5 tons of iron goods from New York City to Buffalo in 1810? in 1830? What was the difference in cost?

e.g. #2: Assume an average barge in 1830 carried 100 tons of bulk goods. The shipping company charged \$6/ton. How much would it have cost a farmer in Buffalo to ship 250 tons of wheat to New York City? How many barges would he have had to use?

C. Harbor Characteristics

1. Explorer Henry Hudson Writes About New York Harbor in 1609

LA activity: Comparison of New York City Harbor 1609/Today

Compare New York harbor as it looked to Henry Hudson to what it is today. Show a picture of harbor (c. 1600) to class. (Note: Most New York history texts, many encyclopedias, and many New York history filmstrips have such pictures.) Read aloud Hudson's quote about the harbor:

"This territory is the finest for cultivation that I ever in my life set feet upon and the situation well adapted to shipping."

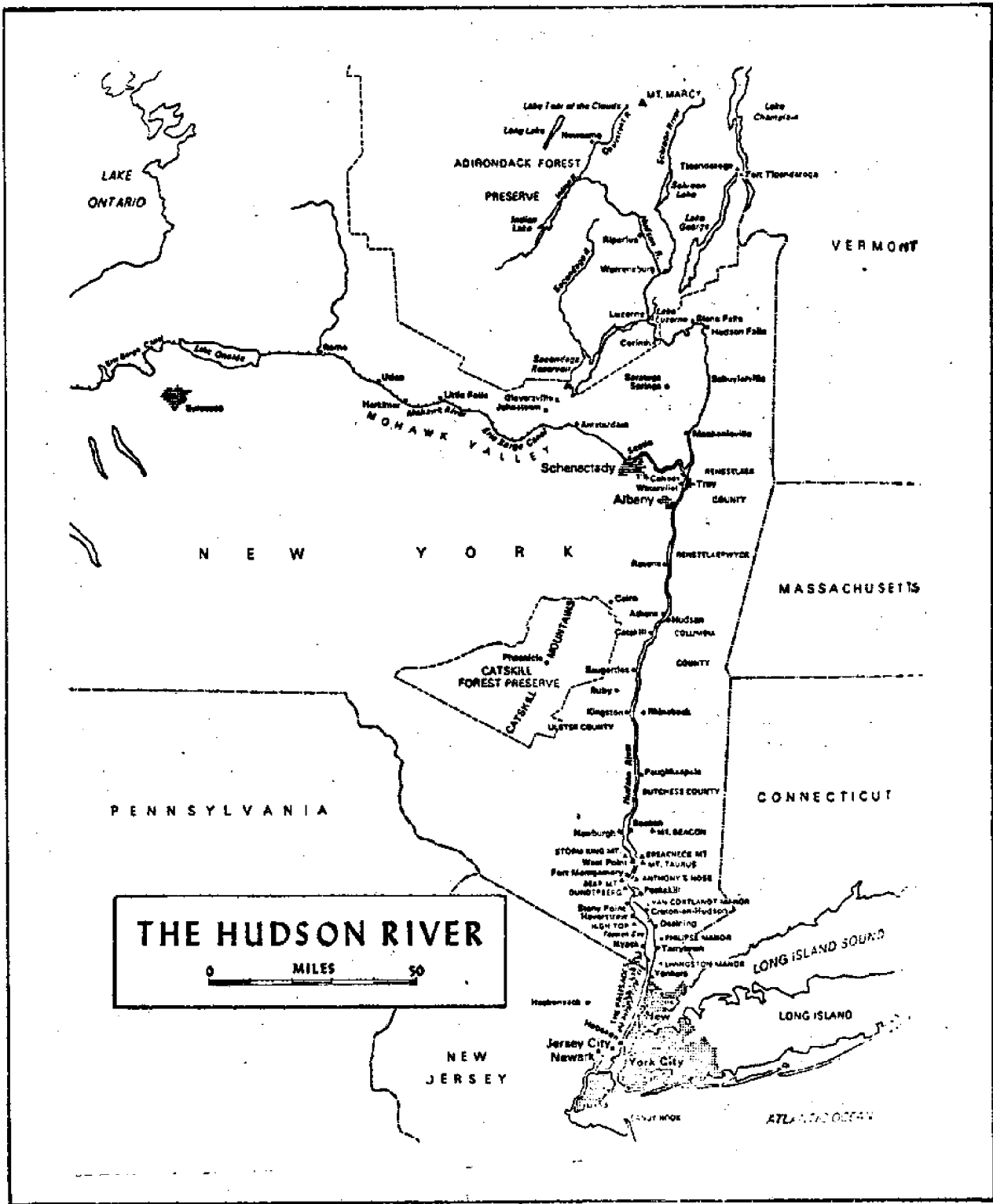
Hudson, c. 1609¹

From this quote, what two industries might you predict would be important in the early growth of New York City? (answer: farming, shipping).

Describe what the harbor looked like then.

The best way to study the present-day harbor would be to take the students on a trip on the Staten Island Ferry (South Ferry, Manhattan) and have them take pictures of the harbor, develop them, and bring them to class. If this is not feasible, show pictures of present-day New York harbor to class. (Again, these may be found in most New York history texts, encyclopedias, and filmstrips.)

¹"The Waterfront". City Planning Commission, January, 1971, p. 17



MAP OF WATERWAYS IN NEW YORK STATE

From: Komroff, Manuel. The Hudson. New York: McGraw-Hill, 1969, p.14.

Summary: The New York harbor has changed in 350 years. Skyscrapers have taken the place of once open land and trees. Industrial and shipping development have polluted and crowded the once clear waterways of New York City.

For homework, write a paragraph describing the present-day New York harbor as if you were an explorer from another planet. (Optional: illustrate your essay with original snapshots and/or magazine photographs.)

2. New York City Has a Sheltered Harbor

SS activity: Map Study - Harbor Characteristics

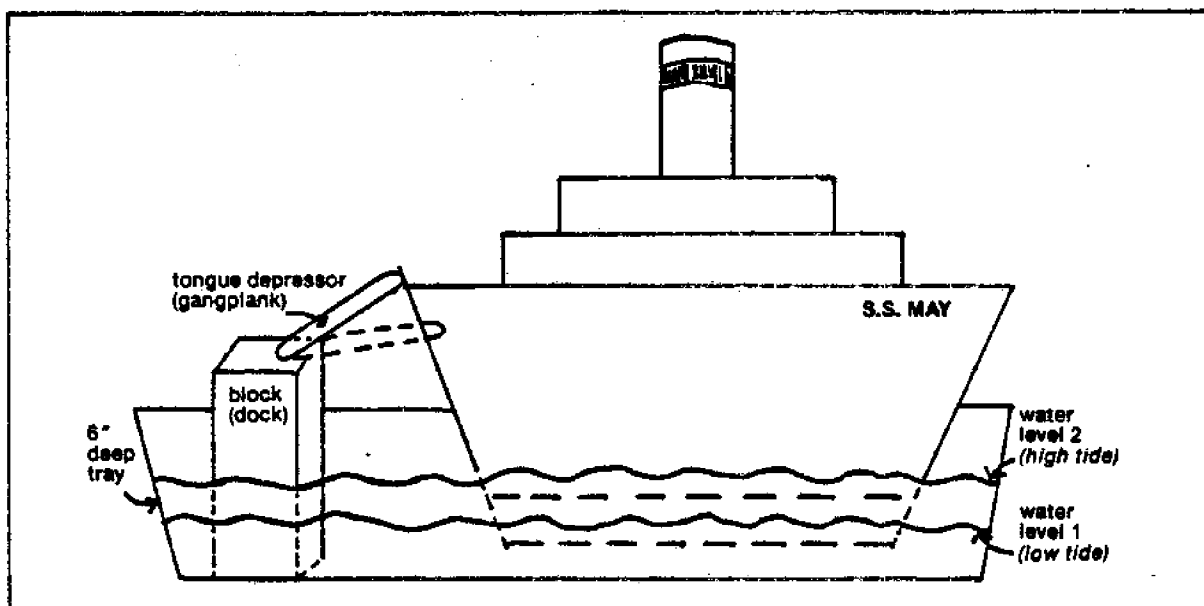
Using a map, guide students to discover factors that made New York harbor so popular. The rexo maps previously labelled by the students can be used for this exercise. Point out how the Narrows protects the harbor. Strategic forts placed along the Narrows shores could easily repel enemy attacks. It is best to try to elicit as much information directly from the students as possible.

Key questions might be:

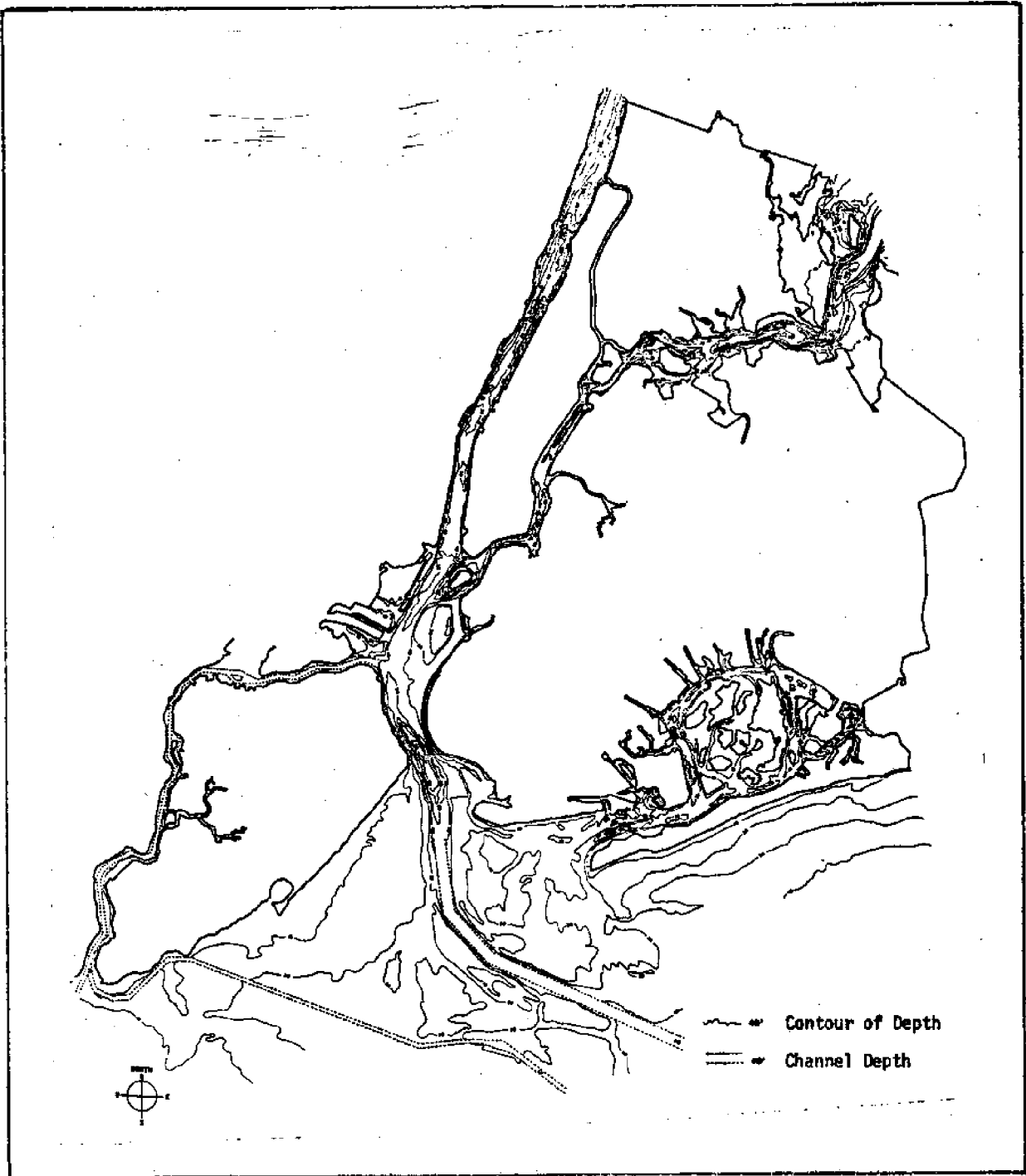
1. What is this strip of water called?
2. How did this strip of water shelter the harbor? (natural break-water from ocean storms; strategic defense positions)

SS activity: Battery Park Observation Trip

(See Field Trip Guide)



Tidal Change Demonstration



DEPTH OF WATER

From: "The Waterfront", City Planning Commission, January, 1971, p. 105.

3. New York City has a Deepwater Harbor with Only 4-1/2' Tide

Sci activity: Tidal Change Demonstration

Examine the effect of tidal change on docking and unloading of ships. Set up a simple demonstration to show tidal effects. Materials needed: one 6" tray, a brick, a toy boat (wooden or plastic), a tongue depressor or ice cream stick, masking or scotch tape, string. (See diagram, p.12)

Place a brick or wooden block in tray of water (water should be about 1" deep). Tie a toy boat loosely to this "dock" with string. Tape a piece of tongue depressor (representing gangplank) to boat deck. Let the other end rest on the "dock". This now represents a ship loading or unloading at low tide. Add more water to the tray (approximately 1-1/2 more inches). This represents the same ship at high tide conditions.

Examine:

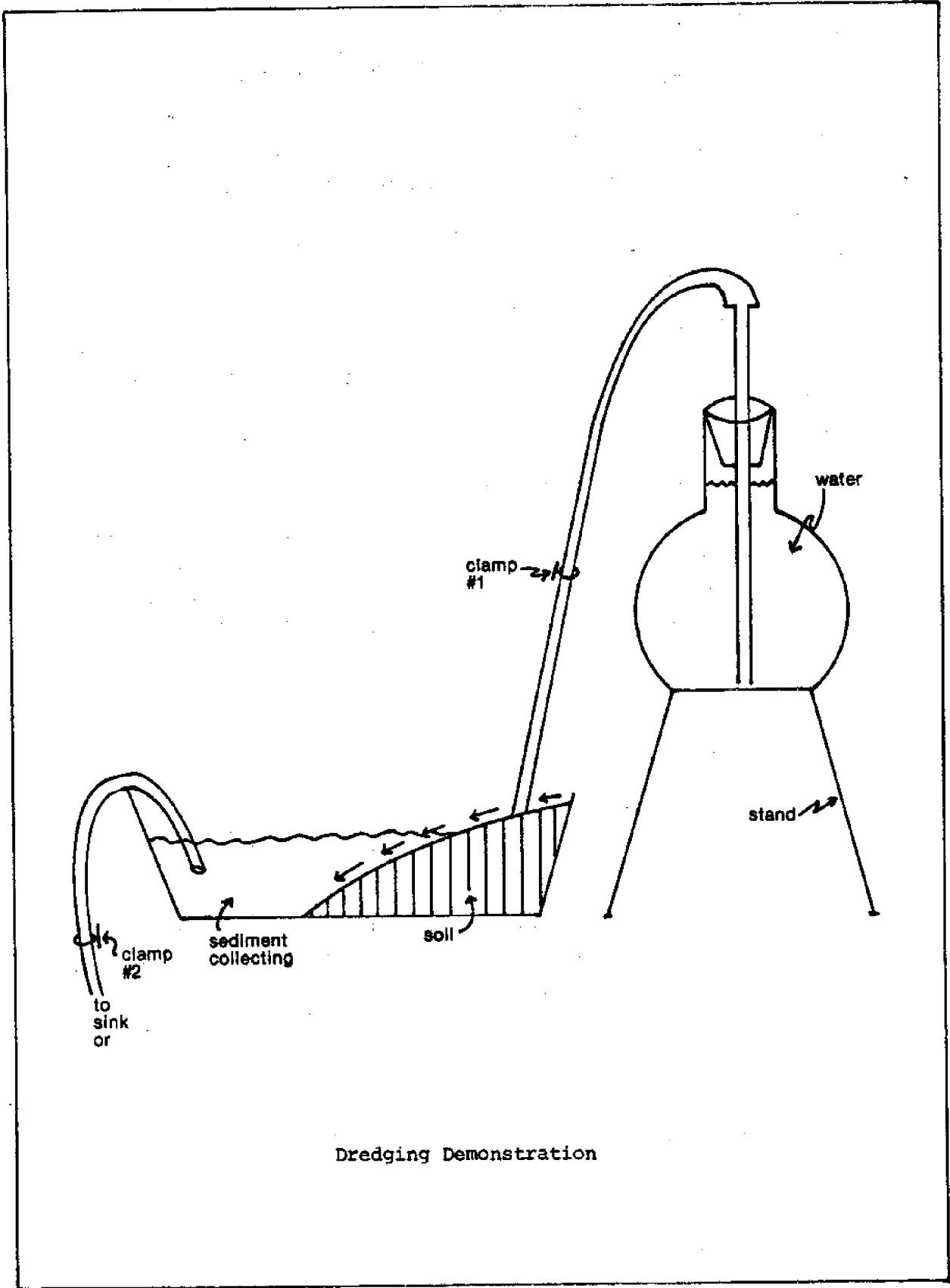
1. Did the gangplank move? Why?
2. What effect would this have on the actual loading or unloading of a vessel?
3. What could you do to adjust for tidal changes? (Answer: floating dock, adjustable gangplank platform and length).

Summary:

- (1) What principle of nature does this experiment illustrate? (answer: tide)
- (2) The above experiment involved a change of only 1 or 1-1/2" of water depth. The tidal change in New York harbor is only approximately 4-1/2'. Both of these are minimal changes. Imagine you are docking and unloading in the Bay of Fundy, Maine, where the tide can be as high as 30' - 40'. What problems will you face?
- (3) Conclusion to be elicited from students is that New York harbor is excellent for shipping because of minimal tide change.

Sci activity: Map Study - Harbor Depth

Study the depth of the New York harbor using thermofax copies of the map on page12.



Have students examine map carefully. Answer the following questions:

1. What do the curved lines along the waterways represent? (contour of depth) the dotted lines? (channel depth)
2. Is the depth of the New York harbor the same in all the waterways? (no)
3. What is the most shallow depth listed on this map? (10' - note: If you hug the shoreline, you might find even shallower depths.) the greatest depth? (80')

Summary: New York has a deepwater harbor whose depth ranges from 10' - 80'.

For homework, trace a route in red pencil for an ocean-going vessel with a draft (depth of part of ship that remains under water) of 35' to enter the New York harbor and dock in the middle of Manhattan on the Hudson River.

Sci activity: Dredging Demonstration

Conduct an experiment to show why dredging is needed to maintain deepwater navigation channels.

Background: Dredging is the removal of sediment or other substance from a riverbed or ocean floor. It is done in New York City for two reasons: to produce fill for construction or beaches; and to maintain existing or cut new navigation channels. It can, and often does, cause disruptions in the marine ecological environment. In New York City, the rights for dredging and navigation are under the control of the U.S. Army Corps of Engineers.

Materials needed: large aluminum roasting pan, soil, 2 pieces rubber tubing, 2 clamps, large flask with 1-hole stopper (use a milk container if flask not available), glass tubing, tripod stand (or 2-3 stacked books).

Procedure: Students work in groups of 3-4. Arrange equipment according to diagram following. No water is to be in the pan until the experiment is under way. Demonstrate how to get water to run through tube by siphon action. Set clamp #1 so that water runs slowly down the slope of the soil. As water builds up in pan (see diagram), set clamp #2 so that the water level stays constant. Run for about 10 minutes. It will probably be necessary to refill the flask or container.

The conflict over harbor dredging

PRO: Economy, ecology boon

Port Jefferson Harbor in large part is already an industrial harbor," says Lee Koppelman, executive director of the Nassau-Suffolk Regional Planning Board. "It's not a conservation harbor. The quality of its waters are very poor. There's no way of overnight converting the harbor back into a pristine area."

The bi-county master plan proposed by his board, explains Koppelman, supports harbor dredging because a deeper channel would permit "larger and fewer shipments of oil. The present lightering process has the potential of an ecological nightmare."

The plan also, he notes, recommends that "industrial uses of the harbor be segregated" along its west side, through elimination of the oil tanks now on its east. He says that research his agency has done into the claim that dredging could lead to salt water intrusion into the fresh water table "is not substantiated."

"As to pipelining, from New Jersey

instead, at this point this is only wishful thinking," says Koppelman. "If such a pipeline existed, I'd be for it." He also questions "whether Jersey has the refinery capacity to service the island."

"In the meantime," says Koppelman, "a real solution is required" and he feels that's dredging of Port Jefferson.

HE'S AGAINST additional oil port development on the island besides Port Jefferson and Northville Industries' off-shore platform at Northville. In this, he takes issue with the Long Island Sound Regional Study of the New England River Basins Commission which envisions the possibility of Manhasset, Hempstead Harbor and Oyster Bay for such activities, also.

Former Suffolk County Executive H. Lee Dennison says, "It makes sense to have fewer and bigger ships, instead of smaller ones having to wait off-shore and barge in oil."

A resident of Belle Terre, a village on the harbor's eastern bluffs, Dennison says

(This, the second in a three-part series by Press reporter Karl Grossman on how oil is transported to Long Island, focuses on the pro and con arguments of dredging Port Jefferson Harbor, the island's current main entry for petroleum.)

By KARL GROSSMAN

No participant in the controversy over the proposal to dredge Port Jefferson Harbor argues that the current system, in which tankers must be partially emptied or "lightered" off shore before coming into the harbor to unload, is sound.

That half of the billion gallons of gasoline and billion gallons of fuel oil coming into Long Island each year is handled this way is inviting disaster, they say.

But harbor dredging is a huge problem, too, the opponents argue. It could lead to heavier tanker traffic, bigger accidents and environmental damage from the dredging itself.

Proponents claim there are no real alternatives, and the tankers, says Consolidated Petroleum Terminals president Gerald P. Smith, "will continue to come and continue to have to lighter off-shore and then come into the harbor anyway, with a barge."

Here is a summary of the arguments:

"To me Port Jefferson is the most beautiful harbor in the world and is in shambles because of local apathy for the last half century." He adds, "Nobody is pushing hard to get a sewage plant built as planned" and as a result large amounts of poorly-treated effluent are dumped into the harbor daily.

Anthony C. Providenti, chairman of Consolidated, talks of Long Island having a "self-imposed blockade" on oil. "We may not get much of Arab oil — anybody's oil for that matter — until that blockade is ended," he says. "It's an underwater blockade and it's simply the difference between 26 feet of water and 40 feet of water. The difference is 14 feet of mud."

HE CLAIMS the current 26-foot channel is costing Island oil consumers "more than a million dollars in unnecessary bills" a year because of berthing delays due to lightering. And, he cites the 6.1

spill danger in the current lightering system. When a tanker is unloaded at Consolidated's 400-foot T-shaped dock within the harbor, a boom or oil spill curtain is floated around it to theoretically catch a spill if one should occur. Out on the sound, notes Providenti, a boom would "not work" in the usual choppy seas.

"We wouldn't favor dredging," says Providenti, formerly a banker. "If we didn't think it was just as sound for the environment of Long Island as it is for the economy of Long Island."

He cites environmental analyses done by the Army Corps of Engineers, as well as a private analysis done by J.O. Groenendyke, Jr. of Flushing, a former Corps official, which claims little ecological disturbance from dredging.

He sees oil through a dredged Port Jefferson Harbor necessary "to support Long Island's growth pattern."

CON: An invitation to disaster

"I would like to see Port Jefferson Harbor retain as much of its residential character and as much of its attractiveness as possible," says Rep. Otis G. Pike of Riverhead, long an opponent of harbor dredging. Oil spill "disasters do happen," he argues, "and the larger the tanker to which the disaster happens, the greater is the disaster."

In any case, he contends, "why on earth should the taxpayers pay for it? (dredging the harbor). The oil companies are not the outfits for whom the poverty program was designed."

He notes that when Port Jefferson Harbor was last dredged, in 1956, it was not at public expense.

This is true. It is claimed by Smith that this happened when Consolidated — which now brings in petroleum through Port Jefferson Harbor for 38 firms, including most of the major oil companies — had as its "only business" dealing then in jet fuel on a U.S. government contract. "The cost of dredging then was regarded as a contract expense," he said.

(SUBSEQUENTLY, the firm was purchased by George Semerjian, who later attracted great public attention with his and-mining operations at Jamesport under the Levon Corp.'s name. In 1968, it was bought by Raymond and Harold Bernstein of Northville Industries Corp. They remain as the major economic factors behind Consolidated, although they transferred it to Total Resources, Inc. of Floral Park, of which they hold 79 per cent of the stock.)

Smith says that if Consolidated and

opponents of dredging is for an extension of the national pipeline system past its now farthest eastern point, Kennedy Airport, to Nassau and Suffolk.

"Bringing large tankers into a small harbor and continuing to dredge is not a practical solution," says the mayor. She would like to see Port Jefferson Harbor mainly used for recreation. "It's a popular port of call for many yachtsmen," she stresses.

"I'M OPPOSED to dredging. I don't think it's necessary," says Brookhaven Town Supervisor Charles W. Barraud, although his town board is on record in favor of it. He's for an off-shore platform. "Port Jefferson Harbor is a recreation harbor," says Barraud. "We don't need to put in these super-tankers in it."

In fact, even at the proposed 40 feet, the harbor would not accommodate the 65 to 100 foot drafts of the 250,000 to 500,000 ton "super tankers."

"What is amazing is that anyone," says Long Island environmentalist Thomas Matres, Jr. of Patchogue, "would seriously consider continuation of tanker delivery of oil to our shores, let alone ask for public funds to encourage such a risk."

The Suffolk Council on Environmental Quality is on record as arguing that Port Jefferson Harbor dredging "presents specific hazards to the local groundwater from salt water intrusion; the harbor is small and cannot be made large enough to accommodate large tankers safely with any amount of dredging," and the "public costs of dredging are large and the benefits appear questionable in view of alternatives."

TO MARRRY: Why not a pipeline?

the other firms using Port Jefferson Harbor commercially had to pay the estimated \$3.8 million dredging cost now, they'd have to "unfairly" pass the cost on to Long Island consumers in higher petroleum prices.

"The harbor has already gone through as traumatic an environmental impact as any natural resource of its kind should be expected to undertake in its lifetime," says Suffolk County Executive John V. N. Klein.

Concerns about lightering are "correct," he says. "Lightering rather than bringing in tankers directly increases the chances of spillage," he says, "but the issue is not whether that is true or not but the balance of the impact of the risks between further dredging and greater commercialization and those inherent risks in lightering."

"WERE CONCERNED," says Port Jefferson Village Mayor Sandra Schwenk, "because of environmental reasons — damage because of dredging to the harbor, to the back bay area where a lot of fish and wildlife live" and she warns of possible harm to the area's fresh water table by digging in the harbor bottom, and erosion to bluffs by increased tidal action in a deeper harbor.

"Then there are the safety factors," says Mrs. Schwenk, "when you have more large tankers unloading within a few hundred feet of a residential area. A captain came in not long ago and spoke to me about how surprised and upset he was to see an oil unloading area so close to homes."

She, like Pike, Klein and most other

Discuss

1. What do you notice at the bottom of the pan?
2. How did it get there?
3. What does the water coming from the flask represent?
(rain washing down a slope or a river current)
4. What would happen if you kept the water running all day?
Why?
5. If this were a river in a deepwater harbor such as New York City, why would large ships eventually not be able to travel into the port? (sediment would decrease depth)
6. How could you prevent this from happening? (constant dredging to maintain present navigation routes)

Sci activity: Effects of Dredging

Study some effects of dredging. Take a trip to a nearby beach. (See Field Trip Guide -- Beach Study Worksheet #1)

SS and LA activity: Debate on Dredging

Conduct a debate on the pros and cons of harbor dredging. Prepare for debate by individually reading thermofax copies of a relevant newspaper or magazine article. (Sample article provided on the following pages). Divide students into pro and con groups. Assign one student to act as moderator (or teacher can serve as moderator if preferred). Teams should be given about two days to devise arguments to support their side. Suggested considerations:

1. What arguments support (oppose) dredging?
2. What are some economic considerations to be taken into account?
3. What are the environmental considerations to take into account?

Further information can be researched in library. After careful preparation, conduct the debate and videotape it if feasible for future showing.

SS activity: Career Opportunities, Army Corps of Engineers

Contact U.S. Army Corps of Engineers for career film and other educational materials. (See resource list.) Have students prepare a pamphlet on career opportunities, e.g. hydraulic engineer, surveyor, foreman, dredger captain. Class can organize a bulletin board display from information received.

4. Landfill Has Changed the Shape and Contour of the New York City Waterfront

SS activity: Group Brainstorming to Recreate First Landfill Project

Study how the first landfill project started. Teacher asks students to imagine they are living in New Amsterdam (old New York) in the 1600's. They are the city fathers or government officials. They must solve a problem: the ships have been dumping all their garbage over the side of the ships as they are docked at the pier. The ships are only twenty to thirty feet apart. The water in front of the docks is filled with refuse. What do you do about it? Ask the students to break into groups of five to discuss the problem and come up with a solution. Give them approximately fifteen minutes. Teacher travels from group to group asking pointed questions to stimulate active discussion:

1. Can you really clean up the water without modern chemical know-how?
2. What can you do with the garbage?
3. If you can't clean up the water, what could you do constructively with all that garbage?

Class reconvenes to share solutions. Teacher should make every effort to encourage creative solutions. There is no one right answer. After students have all spoken, teacher then relates what actually happened in Dutch times:

1. Ships were asked to dump garbage out at sea, not at dock. Rule unenforced.
2. When water at dockside was so full of garbage that ships could hardly manoeuvre, city fathers decided to fill in spaces with soil and rocks, thus creating first landfill project.

(Note: Southern Manhattan expanded 3 blocks on east and 2 blocks on west shores. Water, Front, Washington, West streets all created by landfill.)

Sci activity: Map Study - Landfill

Examine changes in New York City shoreline due to landfill. (Use thermofax copies of the map provided on page 20 following.) Have students examine the map carefully. Teacher then asks students?

1. What do the black areas represent? (answer: landfill)
 2. Is there a limit to landfill use? Why?
 3. Jamaica Bay was recently taken over as a wildlife preserve by the Federal government. Federal guidelines prohibit landfill on marshland. Why might this move have been necessary? (Note the extensive landfill around the Jamaica Bay area.)
 4. The Dutch fathers used soil, rocks, and garbage for landfill. There is a difference, however, between the Dutch garbage used for landfill and ours. Can you guess what that difference is? (answer: much of ours is not biodegradable; we have aluminum cans, plastics, etc.)
 5. Using the map for reference, can you see any places in New York City where you have been on landfill soil? (elicit Coney Island, Orchard Beach, Rockaway Beach, Kennedy airport, LaGuardia airport, etc.)
5. There are Actually 578 Miles of Waterfront and 220 Straight-Line Miles of Waterfront

Math activity: Comparison between Actual and Straight-Line Miles

Show the difference between actual and straight-line miles. Materials needed: string for each student, tape, ruler for each student. Teacher asks students to place a piece of string (approximately one yard in length) on a table or desk top. Curl the string to approximate a shoreline contour. Tape each end of the string. Measure distance between taped outer limits with ruler. Compare the two lengths. Teacher asks students:

What natural fact does this measuring experiment illustrate? (answer: actual shoreline measures greater mileage than straight-line miles as it appears on map)

Summary: Actual mileage greater than shoreline appears to have on map. New York has 578 actual miles of waterfront, while the straight-line mileage is only 200. If you stretch out New York's waterfront in a straight line, it would reach from New York City to Charleston, South Carolina.

Math activity: Measurement of Shoreline

Students will measure the shoreline of their borough. Materials needed: pencil odometer, scale map of New York City (available at any gas station). Teacher explains how the pencil odometer works. (A pencil odometer is an instrument that measures scale mileage as you trace any contour.) Students then take turns measuring the shoreline in actual miles (must be converted from scale) using odometer. Teacher then asks students to compare this figure with straight-line mileage on map (using scale).

Summary: This experiment reinforces concept learned in previous activity.



IMMIGRANTS, ELLIS ISLAND.

Beard, John, commentator. Blue Water Views of Old New York. Massachusetts:
The Scrimshaw Press, Barre Publishers, 1970, p. 43.

D. Cosmopolitan Aspect

1. New York is an Immigration Port of Entry

New York City attracted immigrants because of job opportunities; conversely, job opportunities increased because of the availability of cheap labor supply.

LA activity: "The Immigrant Experience", a play

Read a play about immigrant experiences at Ellis Island to gain an understanding of what immigrants had to go through to enter the U.S. There are several plays about immigrant experiences; we suggest a short play entitled "The Immigrant Experience" (Scholastic Search, April 23, 1973). Teacher sets the scene with a short discussion of the following topics:

1. There is no such thing as a native American; even the Indians were immigrants.
2. Why did people immigrate to the U.S.? (enforced slavery, freedom of religion, job opportunities, etc.)
3. Discuss different waves of immigrants (Indians, slaves, Northern Europeans, Chinese, "new" immigrants from Southern and Eastern Europe -- the latter group is described in the play).
4. Travel conditions prior to arrival in New York City (overcrowded ships with 400-1000 immigrants that took from 14-40 days to cross ocean).
5. Most immigrants came through Ellis Island.

Read the play aloud. If time permits, prepare scenery, memorize parts, and act out play for another class. After reading play, discuss:

1. Was America really "the promised land"? Why (not)?
2. Why was it necessary to come through Ellis Island? What must it have been like?
3. Why does Janek (old man) say at the end: "In the end, I got to be a real American. But it was a long-long trip. It took a lifetime."? What does he mean by this statement? Do you agree?

Math activity: Immigration Statistics

To solve some problems related to immigration statistics.

e.g. 1. Steerage on a steamship in 1840 cost \$20/adult, \$10/child and \$3/baby. How much would it have cost a family including a mother,

a father, a grandmother, two boys of 10 and 12 and a girl of 6 months to come to the U.S. in 1840?

e.g. 2. In 1910, 2 immigrants landed in New York City every minute of the year. How many immigrants landed in 1910?

e.g. 3. Between 1815 and 1860, about 5,400,000 immigrants entered the U.S. Two thirds of them came through the port of New York. How many landed in New York City?

SS-LA activity: Ellis Island Experience

Take a trip to Ellis Island (see Field Trip Guide).

LA-SS activity: Immigration Museum

Take a trip to the Statue of Liberty to see the Immigration Museum (see Field Trip Guide).

SS activity: Ethnic Survey

Teachers should develop a survey form with their classes to determine ethnic backgrounds and national origin. Some sample questions are:

1. List the members of your family who were born in another country.
2. List the country in which each relative was born.

The class can fill out the survey form themselves and go into other classes in the school or to community groups (e.g. church, Girl Scouts) to complete a community ethnic survey. Results can be interpreted and graphed in math class and then displayed on bulletin board or in library.

Math activity: Ethnic Survey Interpretation

Teachers can show how raw data from the survey can be described in various forms: narrative, table, bar graph, circlegraph, etc. Concept of percentage should also be taught and used in tables and graphs.

E. World Financial Center

1. Role of Trade

Flourishing trade makes New York City the financial center of the U.S. and later the world.

SS activity: Research Project - New York City Trade

Have students research in the library how trade made New York City the financial center. Give them a suggested list of sources (see bibliography). Divide students into five groups. Give each group one of the following five questions to research:

1. After the War of 1812, the British blockade of U.S. ports was lifted. How did this affect trade in New York harbor? (answer: Goods were dumped on New York markets, causing dramatic price decreases and increased trading activity.)
2. What role did cotton have in New York City trade? (answer: New York City businessmen became distributors of imported goods, especially cotton from the southern U.S. As cotton trade involved trans-shipment of goods, New York City businessmen prospered from interest, commission, freight insurance, etc. Cotton capital financed commercial and industrial expansion in New York City.)
3. What role did New York City businessmen play in the building of the Ohio Canal? Why? (answer: They financed the canal to open up further interior trading markets and sources of goods.)
4. What effect did the Erie and Ohio Canals have on the type of commercial activity in New York City? (answer: Craftsmen and farmers sent cash crops to New York City in return for manufactured goods. New York City businessmen advanced credit and advanced purchases to insure a share of next crop. New York City became a city of bankers, moneylenders, and insurance men.)
5. When was the Merchant's Exchange founded? Why? What was it later called? (answer: The Merchant's Exchange opened in 1827 to facilitate the financial and commercial activities. It later became the Stock Exchange.)

This research activity should take about two days. Reassemble class. Have groups share their findings.

Summary: Increased trade makes New York City the financial center of the U.S. Activity in one industry causes change in many other industries.

SS activity: Steamship's Effect on Trade Volume

Discuss how the invention of the steamship increased the volume of trade and the waves of immigration. There are several motivations possible; we prefer using pictures of clipper and steam ships. (These can be obtained from the South Street Seaport Museum, Museum of the City of New York, or from Mystic Seaport Museum, Mystic, Conn.) If time permits, select two students to build ship models for display and comparison. Teacher asks students to study the two ships (model or picture). Students are broken into groups to discuss the following questions: Which ship would be best to travel on? send cargo on? Why? Allow fifteen minutes for group discussion. Reassemble class. Let representative from each group present group decision and rationale. Teacher then gives brief presentation on following topics:

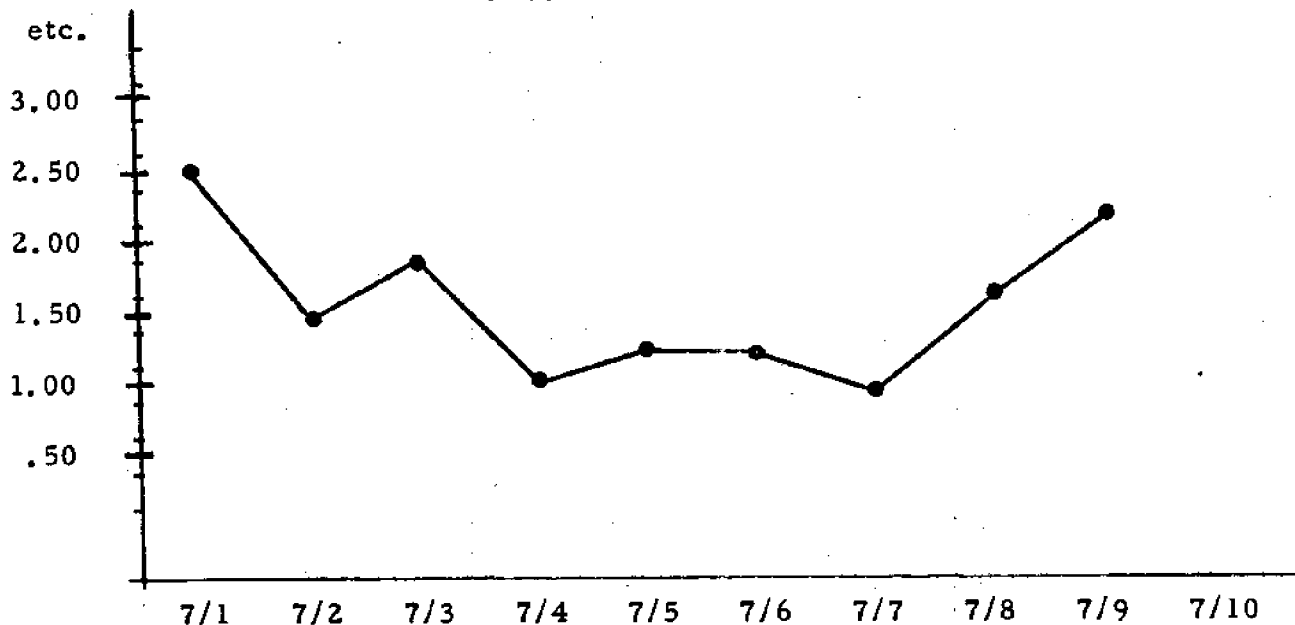
1. Prior to steamship invention in early 1800's, all travel by sail - Golden Age of Clipper Ships, 1820-1850.

SAMPLE STUDENT LEDGER

Date	Stock Title	Bought	Sold	Price/ Share	No. Shares	Cash In/Out	Balance
							\$500.00
7/1/74	Cunard Lines	X		\$50.00	2	-\$100.	\$400.00
7/2/74	Acme Cement Co.	X		\$10.00	10	-\$100.	\$300.00
7/3/74	Cunard Lines		X	\$55.00	2	+\$110.	\$410.00
7/5/74	Acme Cement Co.		X	\$ 2.00	10	+\$ 20.	\$430.00

analysis: lost \$70.00

SAMPLE GRAPH



2. Steamship use increased after 1840 - by second half of 19th century, most travel by steam.
3. Advantages of steamship (less time, more reliability from steam than wind and elements).
4. Increased trade volume; by 1900, 67% of U.S. imports and 37% of U.S. exports passed through New York port.

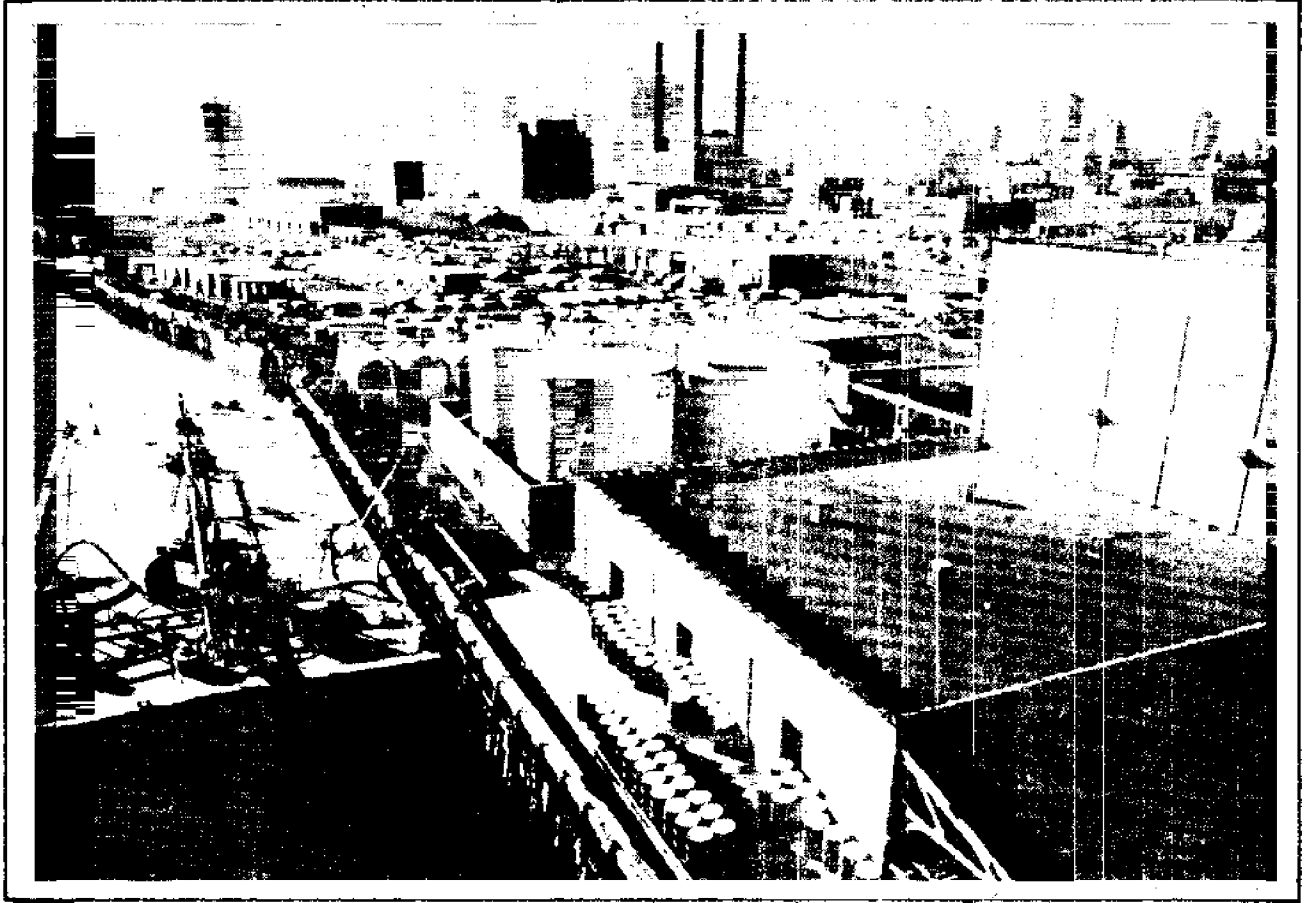
Summary: Steamship took the place of sailing ships because of time and efficiency. For homework, write a short paragraph on the following: What effect do you think the steamship invention had on the growth of New York Harbor? Why?

Math activity: Stock Exchange - Trip to Wall Street

Examine how the present-day Stock Exchange works. Take students on a trip to the Stock Market on Wall Street. Students must be at least 7th graders. Maximum group size 35. The tour takes about an hour; it includes a fifteen-minute film, a thirty-minute lecture, and a guided tour of the floor. Reserve in advance. (See resource list for contact and phone - item 25.) If trip is not feasible, obtain one of the two following films from the Modern Talking Picture Service Inc., 315 Springfield Ave., Summit, New Jersey 07901, for free: "The One Man Band that Went to Wall Street" (#4800) or "The Lady and the Stock Exchange" (#2095).

Math activity: Classroom "Mini" Stock Exchange

Set up a "mini" stock exchange in the classroom. Materials needed: daily New York Times, paper, play money. Teacher shows students how to read the stock results. Teacher then elicits from students a list (on blackboard) of companies related to waterfront activities. (Hint: shipping companies, New York City-based cement companies, etc.) Have students make out play stock certificates on 3 x 5 pieces of paper. Each certificate should include the following information: the title of the company, the word 'one share'. The teacher then assigns a "broker" (or he acts as broker himself). Broker handles all transactions (commission optional) using play money. Prices can be found in daily stock market quotes of New York Times. Students are each given \$500 play money and told to buy and sell as often as they want. Object is to see who can make the most money. Students are asked to keep daily ledgers.



Oil storage tanks, Newton Creek industrial area, Brooklyn, New York

THEME II:

HOW HAS THE WATERFRONT AFFECTED THE ECONOMIC LIFE OF NEW YORK CITY?

A. What Industries are Located on the Waterfront? Why?

Background: Many industries are located on the waterfront because they need to use the water to transport goods (lime, coal, asphalt, Con Ed power plants, meat-packing industries, etc.). Some companies are on the waterfront for transportation access (Staten Island Ferry, Circle Line Tours, Cunard Lines, Coast Guard, etc.). Some are located on the waterfront because land was vacant and cheap, or because they wanted to dump waste directly into the waterways (now illegal).

SS activity: Slide Show of Industrial Usage

Teacher should select slides from audio-visual kit that show industrial usage of waterfront. Slides should include factories, barges, docks (both container and breakbulk), evidence of industrial pollution and water-related industries (e.g. boatyards).

Discuss:

1. What types of industries seem to be located on the waterfront? Explain.
2. Could any of these industries be located in a place not on the waterfront? Explain.
3. What effects do these industries have on the waterways? Explain.

Develop a chart (see sample below).

<u>Type of Company</u>	<u>Reason for Waterfront Location</u>
Circle Line Tour Boats	Waterway access for boats
Power Plant	Waterway for transporting coal; water for coolant
Cement Company	Waterway for transporting heavy cement

LA activity: Write a Letter to an Industry

Have students write a letter to one of the companies that are located on the waterfront. They can explain that they are studying the New York City waterfront and can ask questions such as: (1) How long have they been located on the waterfront? (2) Why did they choose that site? (3) How does their industry affect the quality of the waterways?

4. Which link in the food chain was taken away in the bottom picture?
5. If there were no other food sources, what would the man have to eat? (the posies)
6. What would happen to the man if he could not eat posies? Why?
7. Why is the man in the bottom picture frowning?



Imagine a simple food chain:
posies → sheep → people.



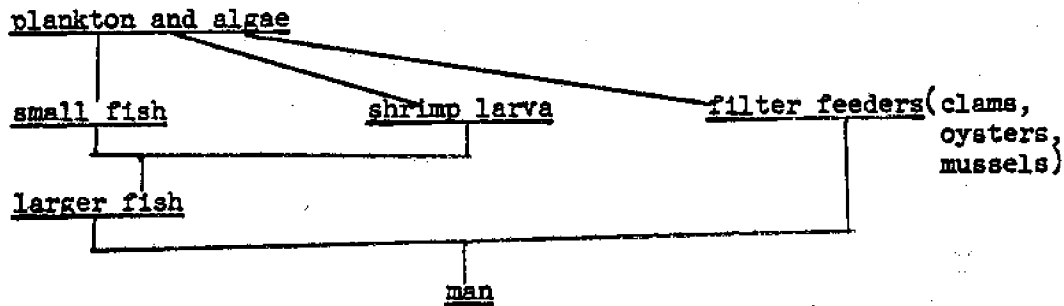
Take Away one — ?
In nature: Simplicity = Instability

Illustrations from: Shepard, Paul and David McKinley, The Subversive Science,
New York: Houghton Mifflin, 1969, pp. 236-7.

Sci activity: Study the Importance of the Fishing Industry through Studying a Food Chain

Background: A food chain is a representation of the dependence of one form of life on many other forms of life for food, one of the basic needs of all living things. In considering any food chain, whether aquatic or terrestrial, the base of the chain is plant life.

Procedure: Make an overhead transparency or draw on the blackboard this very simplified representation of a food chain. Impress upon the class that in reality it is much more complex.



Discuss:

1. Why is this called a food chain?
2. Why is one form of life dependent on lower forms of the chain?
3. How are you involved in a food chain?
4. Many doctors recommend that people eat more fish and less meat because it has a lower cholesterol level. Nutritionists agree that the Japanese and Swedish people have extremely healthful diets because they eat so much fish. If man upsets part of the food chain, how would this affect him in the long run? Explain.

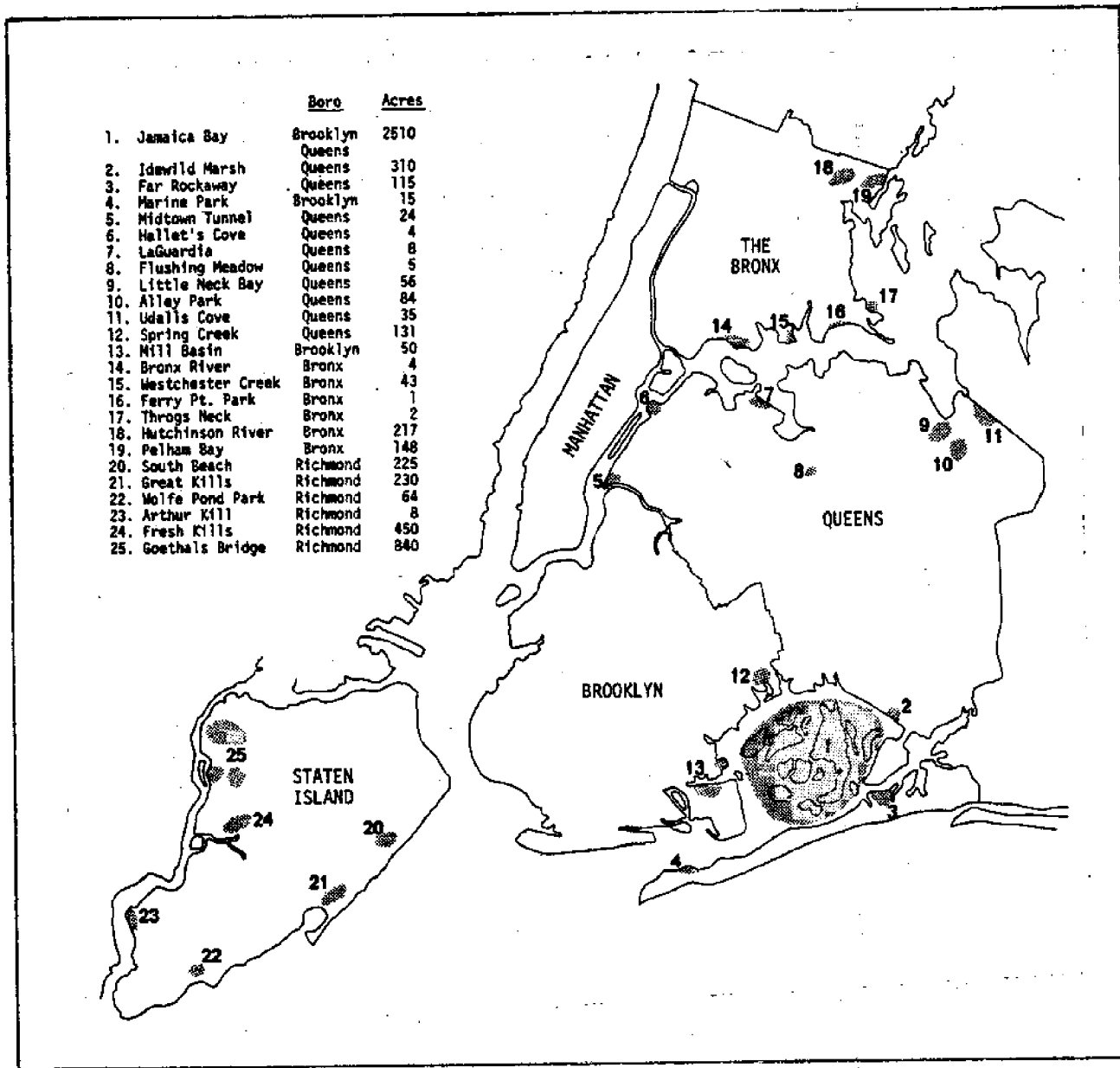
Sci activity: Food Chain Imbalance

To find out what can happen if one of the links in a food chain is destroyed.

Make thermofax copies of the cartoons that follow. Distribute to students. (alternative: make an overhead transparency) Have students examine the cartoons carefully.

Discuss:

1. What are the three elements in the food chain in the top picture?
2. Which link in the food chain does the man depend on for food?
3. Why do you think he's smiling?



WETLANDS

From: "The New York City Waterfront", New York City Planning Commission, June, 1974, p. 36.

Sci activity: Food Chain Film

Show one or more films either to introduce food chains or reinforce learnings. The following are suggested: "Food Chains in the Ocean"¹, "The Community"².

Sci activity: What is an Estuary?

To examine why New York City was ideal for fishing industries.

Background: New York City is a natural estuary since it is located at the junction of the Long Island Sound, the Hudson and East Rivers, and the Atlantic Ocean. An estuary is semi-enclosed coastal water that flows into the ocean, where ocean and fresh waters mix. This mixing results in varying degrees of salinity, strong interaction between tides and rivers which result in natural high concentrations of oxygen dissolved in the water (D.O.) and nutrients. These conditions result in an extremely fertile biological environment. Procedure: Display a large map of New York harbor. Define estuary on the blackboard. Discuss:

1. What features do you see on the map that tell you that the New York harbor is an estuary?
2. Why are parts of New York City's rivers salty?
3. How will the mixing of salt water and fresh water affect the amount of oxygen and nutrients dissolved in the water?
4. Why would this condition be beneficial for marine life?
5. Fishing used to be one of the major industries in New York City. Why has fishing deteriorated in New York City waters? (Pollution)

Sci activity: Salt Marsh Trip

To find out the importance of salt marshes to our food supply by taking a trip to a salt marsh.

Background: The most important estuarine environment in New York City is our salt marshes. Refer to map of salt marshes on page 32. They are the breeding, feeding and nesting grounds for invertebrates, many species of fish, birds, and other biological forms. Most of the fish caught on the continental shelf spawn, breed, or spend their larval stage in a marshland environment. The marshes also serve as a natural barrier against storms and tidal currents. In addition, they have an anti-pollution function because of the filtering action of the vegetation and porous soil as water rises and falls in the marsh.

See map of Wetlands on page 32. (See Field Trip Guide.) Teachers unfamiliar with water testing techniques can refer to lesson on page 32.

¹Available from BFA Educational Media, 2211 Michigan Ave., Santa Monica, California 90404.

²Available from B.A.V.I. at Board of Education.



The Ben Franklin, research submarine designed by Swiss oceanographer, Jacques Piccard, photographed with crew of marine scientists during a visit to South Street Seaport. The 49-foot vessel gathered over one million items of data on sea water and marine life as it drifted at depths ranging from 600 to 1800 feet along the Gulf Stream for 1444 miles from the Florida Coast to 300 miles off Nova Scotia.

"The voyage's big surprise was finding that...marine life is far more sparse than had been believed (and)...that the Stream is not a single current, but a network of many interweaving currents running on a parallel course."¹

¹Ratcliff, J.D. "Hidden Rivers in the Deep", Marvels and Mysteries of the World Around Us. Pleasantville, New York: Readers' Digest Association, 1972, p. 190.

LA activity: Preparation of Slide Tape Show on Marsh

After developing the photographs of the field trip, arrange in order. Using cassette tape recordings of student reactions and responses, coordinate a recorded script to a slide presentation. Small clickers, bells, or other noise objects can be used to signify change of frame. This slide presentation can be shown at school assemblies, or at community group meetings.

SS activity: Richmond Terrace Observation Trip

(See Field Trip Guide.)

B. What Careers are Directly Related to Waterfront Activities?

Background: Excellent career information can be found in the following books: Carse, Robert. Towline, New York: W. W. Norton, 1969; Carse, Robert. Your Place in the Merchant Marine; Carse, Robert. Ocean Challenges; Fenton, Sea Careers; and the most definitive work by the U.S. Department of Labor. Dictionary of Occupational Titles, Vols. I and II, 3rd Edition; Washington, D.C. U.S. Government Printing Office, 1965. Teacher should become familiar with basic information on careers before the unit. The first activities are all field trips. These can be interspersed among the other activities in this theme to provide variety.

SS-LA activity: Trip to Governor's Island - Coast Guard Base

(See Field Trip Guide.)

SS-LA activity: Sheepshead Bay Trip

(See Field Trip Guide. Also see p. 70.)

SS-LA activity: Fulton Fish Market Trip

(See Field Trip Guide.)

SS-LA activity: Tour of Aircraft Carrier, Submarine or Cruise Ship

(See Field Trip Guide.)

SS-LA activity: City Island Trip

(See Field Trip Guide. Also see p. 70.)

SS-LA activity: Brooklyn Navy Yards Trip

(See Field Trip Guide.)

Sci activity: Waterfront Career Films

Teacher motivates students by showing film(s) of science-related careers. Excellent films showing science career opportunities include:

- "Harvest of the Sea" (#3597): depicts world quest for tuna, shrimp salmon, king crab¹.
- "The Sea is My Home" (#30259): opportunities for training as engineer officers in the Merchant Marine¹.
- "Sea Venture" (#4876): about men who search for off-shore oil¹.
- "Seaprobe" (#4826): ocean scientists and engineers on deepsea search and recovery vessel¹.
- "The World Beneath the Sea" (#4901): development of off-shore drilling¹.
- "Ship Explorer, Oceanographic Cruise"².
- "People Who Fight Pollution" (C-18)³.
- Army Corps of Engineers careers films⁴.
- "The Marine Biologist" (#2115)⁵.

Teacher should ask students:

1. What careers are suggested in the film(s) you saw?
2. Which of these careers would interest you? Why?

Homework assignment: Using library card catalogue, make a list of all science-related waterfront careers.

LA activity: Careers on a Merchant Ship

Teacher can obtain photographs depicting various jobs aboard a merchant marine vessel. He can write to The United States Department of Commerce Maritime Administration and ask for their "United States Merchant Fleet Pictures" kit, published in 1973. Display appropriate photos on bulletin board (see samples following). Using photos as a springboard, discuss:

1. What are some of the career options aboard a merchant ship?
2. Which would require the most training? the least? Explain.
3. Where can this training be obtained?
4. Which job would you most like? Why?

¹Available from Modern Talking Picture Service, Inc., 315 Springfield Ave., Summit, New Jersey 07901, at no charge.

²Available from U.S. Department of Commerce, NOAA Motion Picture Films, Rockville, Maryland 20852.

³Available from B.A.V.I. at Board of Education.

⁴Available from the U.S. Army Corps of Engineers (see resource list, item 24).

⁵Available from the Encyclopedia Britannica Corp., 425 N. Michigan Avenue, Chicago, Illinois 60611 for \$8 rental fee.

SS-Sci activity: Careers Research Project

Teacher elicits as many careers related to the waterfront that students can think of. Lists them on the board. Teacher adds to list. List should include: merchant marine (pilot, port engineer, nuclear reactor operator, etc.); Coast Guard (inspector, Captain of the Port, etc.); New York City Harbor Police; New York City fire department, harbor division; tugboat men (deckhand, oiler, captain, dispatcher, etc.); ferry boat captain; tour boat captain; fishing boat captain; boat repairman; shipbuilder; ship designer; marina operator; longshoreman; oceanographer; Port of Authority of New York/New Jersey (engineer, ticket taker, Commissioner, maintenance man, etc.); life guard; City planners; oceanographer (biologist, geologist); ship navigator; marine biologist; water purification plant scientists (chemist, biologist, engineer); sewage treatment plant scientists (chemist, biologist, engineer); merchant marine engineer; Coast Guard engineer; Department of Health water pollution scientist; ship engineer; ship designer.

Students (individually or in small groups) research a career of their choice in the library. They should be guided by the following considerations:

1. What does this person do during an average day?
2. What aptitudes and/or skills are required?
3. What training is necessary; where can it be obtained?
4. How much does this person earn per year?
5. Would you enjoy pursuing this career? Why(not)?

Students should be told that they will be involved in a career seminar at the end of the activity; they should accordingly save or devise visuals related to their career (magazine pictures, pamphlets, etc.). Students should be encouraged to collect newspaper and magazine articles in a scrapbook to be used as a research source for the class. See sample articles that follow.

On Brooklyn Pier, Job Security Is Key Issue

By DAVID F. WHITE

In the chilly winds that whipped across the Brooklyn waterfront, 120 work gangs were loading and unloading cargoes yesterday morning. The normal figure is 60 or 70 gangs.

With negotiations on a new contract nearing a deadline of 12:01 A.M. tomorrow, there was talk in the sheds that few men wanted to hear—talk of a strike. As derricks whirred and steamship lines scurried to discharge and take on freight, Charlie Vacante, a longshore cargo supervisor with 45 years on the waterfront, spoke about job security, the principal issue in the negotiations.

"When I came to work here, you saw more people than cargo," Mr. Vacante said. "Now you see all cargo and no people."

"We had automation and now 14 men can do in a day and a half what 125 used to do in two weeks. Where does that leave you?"

Mr. Vacante stood in the lee of the gray-hulled freighter Inca Capac Yupanqui, which was unloading tin ingots and coffee at Pier One of the Port Authority Marine Terminal in the conventional mode: with manpower. To the south, at the Northeast Marine Terminal, where giant container cranes rise like missile gantries over the harbor, automation was smoothly swinging 40-foot steel boxes called containers onto the container ship Susak.

"Nobody likes to be on strike," said Louis Corio, another longshoreman. "We have families. But the main thing we're interested in is keeping the work here in New York."

The work here in New York has been declining from 44 million man-hours

of longshore labor in 1964 to about 19 million man-hours last year, according to shipping industry figures. The decline, dockworkers say, has followed the growth of containerization.

With their contract almost up, longshoremen are wondering how many more jobs will be lost.

A half-dozen work gangs of 18 men, for instance, were mustered to unload the Inca Capac Yupanqui and the same number to upload the Tachira, another conventional, or "break bulk," freighter delivering coffee at Pier One. About 100 men worked on each ship to stack bags on cargo pallets, attach slings to pallets and maneuver the slings onto the wharf.

One Gang on Container Ship

Abroad the container ship Susak, at the Northeast Marine Terminal, one gang and two container cranes were doing the job.

The growth of containerization is a new trend, by the standards of the sea, and for many longshoremen working on Brooklyn's waterfront yesterday it has taken some getting used to.

"When I came on the docks, I used to carry bags of coffee on my back," said Angelo Noto, a dock boss for 35 years. "Years ago, potash came in bags and when the men handled that, they started sneezing the first minute."

Other tough cargoes came to memory yesterday—wet hides, linseed oil cakes and bags of chemicals, all unloaded with shoulders and backs and arms.

Alfred Guardino, 48 years old, who went to work along the docks 27 years ago, also remembers the bags of coffee and the work of shoulders, his father's shoulders. "My father used to come home with blisters from carrying cof-

fee," he recalled. "I used to rub liniment on the shoulders."

Today, the job is different. In 1977, more than 60 percent of the general cargo passing through the New York-New Jersey port is containerized.

"We're at a really critical point right now," says Anthony Scotta, a vice president of the International Longshoremen's Association and president of its Local 1814 in Brooklyn. "It's not only job security in terms of jobs itself, but the jobs generate the revenues for all the benefits."

The change has brought one development that longshoremen say pleases them. To make up for the inroads of containerization, a longshoreman is guaranteed 2,080 hours of pay a year, whether he works or not, about \$16,200, according to the union.

"I've been running from dock to dock, shouting, 'Hurry up, hurry up, before they're full,'" Mr. Guardino said in recalling the longshoremen's search for work in the days before the guaranteed income.

But Thomas Crivella, shop steward on Pier One, says: "We're looking for work. Not guaranteed annual income. When we get up tomorrow, give us a job. We want a job to go to."

"Do we all have to go on welfare?" asked Charlie Vacante, who got the nickname of "Papers" along with a career on the piers of New York. The name comes from the paper he carries around in the back pocket of his pants.

Once his wife called and asked for Mr. Vacante. She was told there was no one around by that name. Finally she got Charlie Papers. The name stayed constant through an entire career. The industry changed more quickly

New York Times, September 30, 1977

Adventure, at Low Depths and High Pay,

Lures Sea-Diving Students

By DAVID BIRD

A year ago Ron Columbo was majoring in English and philosophy and planning to become a teacher. The other day he squirmed into a cold, cramped diving bell and adjusted 45 pounds of diving equipment over his body.

Mr. Columbo, lured by what he said was a combination of high pay and adventure, was finishing the last day of a 13-week course to become a deep-sea diver.

The main classroom for Mr. Columbo and his new classmates is a 33-by-100-foot seagoing barge moored at City Island that is the headquarters of the Professional Diving School of New York. The school is a subsidiary of International Underwater Contractors, a worldwide diving company operating out of the same location on the edge of Long Island Sound.

New Jobs Hinge on Oil

The school is only two years old and is still the only commercial diving school in the city, but it is one of the first indications of an emerging scramble for jobs as new opportunities are perceived if oil is found off the East Coast.

Not a drop of oil has been found so far, and there is heavy environmental opposition to any drilling at all, but there are strong indications that oil is there, and that is enough to attract the early wave of those seeking money and a more exciting way of life.

There are fewer than 2,000 American commercial divers now, but if the East Coast offshore fields are developed, it is estimated the demand could at least double the number of divers.

A commercial diver earns \$20,000 to \$30,000 a year, but the income can go to \$70,000 or \$80,000 for highly skilled work in difficult situations.

"Money" was the first thing Mr. Columbo said when asked why he gave up teaching for diving. He is 21 years old and wears a red beard. He was in the barge's locker room, slipping out of a bulky sweater and into rubberized diving gear. He thought for a moment and added: "I wanted to get away from those little hassles, like having to wear a tie and having to drive to the same place to work every day. It beats sitting and waiting in a traffic jam on the Long Island Expressway."

Danger Beckons

At the next locker, 24-year-old Pete Wells laughed and said: "Yeah, instead you could be sitting around [an off-shore oil-drilling] tower waiting for the

starchions to break in a storm with 60-foot waves."

Divers not only work to construct the towers, whose legs are imbedded in hundreds of feet of water sometimes, but they are stationed on the towers after they are built, to be ready in case anything goes wrong below.

Mr. Wells has a degree in engineering, but he could not find a job in his field. "I was a security guard at Macy's, and I really hated, hated that job," he said. "I stood all day by a down escalator answering people who wanted to know where the down escalator was."

The school's director, Larry Di Giacomo, spends a good deal of time disabusing students of the idea that diving is all a trip to a glamorous world of sunken treasure.

"They're workers, laborers," he said of divers, as he sat briefly in his small office on a trailer next to the barge. "They don't go down to blow bubbles and watch fish. Most of the time we work in places where there's nothing to see—in sewage, in oil dumps."

Challenge in 'Strange Environment'

"But don't get me wrong," he adds. "Diving still has its attractions. It's glamorous in a different way. You're all alone in a strange environment. Unlike most people, you're able to do something under harsh conditions, like the challenge of climbing and conquering a mountain."

Mr. DiGiacomo is 24 and has a mechanical-engineering degree from Columbia University, where he designed and built his own diving bell. He said he started diving at 14: "As soon as I could con my parents into letting me go down."

At the school students pay \$1,800 for the diving course, during which they learn how to work underwater as well as how to use diving gear. They learn welding, pipe-fitting, photography and the mechanics of oil rigs.

After they graduate, they start out first as tenders, handling the equip-

ment above water, for about a year before they are promoted to divers. As tenders, they earn \$12,000 to \$15,000 a year.

During the diving course the dropout rate runs as high as 50 percent. "A lot of them have visions of grandeur," Mr. Di Giacomo said, "and when they find out it's not the fun and games they thought it would be, they quit." Right from the beginning, student divers have it hammered into them that they are in a serious business and that if they do not apply themselves, they will flunk out.

"I want you to be good divers," Mr. Anderson was telling a group of nine students who were just beginning their course the other day. "Your life depends on it, so don't try to squeak by. I'm not going to tolerate any arguments. On this barge, my word is law."

Tough Training Advised

As the new students filed out of the locker room after the lecture, some looked bewildered and ready to quit. They passed Mr. Columbo's class as it was going through the last stages of training in the diving bell.

A couple of men in the advanced class chuckled as they stepped into the cramped bell. They had learned how tough it was. In less than 13 weeks, dropouts had cut their class in half from 12 students to six.

Other diving schools are mostly in the softer climates—California, Texas and Florida—but now, with the bitter winter conditions of the Northeast Coast waiting to be tackled, there is a feeling that divers should be taught in a harsher environment.

Andre Galerne, the president of International Underwater Contractors, looked out from his office window at a class of student divers at the water's edge. The men were going through strenuous calisthenics as part of their everyday work. "If you want to produce tough divers," Mr. Galerne said, "you have to do it in tough waters."

New York Times
September 29, 1978



Dave Malhiot helping Shaun O'Sullivan with his breathing apparatus at the Professional Diving School at City Island.

Art activity: Career Posters

Have students make a career recruitment poster that includes pertinent information on a particular career and attracts interest. Use several magazine career advertisements as motivational examples, e.g. "The Army Wants You". Use paint or magic marker on cardboard or heavy paper.

LA activity: Careers Seminar

After careful researching, students will conduct a careers seminar. Select a student to represent each career. Arrange chairs in a semi-circle. Choose a student to act as moderator. Moderator questions students about their career, using the following questions as guide:

1. Why did you choose your career?
2. What skills and aptitudes did you need?
3. Where did you go to school? For how long?
4. How much do you earn?
5. Do you work with others? Who? How must you coordinate efforts?
6. What suggestions would you make to others interested in your career?

This seminar should be videotaped, if feasible. Make sure the recruitment posters made in art are prominently displayed in the background. The videotape can be shown to other classes within the school.

LA activity: Careers: Radio Melodrama -- "A Day in the Life of..."

Have students write a script for a radio melodrama of an incident in the everyday life of a coastguard officer (harbor policeman, tugboat captain, etc.). Teacher guides students in the use of sound effects, background music, timing, and other technical problems. Script-writing should be done in small groups, where each student is responsible for the dialogue of one of the characters. Writing and editing should take 2-3 days, actual taping onto cassette tapes should take another 2 days. Finished products might be aired over school P.A. system.

SS activity: Trip to Conference House

(See Field Trip Guide.)

LA activity: The Alva Cape Collision -- A True Story

Students read and discuss harbor disaster of June 16, 1966 (collision of two tankers), to see how the New York City harbor is policed. Teacher reads about, hands out repro for silent reading, or plays cassette tape recording of disaster:

"At 2:12 p.m. on June 16, 1966, a British tanker, The Alva Cape (carrying naphtha), collided with an American tanker, The Texaco Massachusetts, in the Kill van Kull. The naphtha spilled, causing first a tugboat and then the Alva Cape to catch fire. The Alva Cape exploded and had to be towed out to sea and sunk off Cape May. The Texaco Massachusetts, in danger of exploding an oil storage tank in

Bayonne, was boarded by two tugboatmen. The fire was extinguished and the tanker was towed to Brooklyn."¹

Questions for discussion:

1. Why did the Alva Cape explode? (naphtha highly flammable)
2. Why was she towed out to be sunk at sea? (3 reasons: she might have blocked the harbor channels; the Texaco Massachusetts oil tanks might have exploded; the nearby Bayonne oil tank farm might have exploded)
3. Who do you think was involved in rescue operations? (fireboat, Coast Guard, harbor police, tugboats)

Summary: Harbor is patrolled and policed by several organizations that often work cooperatively to maintain safety.

C. How has the Waterfront Affected Transportation Development in New York City?

Background: Highways, bridges, tunnels, waterways and airports can't be considered as individual facilities. They are all component parts of the general New York City transportation system. Obviously, as New York is an island city, water transportation dominated the transportation system until the construction of railroads, bridges and tunnels fifty years ago, and the advent of trucking. Waterfront land was used for construction of sixty miles of New York City highways, both major airports, 3 seaplane bases, and 5 heliports, because the land was cheap and available and for safety purposes.

Bridge and tunnel traffic regulation by the Port of New York Authority affects all traffic flow throughout the City.

Waterborne transportation (note: this refers to intra-city passenger transportation, not ocean liners or freight vessels) is presently limited to ferries and tour boats, although hydrofoil and hovercraft projects have been explored.

SS activity: Map Study -- Transportation

Pinpoint major New York City airports, heliports and seaplane bases on map of New York City and discuss why they are all on waterways. Teacher asks students to take out New York City outline map previously used. Teacher posts. A large gas station map, a Hagstrom's Guide, or a transparency on the overhead projector can be used. With a magic marker, teacher marks all airport bases with an X. Students must transfer these spots onto their individual maps.

For teacher reference:

- A. airports - Kennedy and LaGuardia should be labelled
- B. seaplane bases - Wall Street, East River, Manhattan 23rd

¹Disaster described in Carse, Robert: Towline, New York, W. W. Norton Co., 1969.

Street, East River, Manhattan Evers, City Island,
Bronx

- C. heliports - 60th Street, East River, Manhattan 34th Street, East River, Manhattan Wall Street, East River, Manhattan 30th Street, Hudson River, Manhattan World Trade Center, Hudson River, Manhattan

Questions:

1. Why are the major airports (Kennedy, LaGuardia) located on waterfront land? (large areas of land available at cheap prices, and open air corridor space for landing approach and take off)
2. Why are the seaplane bases on the waterfront? (land on water)
3. Why are the heliports on the waterfront? (a. land vacant and cheap; b. water safer than land for emergency landing; c. open air corridor space for landing and take off)

A good follow-up thought question for written homework assignment is: Why do you think all but one of the heliport and seaplane bases are in Manhattan? (Manhattan is the center of New York City)

SS activity: Staten Island Ferry Trip combined with St. George Observation Trip

(See Field Trip Guide.)

SS activity: Compare Ferry 1650, 1830, Today

Compare ferry boats used in New York City in 1600's, 1800's, and today. Obtain pictures from history texts or encyclopedias if possible. Teacher reads aloud the following historical description:

- a. ferry (c. 1650) - The Old Ferry ran between Fulton Street, Brooklyn, and Peck Slip, Manhattan. It received its locomotion by horses hitched to a treadmill that turned primitive paddlewheels. Passengers called for service from the farmer, Cornelius Dirckson, by blowing on a horn hung on a tree. The crossing took from 8 to 18 minutes.
- b. ferry (c. 1830) - This ferry was run by steam. It crossed from Manhattan to Staten Island and from Manhattan to New Jersey. The boats were elaborately decorated. Saloons were filled with polished brass. Men retired to smoking rooms littered with spittoons. Ladies' resting areas contained 6' mirrors. People played craps and poker during the crossing.

Teacher asks students to recall their trip on the modern Staten Island ferry. Students are asked to compare the three ferry boats. Key questions:

1. What powered the boat?
2. What could passengers do during the crossing?
3. Which boat would you prefer to take? Why?

Thought question for follow-up homework assignment: Why do you think ferry service declined from 26 operating lines in 1860 to only one at present? (Bridge and tunnel construction in early 1900's opened up more efficient means of transportation.)

Math activity: Staten Island Ferry Statistics

To examine some statistics related to the Staten Island ferry, teacher assigns students the following problems:

1. The Staten Island ferry is subsidized by the City. The 5¢ fare covers only 10% of the operating cost. How much does it cost the line to ferry across one passenger? (50¢)
2. The eight ferry boats of the Staten Island line carry 67,000 passengers on an average day. Assuming each boat carries the same amount of people, how many does each boat carry? (8,350) The ferries carry 32,000 on an average weekend day. Assuming each boat carries the same amount of people, how many does each boat carry? (4,000) How many more passengers travel on a weekday than on a weekend day? (4,350)
3. 85% of the passengers on weekdays are commuters travelling to and from work. How many workers travel by ferry each day? (56,950)
4. In 1972, the Staten Island ferry carried 22 million passengers and 630,000 vehicles. How many more people than cars? (21,370,000) How many people travelled for every one car? (34.92)

SS activity: Museum of the City of New York, Maritime Exhibit Trip

(See Field Trip Guide.)

SS activity: Harbor Observation Recall

Examine the different waterborne transportation means used today in New York City. Teacher asks students to recall their observations on the New York City harbor from the Staten Island ferry trip. Teacher directs students to write down how many different kinds of boats he was. (A contest might be devised with a prize for highest number of ships.) Teacher then lists on blackboard a compilation of student lists (ferry, tug, barge, freighter, ocean liner, fireboat, harbor police launch, coast guard cutter, coast guard picketboat, tanker, sightseeing tour boat, sailboat, outboard motor, yacht, Navy

cruiser, Navy destroyer, aircraft carrier, etc.) Refer to pamphlet on types of ships at end of Staten Island Ferry trip in Field Trip Guide. Also use photos from the "United States Merchant Fleet Pictures" kit published in 1973 by the U.S. Department of Commerce Maritime Administration (see samples following).

Questions:

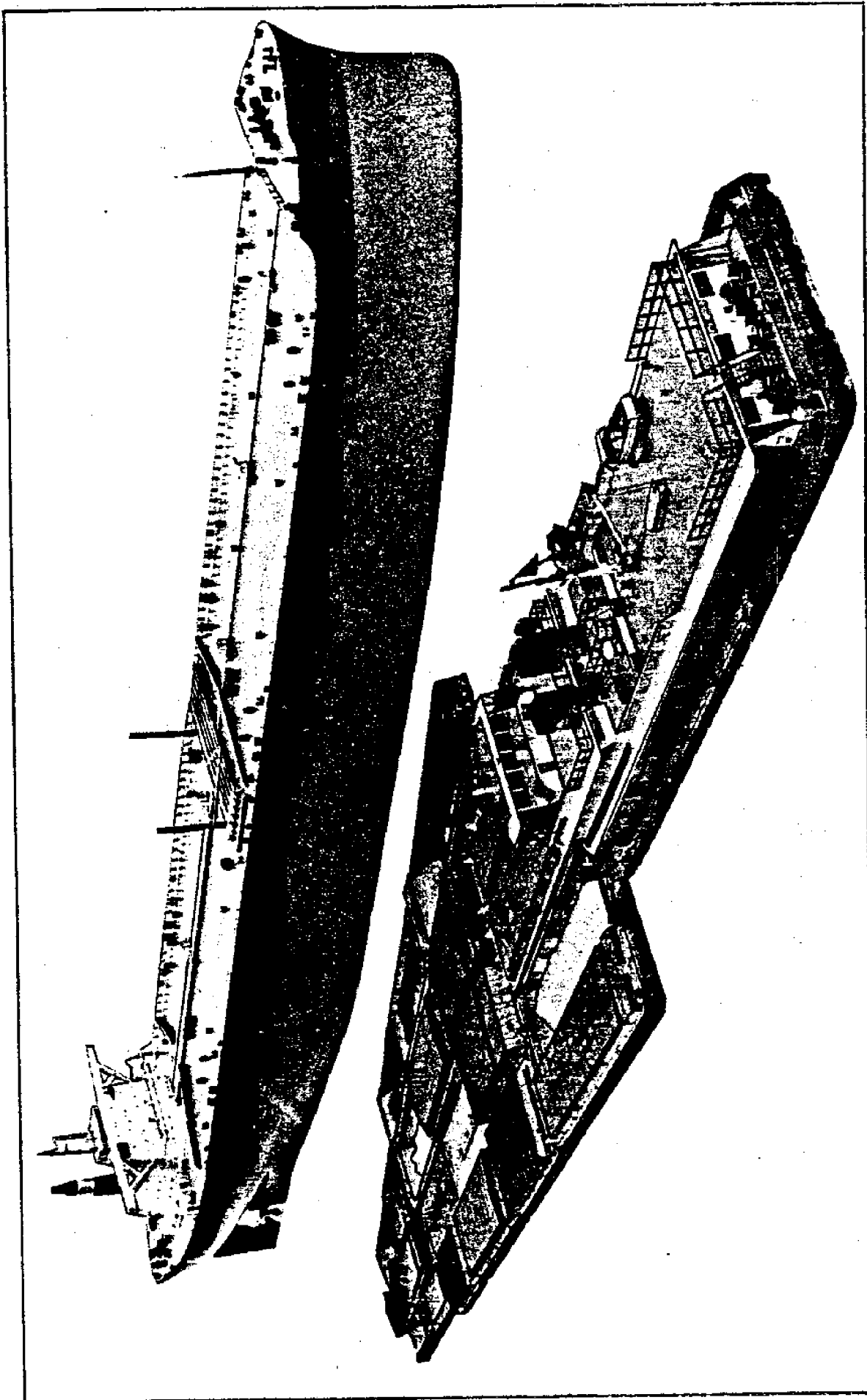
1. Is the harbor busy?
2. What are traffic rules of harbor called? (Rules of the Road)
3. Who directs traffic in the harbor? (Dispatcher)
4. How many of these boats are used to transfer people around the city only? (ferry, tourboats, pleasure boats)

Sci activity: Types of Ships and Modes of Power

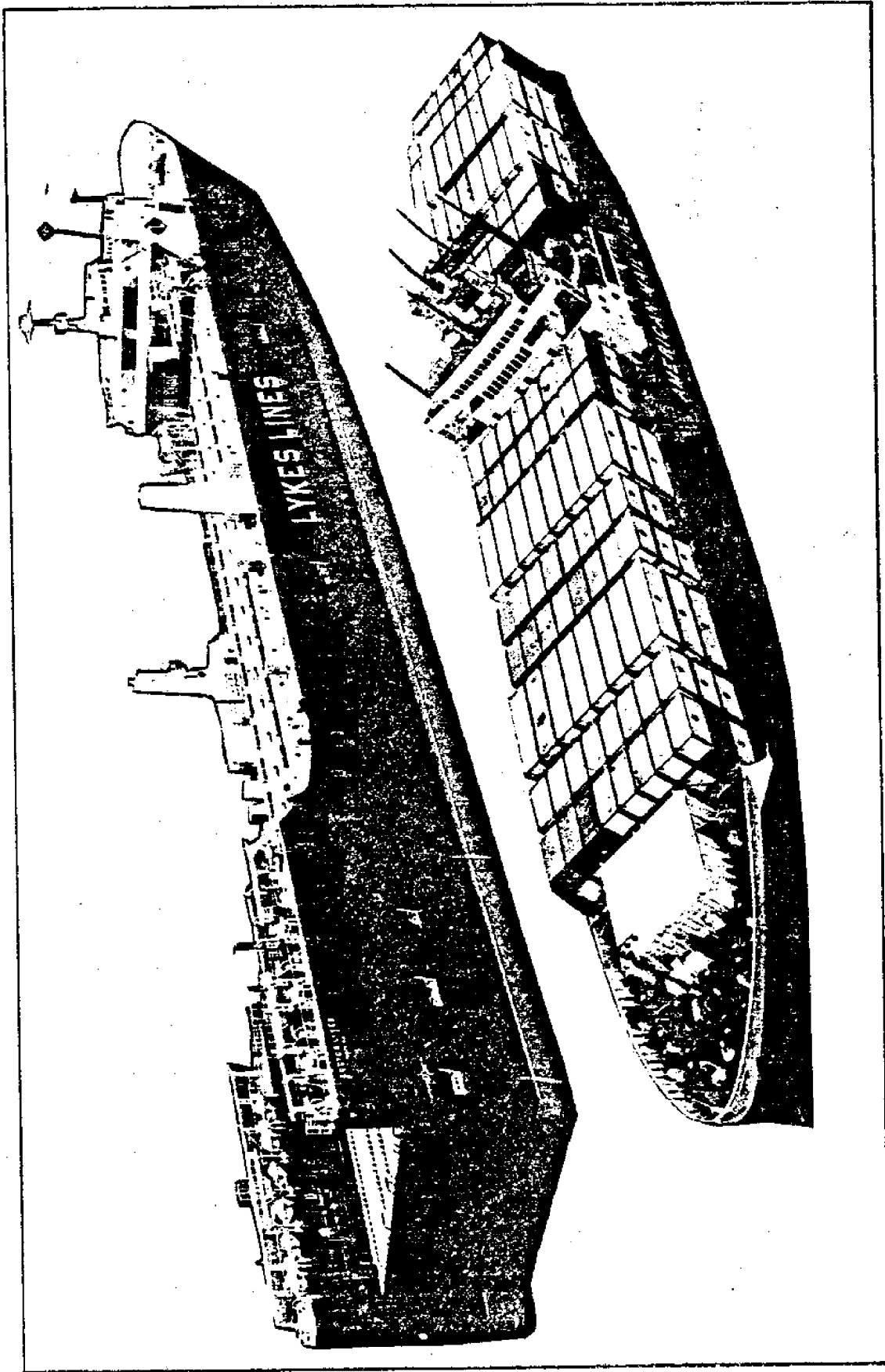
Discuss the various modes of powering a ship (wind, manual, steam, gas, nuclear). Compare a sailing ship to a steamship. Use the following guideline questions:

1. What propels a sailing ship?
2. What propels a steamship?
3. Which is more reliable? Why? (Steamship is more reliable because power is manmade and you don't have to rely on wind velocity. Further, you are not as vulnerable to storms.)

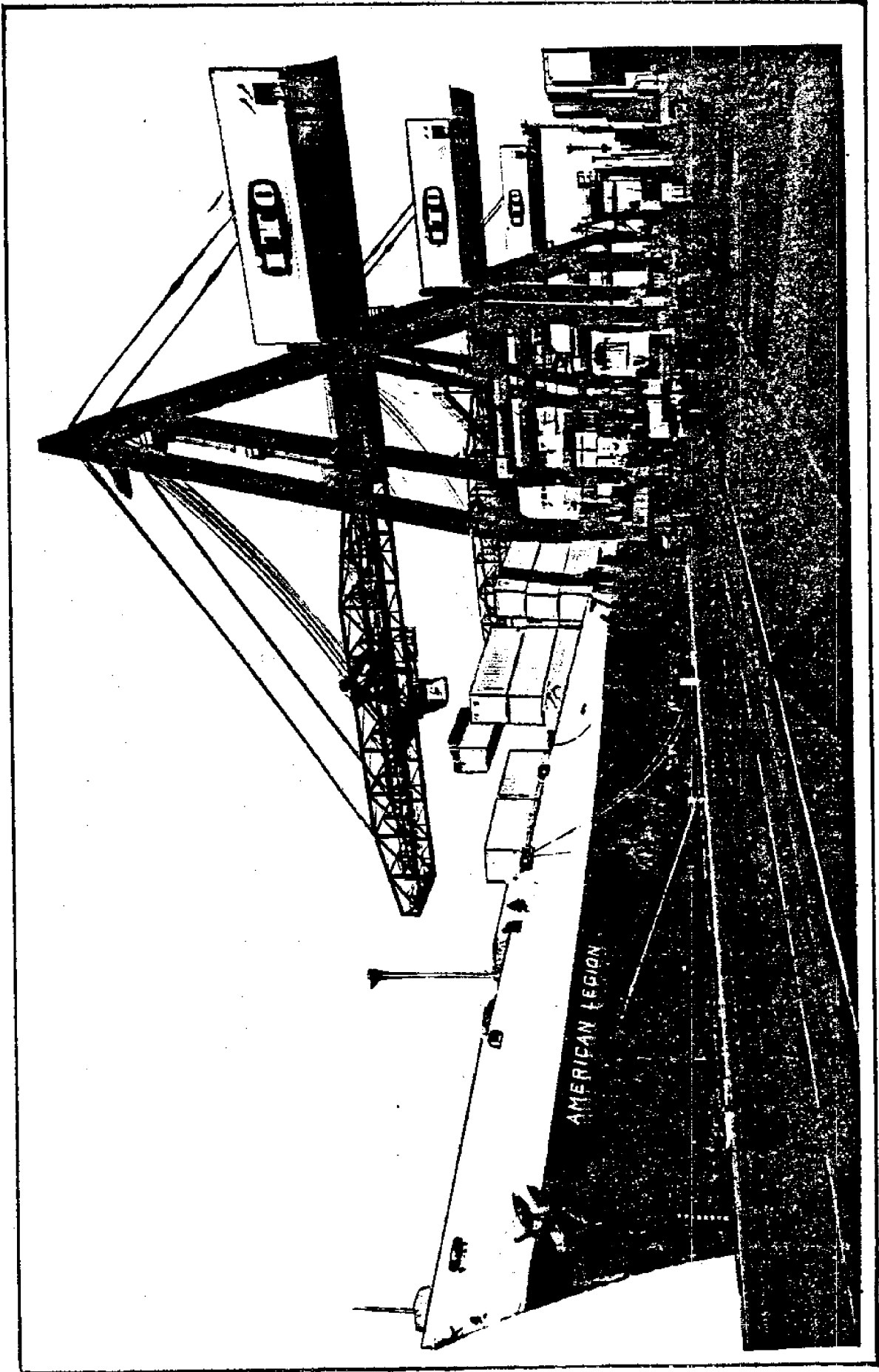
Have students make their own sailboats as a follow-up homework activity. Directions: take a 3" x 5" piece of wood, no more than 1/2" thick. Glue a plastic straw slightly forward of center (2" from front). Attach a rectangular piece of heavy paper (3" x 6") to the straw by punching two holes with a hole-puncher in the center of the paper 2" from each of the long ends, and then drawing the paper onto the straw slowly. See diagram on page 52. Have students bring their boats to class the following day.



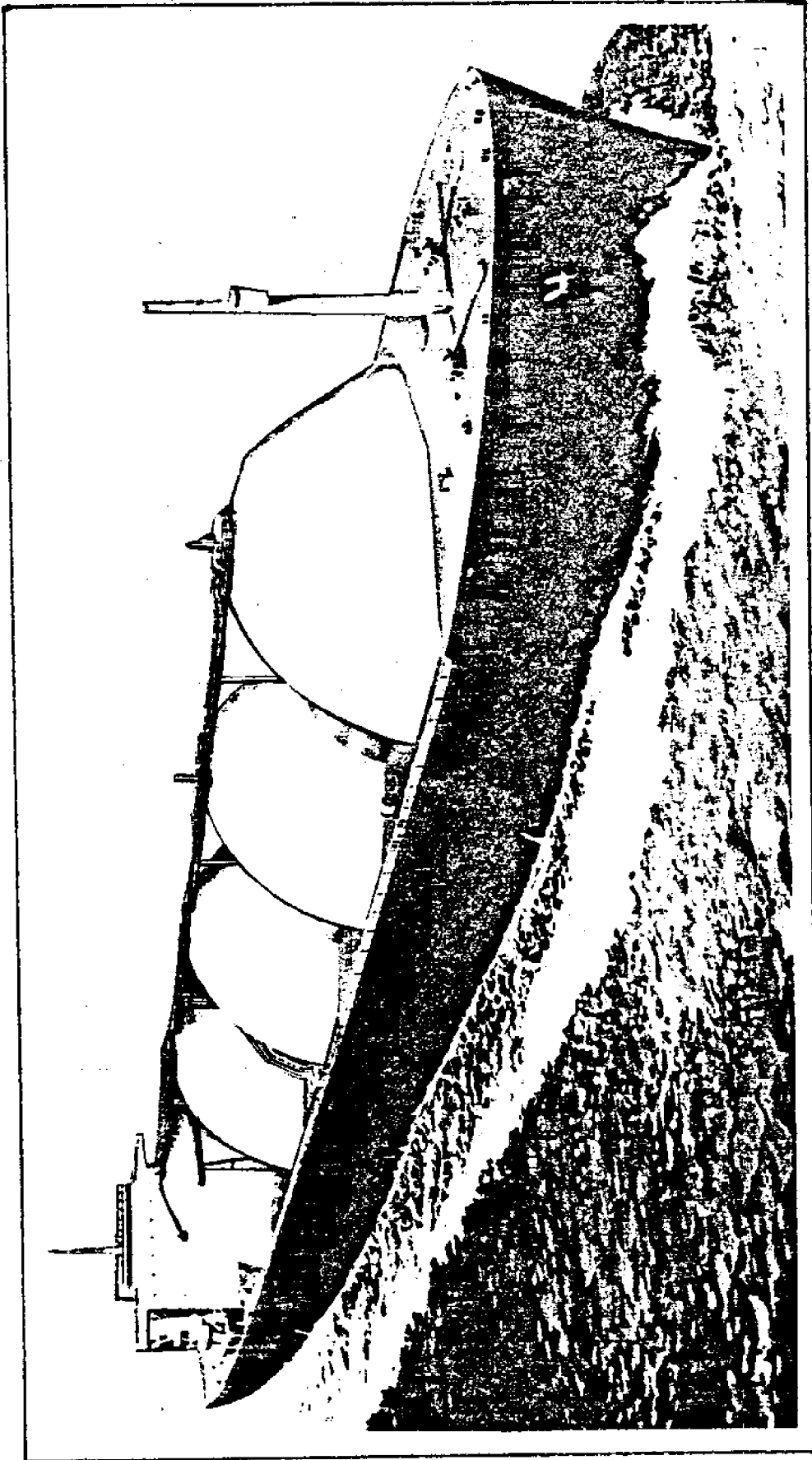
TOP: This 265,000-ton tanker--when completed--will be the largest vessel in the US fleet. Wider than a football field and longer than three of them, this supertanker can carry 2,050,000 barrels of oil at a cruising speed of 15-1/2 knots. When this ship joins America's growing merchant fleet, it will be a major link in our oil supply line for the future. BOTTOM: More than 500 million tons of freight are moved each year by inland waterways craft exclusive of the Great Lakes. Barges loaded with coal, petroleum, and many bulk cargoes and pushed or pulled by powerful tugs provide an important, low-cost transportation link between ocean ports and inland cities.



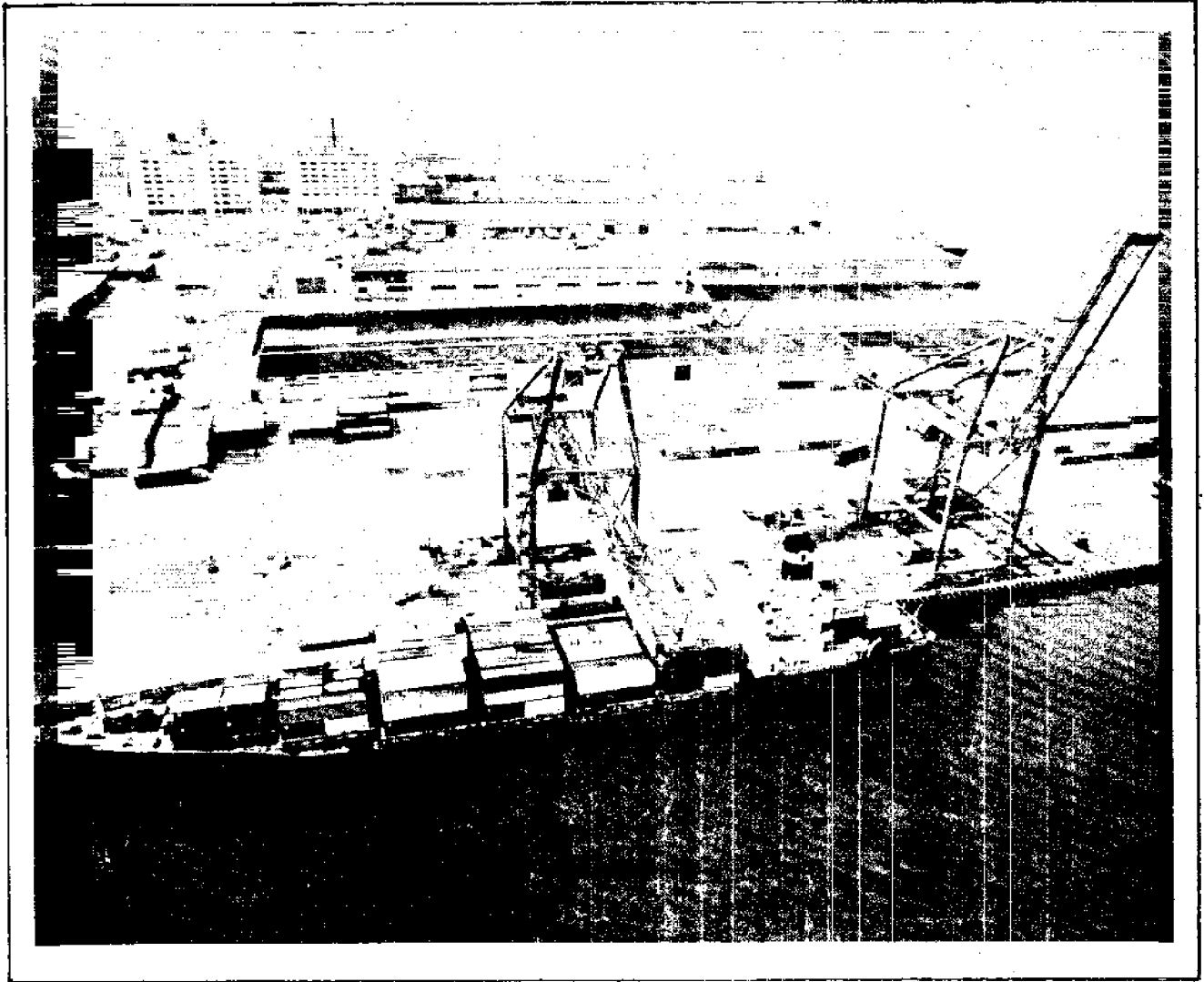
TOP: The Doctor Lykes is one of America's fleet of barge-carrying merchant ships, which is the largest in the world. One advantage of this type of ship is that barges fully loaded with a wide variety of cargoes can be quickly loaded and unloaded using a stern elevator, as on the Doctor Lykes, or a large crane, as on another type of barge carrier. The barges, after being unloaded, can be towed by a tug to their destination, while the "mother ship" loads barges bound in the other direction. BOTTOM: Containerships, pioneered by American steamship lines, are designed to carry large standard-sized metal boxes which can be transported inland on railroad flatcars or truck tractors. The elimination of much cargo handling and the simplifications of paperwork involved, has helped to trim the time and cost of ocean transportation, thus making American products more competitive in the world markets.



Containers--truck-sized metal vans into which cargo is packed--are loaded and discharged from ships using large cranes, such as these. With several of these cranes working simultaneously, a ship can be unloaded and loaded in a matter of hours, instead of the days required for a conventional freighter to discharge and load its cargo of crates, boxes, and drums.



A specialized type of ship designed to transport natural gas in large quantities between Africa and the Middle East and this country is becoming increasingly important in the US merchant fleet. These ships carry the fuel in a liquid form, at a temperature of 260 degrees below zero. In this state, the gas occupies only 1/600th of its normal volume. Upon reaching port, the fuel is converted back to its natural state at special plants, from which it is transmitted to consumers.



ILA Unloads Containership at Northeast Terminal-39th Street, Brooklyn

Sci activity: Sailboat Demonstration

Test out the sailboats the students have brought. If trip to nearby park pond is unfeasible, use large trays of water or cafeteria sink. Let each student place his boat on the water and propel it using a portable electric fan, or a balloon that is filled with air and then allowed to release through the neck in the direction of the boat, or by simply blowing hard from a distance of one to two feet. Ask students the following questions:

1. What natural phenomenon is represented by the fan (balloon, blowing)? (wind)
2. What happens when the wind dies down?
3. What might you do to maximize the effect of the wind? (add more sail)

Summary: Sailing ships are not as reliable as steamships, because you must depend on the wind.

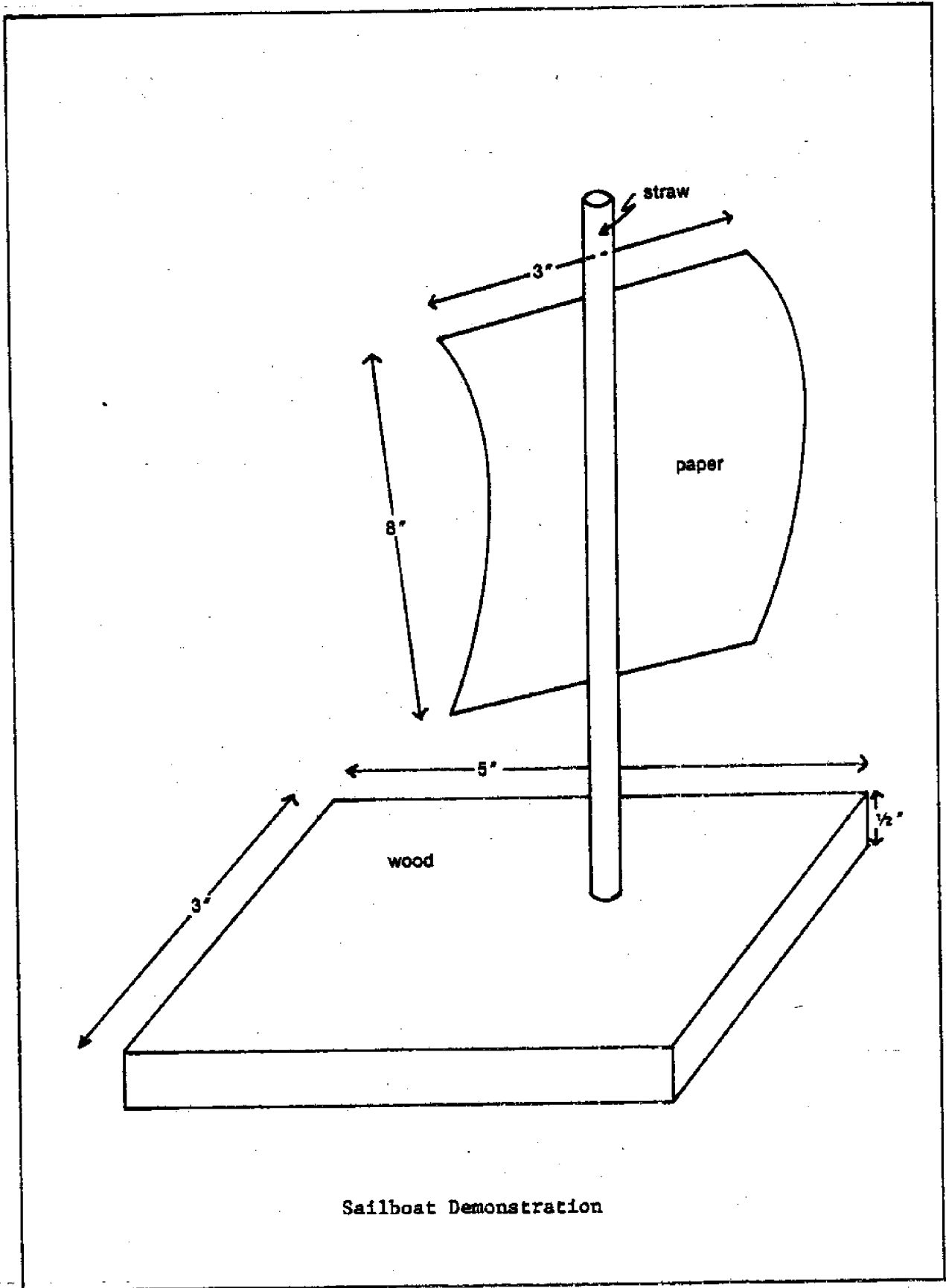
SS activity: South Street Seaport Trip

(See Field Trip Guide.)

Math activity: Boat Usage Statistics

Examine statistics related to the operations of the Circle Line Company. Teacher assigns the following problem:

1. The Circle Line tour boats that circle Manhattan carry one million passengers per year. There are nine boats. Each has a capacity of between 500 and 600 passengers. Assuming every boat carried 500 passengers on each run, how many trips were made by all nine boats in a year? (2,000) If one of the boats broke down after 10 trips, how many trips did each of the remaining 8 boats make? (255)
2. The Statue of Liberty ferry line carried 1,200,000 passengers to and from Liberty Island in 1972. Assuming the same number travelled each month, how many visitors toured the Statue of Liberty in March? (100,000)
3. The Day Line boat leaving from pier 81 in Manhattan, that stops at Bear Mountain, West Point, and Poughkeepsie, carries 200,000 passengers every year. It operates from May through September. Assuming the same number travel each month, how many people travelled on the Day Liner in July? (50,000)
4. The Rockaway Boat Line operates three boats for 10 weeks every summer. Two of these boats tour Jamaica Bay. One takes one hour and costs \$1.50. The other takes two hours and costs \$2.50. If the longer tour were all full, and a passenger decided to take two one-hour tours instead, how much more money would he have to spend? (50¢)



Sailboat Demonstration

SS Activity: How Bridges and Tunnels Affect Traffic

Examine the effect on traffic flow of bridges and tunnels in New York City. Teacher asks students to imagine what would happen if an enemy power were to bomb and destroy the George Washington Bridge, the Lincoln Tunnel, and the Brooklyn Bridge in one day. Students discuss (increased traffic in Holland Tunnel, Manhattan Bridge, Brooklyn Battery Tunnel, etc. Traffic backs up on New Jersey and Brooklyn sides of arteries, affecting street traffic there.) The map on page 54 shows bridges, tunnels, and ferries. (Display gas station maps or Hagstron's to enable students to identify arteries.)

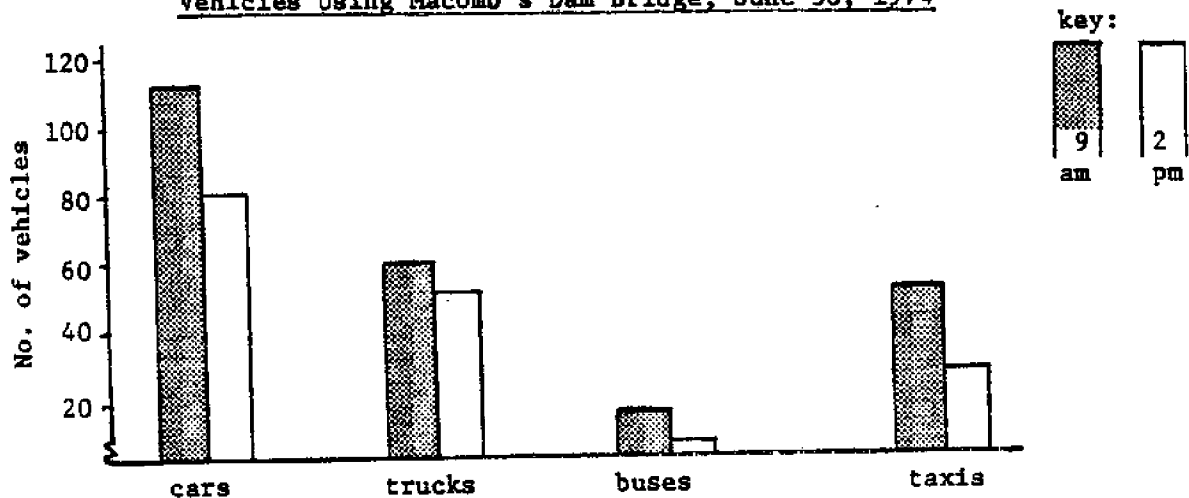
Summary: The fact that New York is an island city predetermines traffic flow problems. Traffic coming into or leaving the city and inter-borough traffic must use bridges and tunnels. These act as a bottleneck, constricting the free flow of traffic around the city.

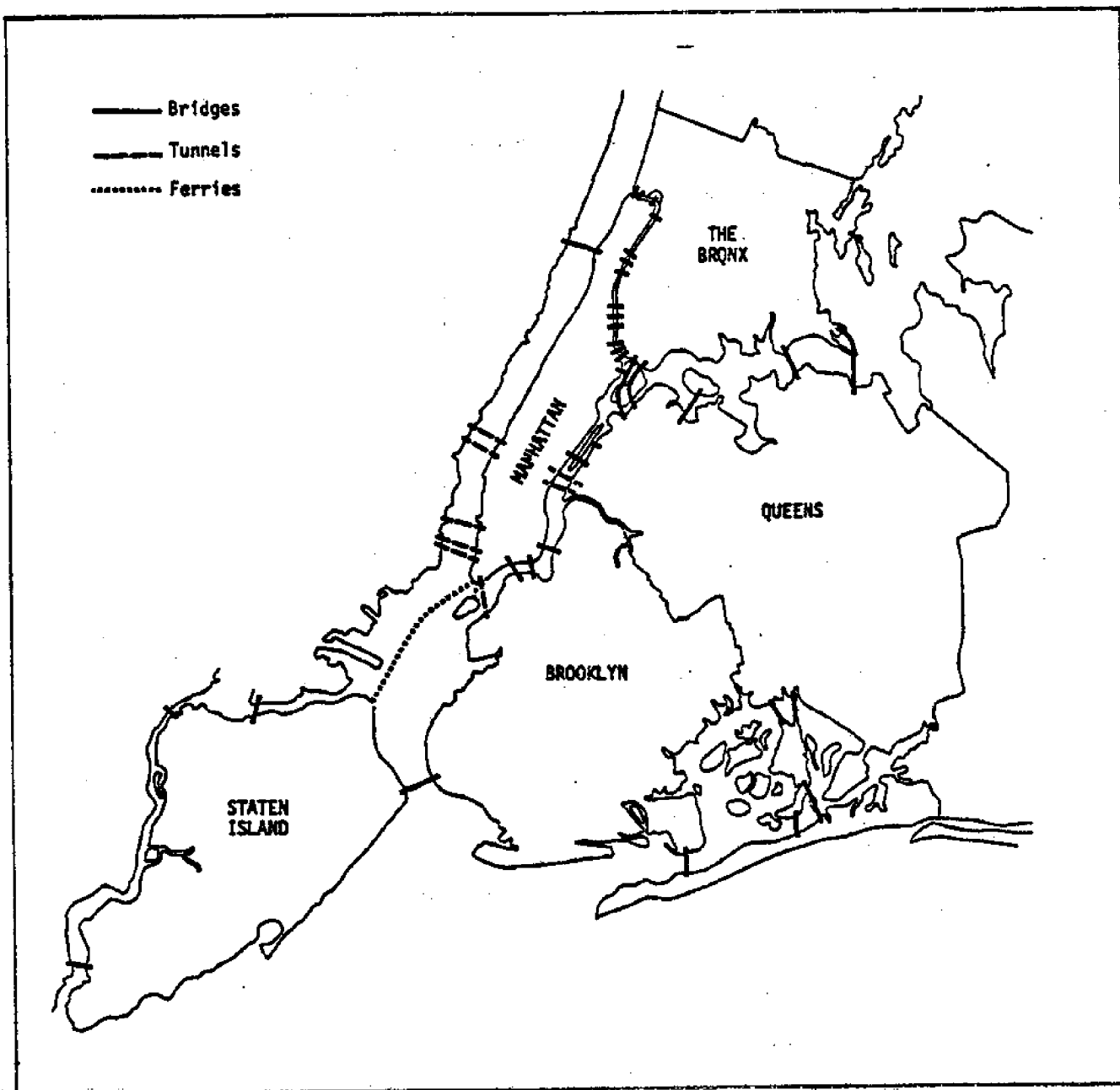
Math activity: Making a Graph of Traffic Flow on a Bridge

Examine the traffic flow on a specific bridge or tunnel at two different times of day; make a bar graph of the results.

Materials needed: graph paper, pencils (two different colors), rulers, pocket counters (optional), watches, notebooks. Teacher takes students to the nearest bridge or tunnel. Standing at one end of the artery, students are asked to record the number of cars, trucks, buses, and taxis passing in a 5-minute period in their notebooks. (If traffic flow is heavy, divide students into four groups and let each group be responsible for counting their class of vehicle only. Give one student in each group a pocket counter for accuracy.) Repeat this activity at another time during the same day. When the class next meets, students are asked to bring their results. Teacher shows students how to make a bar graph of their results, using two different color pencils for the different time periods. See sample following.

Vehicles Using Macomb's Dam Bridge, June 30, 1974





Bridges, Tunnels & Ferries

From: "The New York City Waterfront". New York City Planning Commission, June, 1974, p. 134.

Teacher asks students to draw conclusions from this graph. (Traffic in all types of vehicles heavier at 9:00 a.m. than at 2:00 p.m.)
Optional activities:

1. Have students calculate percentage change of traffic for each type of vehicle between two time periods.
2. Assuming an average car holds 4 passengers, an average bus 60, an average truck 2, and an average taxi 3. Calculate the number of people that pass over the artery during the two different time periods.

THEME III:

HOW HAS THE UTILIZATION OF THE WATER RESOURCES

AFFECTED THE PHYSICAL AND SOCIAL ENVIRONMENT OF NEW YORK CITY?

A good motivational introduction to this theme would be to show the sound filmstrip, "New York City: An Environmental Study" (Denoyer Geppert Audio-visuals Co.). The filmstrip points out the problems of pollution, poor access to waterfront areas, and lack of planning and how they affect the total environment of New York City.

A. Industrial and Shipping Activities

1. Physical appearance - piers

SS activity: Comparison of Industrial, Residential and Recreational Waterfront Usage - Pictures

Examine the effects of industrial and shipping activity on the physical appearance of the waterfront. Using pictures, compare industrial waterfront with residential or recreational waterfront. (Preferably, use student slides taken on Circle Line tour. If not available, use relevant frames from the filmstrip: "New York City: An Environmental Study" or pictures from magazines and/or newspapers.) Ask the students key questions:

1. Would you like to live near this (industry or docks) or this (parkland)? Why?
2. What does this factory or dock do to the surrounding neighborhood? (need for transportation facilities, cuts off people access, etc.)

Optional activity: Teacher can take comparison further by showing examples of attractive dock facilities (new Staten Island terminals and older, decrepit piers).

SS activity: Containerization vs. Breakbulk

Examine the effects of the change in shipping technology (containerization) on the New York City waterfront.

Background: Traditional loading and unloading was done piece by piece. This method was called breakbulk unloading. Recently engineers have designed a new method of packing and unloading cargo called containerization. Cargo is packed in large containers which can easily be moved by heavy cranes. Containerization has made breakbulk piers obsolete; much of the shipping activity has shifted from Manhattan to Brooklyn, Staten Island, and New Jersey shores, which have greater space available for trucks to maneuver the large con-

tainers. Teacher demonstrates to students how containerization works.

Materials needed: two flat wooden boards (barges) 10" x 15", six boxes (approximately 5" x 5" x 5"), an assortment of irregularly shaped objects; e.g. hairpins, pencils, erasers, chalk, rubber bands, toys -- enough to fill the boxes twice over; stopwatch.

Procedure: Teacher arranges on a table the two flat wooden boards. On one board, place the six boxes and fill with half of the objects. On the other board, place the other half of the objects. Ask for two student volunteers to act as longshoremen. They are assigned to unload the two barges. Time them. (The student who has the containerized barge will obviously finish first.) Ask students to draw conclusions from this experiment, using key questions:

1. What do you think this experiment demonstrates?
2. How would you compare the time required to unload, using the two techniques? (breakbulk and containerized)
3. How would you compare the number of longshoremen needed to unload using the two techniques?
4. Which method would you guess is now used more? (In late 1960's, container berths handled 27% port trade; it is estimated that by 1975, they will have handled more than 50%.) Why? (more efficient)
5. Many longshoremen union officials are opposed to containerization. Why? (a. They fear job cuts because it takes only 1/12 the time to load and unload a containerized ship; b. Union regulations won't allow men who are working on Manhattan piers to work on Staten Island. The shift of port activity away from Manhattan threatens workers.)
6. Is the longshoreman's fear well grounded? See sample news article on next page.

LA activity: The Impact of Containerization

Read the following excerpt about containerization and discuss its significance:

"The City learned about the uncontestability of containerization the hard way. In 1965 it spent \$7.3 million to build Pier 36 on the East River, one of the finest breakbulk piers in the country, but it fell almost immediately into disuse. The modernization of the Chelsea piers in 1964 for \$34 million ended just as unfortunately."¹

1. Vocabulary: incontestability, disuse, modernization

¹"The Waterfront". New York City Planning Commission, January, 1971, p. 24

2. Drawing on what you learned in your social studies activity, why were the Chelsea piers and Pier 36 on the East River abandoned? (containerization)
3. What effects on the physical and social environment do these abandoned piers and other docks like them have? (Vacant property is often vandalized; abandoned property always looks depressing; vacant property attracts criminal activity, e.g. drug dealing)

Dock Union Prepares for Strike Amid Efforts to Avert It Tomorrow

By DAMON STETSON

The International Longshoremen's Association went ahead yesterday with plans for a dockworkers' strike at 12:01 A.M. tomorrow amid a flurry of moves aimed at forestalling a walkout.

... About 35,000 longshoremen are affected.

Mr. Gleason has announced that a strike, if one occurs, will be aimed at container ships, which carry huge steel boxes for cargo that are hoisted on and off vessels by giant cranes. The development of these automated container ships has sharply increased productivity and efficiency on the piers but with less manpower.

The I.L.A. leader said, however, that the longshoremen would continue to handle cargoes on

conventional ships, which carry bulk shipments rather than containers, and on passenger ships and on ships loaded with perishables.

As a result of the impact of the use of containers on productivity and jobs, the union has placed increasing emphasis on job security and contract provisions that would give longshoremen guaranteed incomes over the year, even when there is a reduced amount of work for them.

... The impact of a major dock strike would be felt initially by the ocean carriers, stevedores and truckers who handle the millions of tons of general cargo that pass through Atlantic ports. The Port of New York, which handled more than 58 million tons of oceanborne

foreign trade worth \$30 billion last year, has a broad-based general cargo mixture. The port ranks first in a wide range of commodities, such as raw materials, semi-processed goods, food products, consumer goods and manufactured products.

There were 50 vessels in the Port of New York yesterday, nine of which were container ships, according to figures of the Waterfront Commission of New York and New Jersey. The commission said that 9,638 longshoremen of the 11,800 registered in the port were working yesterday, a figure higher than the average and apparently reflecting an effort to load and unload cargoes before the strike deadline.

New York Times, September 29, 1978

SS-Math activity: Containerization Statistics

Examine the following statistics and draw conclusions on the effects of containerization:

Port of New York Waterfront Hirings¹
Change from 1962-3 to 1972-3

	change in number	percentage
Manhattan	- 1,095,768 loss	81% decline
Brooklyn	- 844,620 loss	42% decline
Staten Island	+ 54,486 increase	53% increase
New Jersey	+ 162,638 increase	17% increase

These statistics can be shown on a transparency with an overhead projector or copied on the blackboard. Students are asked key questions to elicit conclusions:

1. Which area or borough experienced the greatest loss in waterfront hirings?
2. Which area experienced the greatest number gain? percentage gain? (discussion of difference in two types of statistics - number and percentage)
3. What do these figures show? (shipping activity is shifting to Staten Island and New Jersey; note: recent plans for container ports in Brooklyn may reverse the decline in that borough)
4. What accounts for this shifting? (containerization ports built in Staten Island and New Jersey make Manhattan's break-bulk piers outmoded)

2. Industrial, Shipping, and Other Urban Wastes Pollute the Water

Background: Booklets and information available from the D.E.P. Department of Water Resources, e.g. "The Water We Use in New York".

Sci activity: Pollution - Motivational Film

Study water and water pollution. A good motivational film is "Water Pollution: A First Film"². Two other good a.v.i. materials include "Water Pollution"³ and "Pollution - Water"⁴.

¹City Planning Commission Statistics, June, 1974

²Available from B.A.V.I. at Board of Education

³Available from Encyclopedia Britannica Educational Corp.

⁴Available from Educational Directions, Inc.

While watching the film(s) or filmstrip, have students record in their notebooks all the sources of water pollution that they observed.

1. Which kinds or sources of water pollution are most prevalent in New York City?
2. What other sources of water pollution are prevalent in New York City?
3. A master New York City water pollution chart can be developed around the following categories (and displayed in the classroom):
 - a. thermal pollution - see diagram of Con Ed generating plants that follows;
 - b. spills - oil and garbage from marine transfer stations - (see diagram of environmental facilities on p. 64) ships pumping bilge, water and oil storage transfers;
 - c. industrial wastes - chemical, other;
 - d. offshore dumping - garbage and sewage treatment plant sludge;
 - e. residential waste - human, pets, dishwashing, etc.

Sci activity: How Do You Contribute to Pollution?

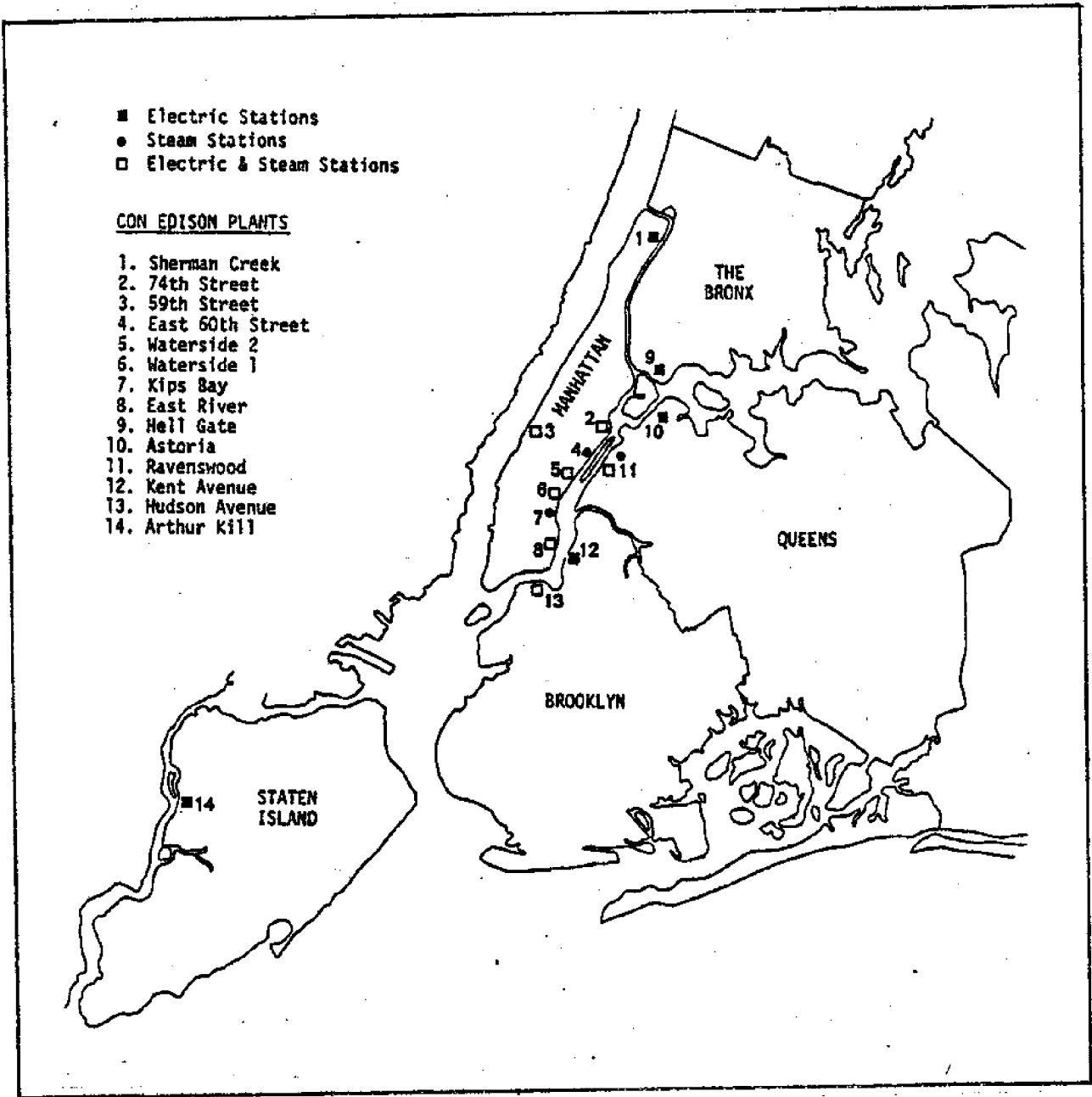
Discussion on how everyone in the class contributes to the water pollution problem.

Motivation: Teacher tells class: you all stand guilty of polluting New York City's water. Discuss:

1. Why did I accuse you of polluting the water?
2. Have class think of all the ways in which they use water in their daily lives.
3. How do these activities add to the pollution of New York City's waters? (examples could include dishwashing, biological elimination, all forms of cleaning, etc.)
4. How can you pollute the water less?

Sci-IA activity: Pollution - Research

Research different kinds of water pollution (thermal, chemical, solid waste, etc.). Based on the class New York City Water Pollution chart, divide the class into task force groups of 3 or 4 students to actively research the pollution sources listed. Where possible, if the task



Con Edison Facilities

From: "The New York City Waterfront", New York City Planning Commission, June, 1974, p. 54.

force can locate the name of a particular pollution source, have the task force write to the company, industry, etc., and ask what steps they are taking to eliminate it. Research should include:

1. Kind of water pollution
2. Who is doing it?
3. What is its effect on the water environment?
4. What can be done about it?

Sci activity: How Do We Test the Water?

Test for different indicators of water quality.

Teacher must become familiar with each kit or its equivalent. Students will first gather samples of the following: fish tank water, tap water, and sewer discharge (see custodian of school or obtain sample from water pollution control plant). They will then test for dissolved oxygen, pH, acid/base, carbon dioxide, hardness, phosphate, nitrate, and coliform bacteria. The number of tests you do will depend on the availability of equipment and chemicals. This lesson is essential as preparation for all water systems field trips. Discuss how the various test results can be interpreted in terms of water quality. For example, dissolved oxygen (D.O.) can be interpreted as follows:

Minimum of 5 mg/liter = suitable for swimming, shellfish harvesting

Minimum of 4 mg/liter = suitable for fishing, boating

Minimum of 3 mg/liter = suitable for fish survival and fish passage

See map of water quality objectives that follows.

B. Rapid Growth Outstrips and Pollutes Water Resources

1. Water Systems

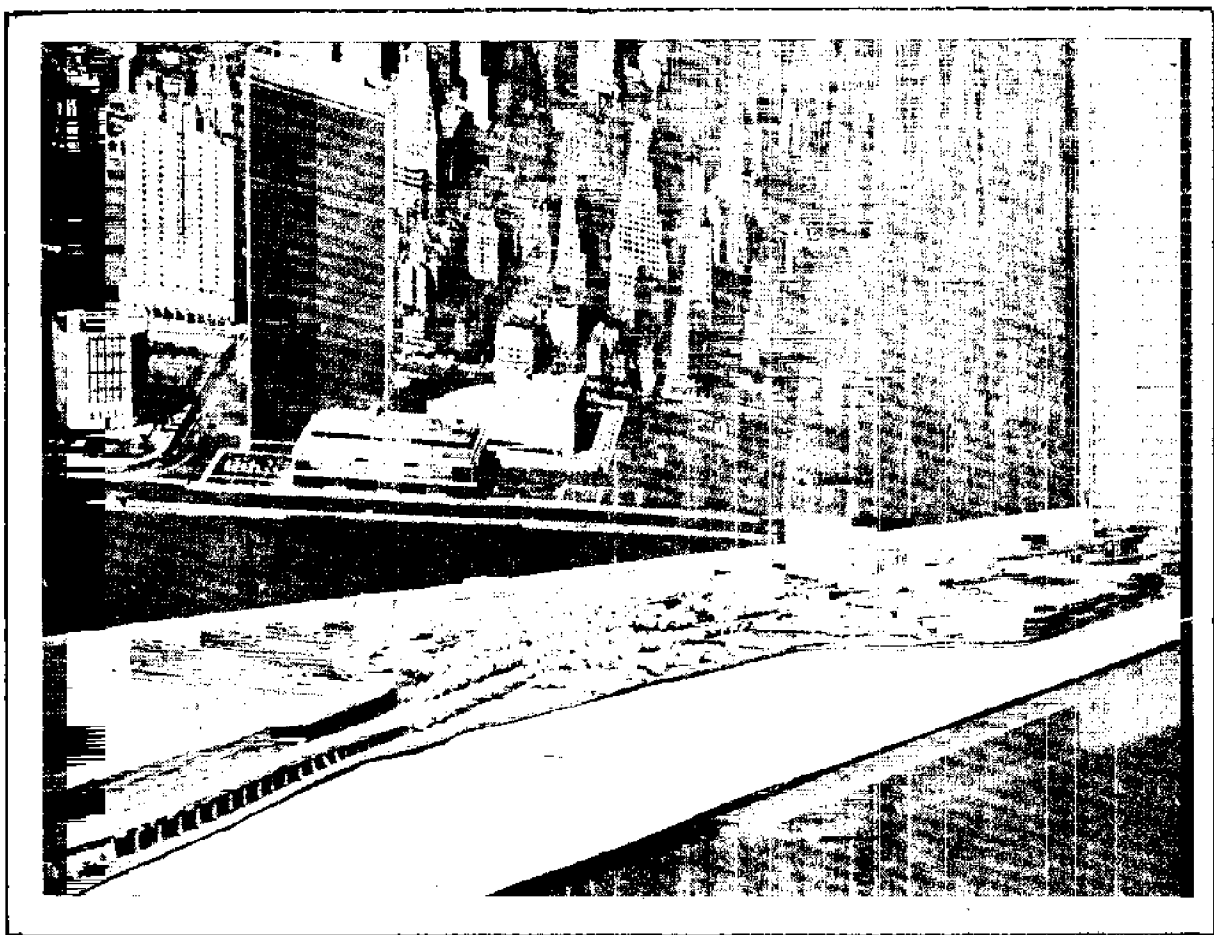
Background: New York City has every type of water system. This section is best studied through on-site learning experiences.

Sci activity: Trip to New York Aquarium

To see exhibit on types of bodies of water (see Field Trip Guide).

Sci activity: Trip to Coney Island Beach

(See Field Trip Guide.) Note: Beach study activities also found in Gateway National Park Trip (see Field Trip Guide). This trip can also be taken later (see p. 76).



Model of Riverbank Park proposed for roof of new water pollution control plant at 145th Street and Hudson River. Backdrop is mural of UN on East River in Manhattan.

Sci activity: Trip to Pelham Bay Salt Marsh

(See Field Trip Guide.) Note: This trip is also appropriate during food chain instruction (see p. 31).

Sci activity: Pond Study Trip to Alley Park

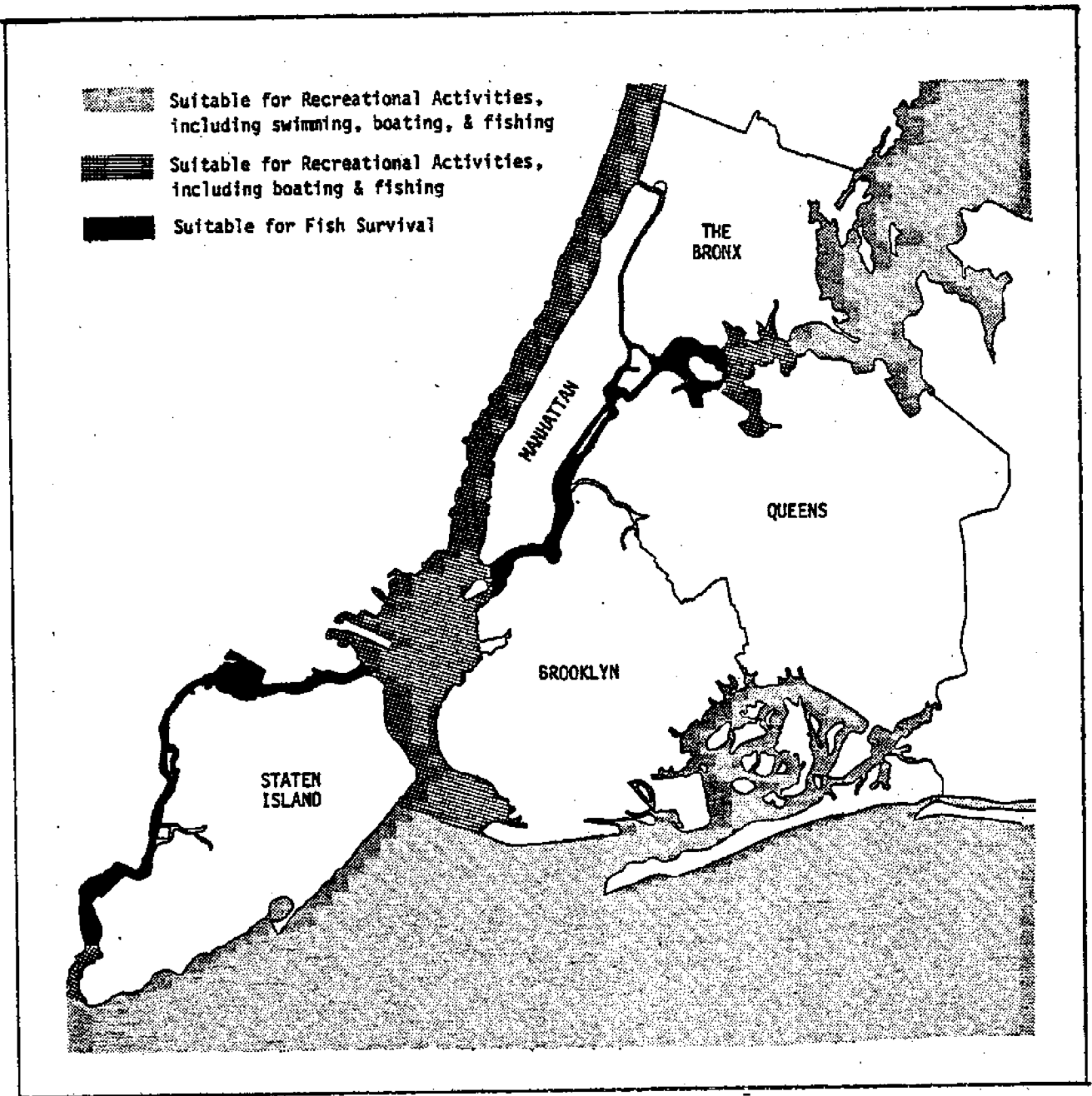
(See Field Trip Guide.)

Sci activity: Stream Study - Richmond Creek

(See Field Trip Guide.)

Sci activity: Bay Study - Sheepshead Bay Observation Trip

(See Field Trip Guide.)



WATER QUALITY OBJECTIVES

From: "The New York City Waterfront", City Planning Commission, 1974, p.48.

2. Water Supply

Background: "You can lead a horse to water but you can't make him drink" is an old saw that may have had its roots in New York City. Prior to the Revolutionary War, the drinking water was so polluted that even the horses refused to drink it. Water for the 22,000 residents came from wells and springs in lower Manhattan. Not only was the water polluted, the supply was also inadequate for fighting the numerous fires in the city.

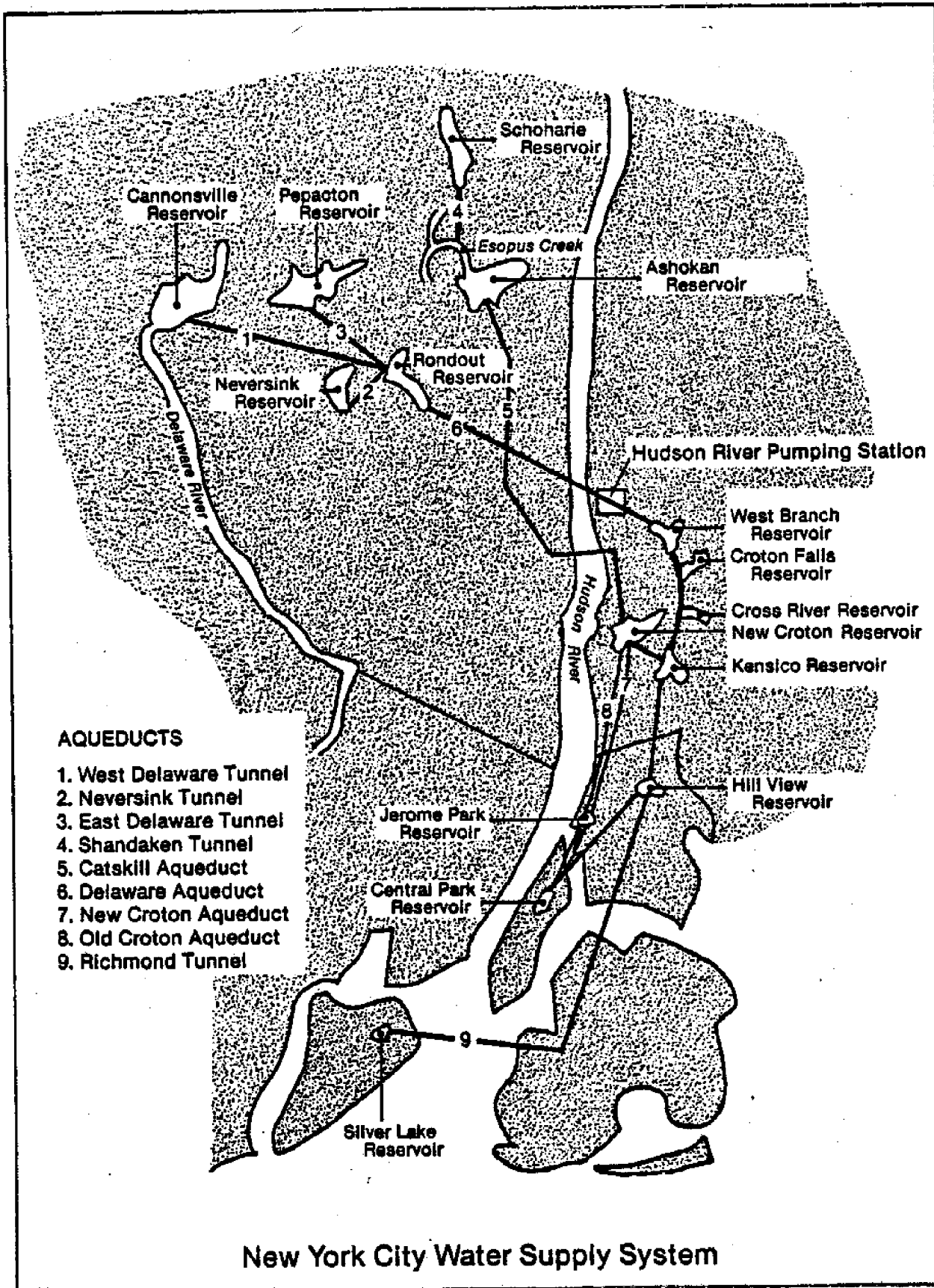
In the 1830's, Colonel DeWitt Clinton rejected proposals to use the Bronx River, dam the Hudson River, and sink artesian wells into the underlying rock strata because these plans were either inadequate for anticipated future use or unfeasible from an engineering viewpoint. Clinton finally suggested using the Croton River. The Croton Aqueduct system of reservoirs and aqueducts was completed in 1848 at a cost of \$2-1/2 million. While the supply was now adequate, the water pressure was often insufficient to serve the more elevated areas; thus the Highbridge Tower and Reservoir was constructed between 1866 and 1872 in Northern Manhattan. At its top, the tower was 60 feet above the highest point in Manhattan, thus insuring adequate water pressure throughout the city.

The ever-growing population soon put a strain on the Croton system. By 1883, the population had swelled to 1-1/2 million and after the consolidation of the five boroughs into Greater New York in 1898, the population soared to 4 million. The Board of Water Supply was created in 1905 to investigate new sources from the Catskill Mountains. Construction on the Catskill supply system began in 1907 and was completed in 1927. When this system too proved inadequate, construction began on the Delaware Project in the late 1920's to tap the Delaware Watershed.

While the total water supply was now adequate (2 billion gallons a day), several of the conduits began to deteriorate. The present system now includes large supply conduits which are over 100 years old, which results in many watermain breaks. Despite the fact that the last water supply construction project was completed in the 1930's, and many conduits need replacement, the quality of New York City's drinking water is reputed to be among the best in the world.

Politically, there is a conflict over roles and jurisdiction between the Board of Water Supply and the Department of Water Supply of the Department of Environmental Protection. It is to be hoped that this conflict doesn't impede necessary conduit repairs.

It is interesting to note that some former receiving reservoirs were filled in to make recreational facilities. Bryant Park and Central Park's Great Lawn were built on reservoir sites. The Highbridge Reservoir became a city swimming pool and the tower was converted to a carillon. Silver Lake Park was built around the Silver Lake Terminal Reservoir.



New York City Water Supply System

Sci activity: How Do We Get Our Fresh Water?

Using the map on the previous page, discuss the following:

1. Where does our "fresh" water come from? (Include the hydrologic cycle.)
2. Locate three of the upstate reservoirs.
3. How does it get to the city? (through underground pipes called aqueducts)
4. Why doesn't the water have to be pumped to the city? (water comes from high elevation and gravity moves it)
5. Have class design an experiment to demonstrate that water can travel without pumping by gravity feed.

Sci activity: Film on Effect of Rapid Urban Growth on Water Supply

To find out the effect of rapid urban growth on an adequate water supply.

Show a film such as "Problems of Conservation: Water" (color 14 min, 2 reels, available from B.A.V.I. subscription service). Deals with the problem of obtaining a supply of fresh water and maintaining the existing supply. Discussion:

1. Why must New Yorkers be concerned about their fresh water?
2. What might happen if we didn't look for additional water supply resources? Recall water shortages of late 1960's.
3. Why is it necessary for us to make better use of our fresh water?
4. What are some things you can do to use less water? (New York City uses approximately 1.5 billion gallons of water per day. Flush toilets waste 4 to 6 gallons of fresh water for each use to remove only a small amount of pollutant. Sweden has in use a valve that reduces this consumption by 70%.)

SS activity: Guest Lecturer - Water Quality

Contact the Department of Environmental Protection, Department of Water Resources. Ask for a guest speaker to come in to discuss quality of drinking water in New York City and problem of water supply in a large urban area. Class should prepare questions in advance, e.g.

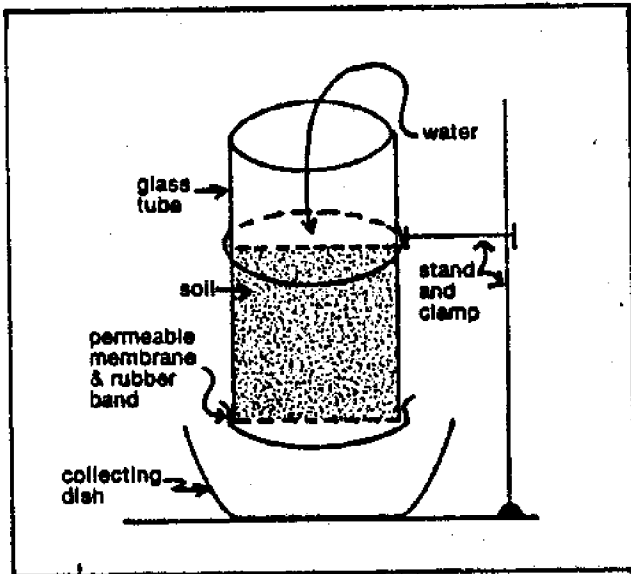
1. Does New York City water have to be purified? Why (not)?
2. What chemicals are added to our drinking water? Why?
3. Does New York City water have to be aerated? Why (not)?

4. What problems, if any, are there in distributing water once it reaches the city?
5. How does the quality of New York City water today compare with New York City water in 1800? in 1850? in 1900? in 1925?
6. How does the quality of New York City water compare with other large cities?

Sci activity: Experiment - Ground Water and Water Table

What is ground water and the water table?

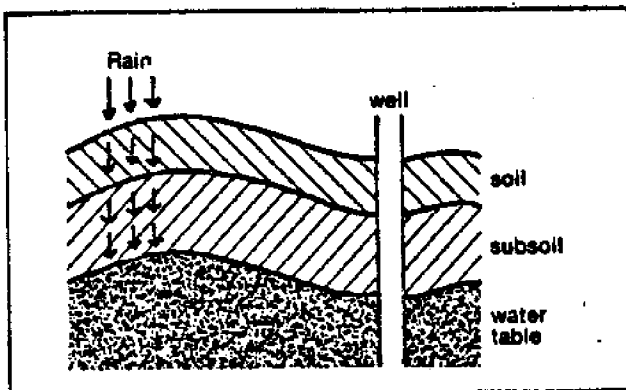
Have the class do the following experiment in groups of two to three students. Materials: large glass tube open at both ends (or fruit punch can with one end open and the other end with small holes punched in it), semipermeable membrane and rubber band (for glass tube only), stand and clamp, collecting dish, soil (sand or gravel).



Procedure: Set up equipment as in diagram. Secure membrane and add soil slowly. Do not pack down. Attach tube with soil to stand with a clamp. Be sure clamp is snugly on the tube before attaching to stand. Check your set-up and make sure everything is in place. SLOWLY pour 50 ml. of water into tube as shown. Time how long it takes for water to start dripping into collecting dish.

1. How did the water get into the collecting dish?
2. How does this process occur in nature? (rain falls on the soil and filters down through it)
3. Why do you think this water is called groundwater?

4. Why is there very little place for water to become groundwater in New York City? (roads, sidewalks, parking lots, etc.; water flows into sewers) Inform class that many people who live in Queens and almost all of Long Island get their water from groundwater. Wells are dug into the water table (place where groundwater collects).



5. Why is the water table dropping in Queens and Long Island? (many people using it but little being replaced since little open areas for water to enter the soil.)
6. Why are people able to drink groundwater? (soil acts as filter to remove impurities)

Optional class discussion:

7. Why is the Queens and Long Island water table becoming polluted? (Pollution of water table due to use of cess pools and septic tanks without adequate soil area to filter impurities.)
8. Why is the water table in Queens and Long Island becoming salty? (The constant lowering of the water table is permitting salt water from the ocean and Long Island Sound to infiltrate the water table.)
9. Why is the rest of New York City not so concerned about the water table? (Rest of New York City gets its water from upstate watershed and not from wells.)

Sci activity: Film - Water Table

To study how urban growth has affected the underground water table. Show a film such as "Man's Problem" (color, 17 min, 2 reels) available from B.A.V.I. subscribers' service. Deals with water use (industrial, recreational, etc.), how it affects the water table and includes regional control and conservation. Discuss:

1. Why is the water table dropping?
 2. How does construction affect the water table? (residential and commercial)
 3. How does population density affect the water table?
3. Sewer Systems Waste Treatment

Sci activity: Trip to Water Pollution Control Plant

Background: New York City uses primary plus secondary sewage treatment. Primary sewage is screened for large debris, then allowed to stand for an hour to permit heavy particles to settle. Secondary treatment uses primary settling tanks, aeration tanks, and final settling tanks. When the water is pumped out, sludge is left. The sludge settles in a tank called a thickener, then is sent to a tank called a digester. The sludge is dumped out at sea. New York City does not use tertiary treatment to remove inorganic chemicals.

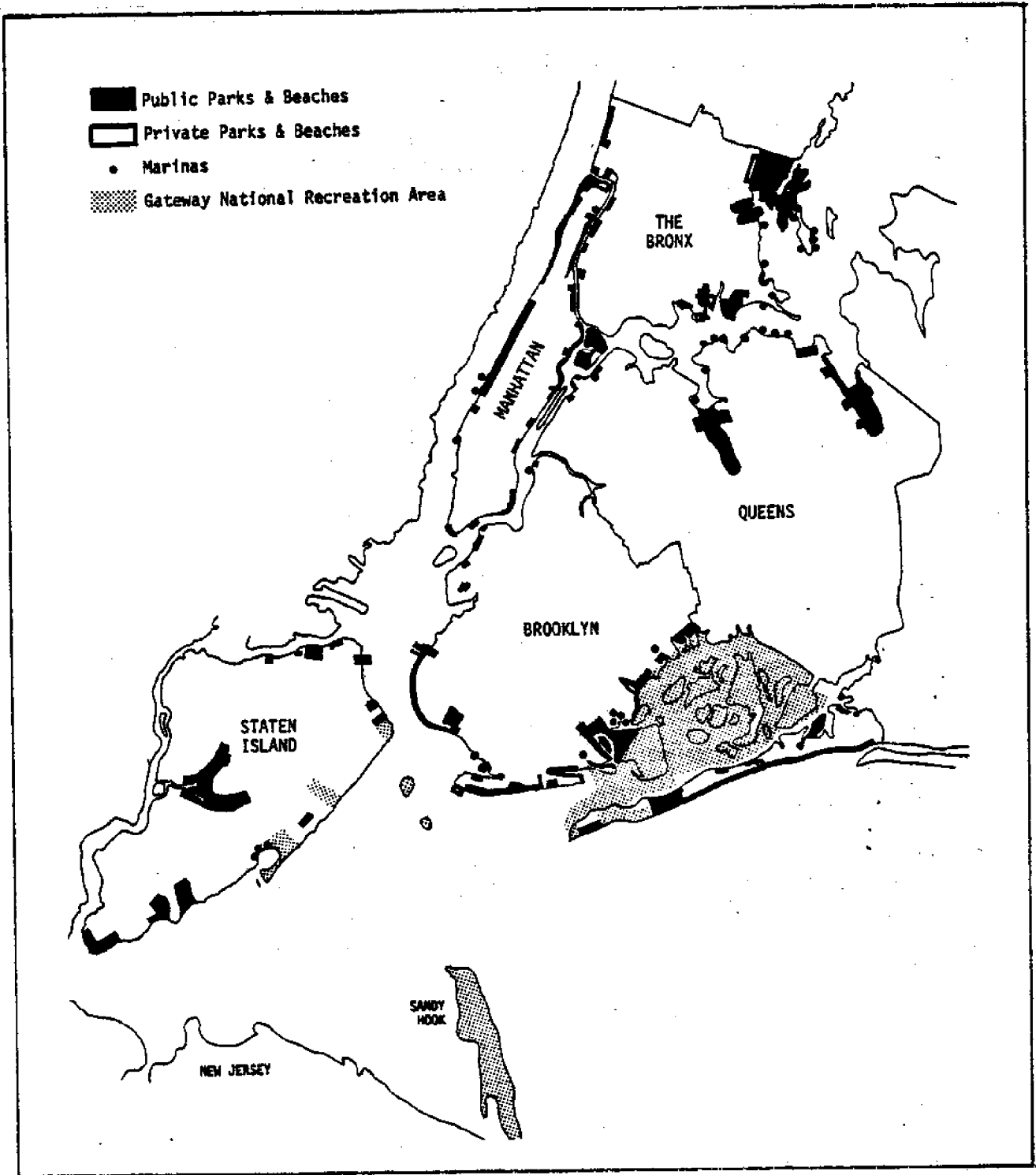
(See Field Trip Guide.)

4. Oil Spills

Background: Large urban centers such as New York City require large shipments of oil to satisfy its energy needs. Recent news items document the increase in oil spillage and its effect on the water systems.

LA activity: Research on Oil Spill

Have students research the problem of oil spills and their effect on the quality of water.



WATERFRONT PARKS

From: "The New York City Waterfront", City Planning Commission, June, 1974, p. 104.

Seek answers to the following questions:

1. What are the major causes of oil spills?
2. What weather conditions maximize the problem? Why? How?
3. How can oil spills be contained or combatted?
4. How can the danger of oil spills be minimized?

2 Oil Barges Go Aground Within 24 Hours

New York Times, November 28, 1978

By JUDITH CUMMINGS

A huge oil-bearing barge ran aground early yesterday on a rocky island in the East River, spilling 40,000 gallons of light-weight heating oil into the waters of Hell Gate near Gracie Mansion.

[At 9:30 last night a second barge, carrying one million gallons of light heating oil, ran aground in East Rockaway Inlet in Queens, the Coast Guard said. United Press International quoted a spokesman for the Coast Guard as saying early today that no oil had leaked but that there were fears that waves might cause the barge to break up, causing a major spill.]

James Fleishell, the Coast Guard's Captain of the Port of New York, called the East River accident "a serious spill" but not a substantial threat to the environment. The river's strong currents and tidal action were expected to dissipate the oil downriver toward upper New York Bay, according to a Coast Guard spokesman.

An official of the State Department of Environmental Conservation agreed with the Coast Guard's assessment.

"As of now, it's relatively minor," said Richard Newman, regional supervisor of the department's Pure Waters Program.

"We're only talking about a sheen on the water, not a big concentration of the stuff. It spreads out and there's just a sheen."

The spill occurred after a 425-foot barge, the Cibro Philadelphia, went out of control in turbulent waters and ran aground at about 1:30 A.M. at Mill Rock, the Coast Guard spokesman said. Two McAllister Brothers tugboats were pushing the barge, which was bound for New Haven from an Exxon facility in the Bayway area of Linden, N.J., and loaded with 7.5 million gallons of No. 2 light home-heating fuel.

C. How Has the Waterfront Been Used for Recreational Purposes?

1. Parks and Beaches

SS activity: Map Study of Recreational Use of Waterfront

Examine the map on page 72 that locates parks, beaches, and marinas.

Key questions:

1. How is waterfront land used for recreational purposes?
(fishing, swimming, parks, boating)
2. Does it appear from this map that recreation areas are evenly distributed throughout the city?
3. Why do you think so many parks are located on the waterfront?
(open space essential when living in concrete skyscraper city)
4. Where are the national recreation areas located?

LA activity: Research on Robert Moses

Have students research the life of Robert Moses in the library. They can be directed to write a paper from their findings on his achievements in recreational development of waterfront land in New York City. Why was he called "the Master Builder"?

SS activity: Location and Usage of Beaches

Examine the use of beaches in New York City. Teacher asks students to brainstorm in small groups to list every conceivable use of beach land. Teacher asks group representative to list all uses on board. (List will include swimming, sunbathing, building sand castles, shell collecting, sleeping, surfing, watching the ocean, etc.) Questions for discussion:

1. What seems to be the most popular uses of the urban beach?
2. Are there any uses of beaches in other locations that are not applicable in New York City? (e.g. surfing)
3. Why aren't some beaches safe nowadays? (pollution, overcrowding cuts down on lifeguard's ability to see, swimming accidents)
4. Where are most of the beaches located? (There are 18.4 miles of public beach in New York City; only one is in the Bronx, none in Manhattan, a few in Staten Island - most of which are too polluted for swimming, and the rest are in Brooklyn and Queens.) Why are there no beaches in Manhattan?
5. Do you think more beaches are necessary? Why? (Why not?)

LA activity: Article, "Parks for Our Waterfronts"

Read the following article from Waterfront News, published by the South Street Seaport Museum (Vol. III, No. 1, October, 1973) and discuss:

1. How many acres of parks border on the waterfront?
2. Give two examples of man-made parks.
3. How will cleaner waters (assuming treatment plants do their job) affect waterfront recreational use?
4. Does the City Planning Commission advocate increasing or decreasing the recreational portion of the waterfront?
5. Would you like to see the recreational portion increase? Why (not)?

Parks for Our Waterfronts!

**By Robert S. Cook, Jr., Executive Director
The Parks Council**

The largest and most important of these developments is the Gateway National Recreation Area. Encompassing Jamaica Bay, Floyd Bennett Field, Breezy Point and Great Kills Park in New York City and Sandy Hook in New Jersey, Gateway will be the first truly urban national park. Planning is underway for development, an important component of which will be transportation within and to Gateway, making it available to millions of urban residents without automobiles. The City Planning Commission will be holding September hearings on the transfer of City lands to the National Park Service. Gateway will be developed

Parks aren't exactly foreign to New York City's waterfront. Of 35,463 acres of parks in the City, 22,531 acres are underwater parkland or in parks bordering the waterfront. Put another way, 84 of New York's 220 miles of waterfront are currently used for recreational purposes, i.e. parks or beaches.

The waterfront parks are both natural and man-made. Natural parkland varies from rocky coast (Pelham Bay Park, Bronx), to tidal wetlands (Jamaica Bay, Brooklyn and Queens), to beaches (Breezy Point, Queens). Man-made waterfront parks include Riverside Park, built on fill excavated from the construction of the 8th Avenue Subway, and Great Kills Park, formerly a dump.

over a period of years, with an eventual investment of some \$100 million, if Congress cooperates.

Also new to New York is the State Park Commission for New York City, whose first two ventures are waterfront parks. At a site on the Harlem River in the Bronx, the Commission in August dedicated a new park containing a handsome recreation center and large swimming pool. The park will eventually be enlarged to incorporate a long strip on the waterfront. The Commission is also building a 30 acre park on top of the North River Pollution Control Facility, now under construction on Manhattan's West Side. Completion of the plant will result in the treatment of virtually all of New York's sewage; cleaner waters will increase the demand to use our waterfront for recreational purposes.

Other changes will also affect recreational usage of the waterfront... beaches are eroding, abandoned piers find a new lease on life as sites for tennis or sitting, landfill goes on, a radically new West Side Highway is contemplated. In this context, the Waterfront Report of the City Planning Commission advocates increasing the recreational portion of the waterfront from 84 to 117 miles. A new day is dawning for waterfront recreation as these positive, and negative, changes occur. Vigilance will be required to ensure that opportunities are not lost and mistakes are not made if New Yorkers are to receive the maximum benefit.

"Waterfront News," Vol. III, No. 1, South Street Seaport Museum, October 1973

SS-LA activity: Carl Schurz Park Observation Trip

(See Field Trip Guide. Also see p. 79.)

SS-LA activity: Inwood Hill Park Observation Trip

(See Field Trip Guide.)

SS-LA activity: Roberto Clemente State Park Observation Trip

(See Field Trip Guide. Also see p. 80.)

Sci activity: Film on Animal and Plant Life at Beach

Study the animal and plant life of the beaches by showing a film. Suggested films are "Between the Tides" (22 min), "Seashore Life" (11 min), "Animals That Live in the Surf"; all three available from B.A.V.I.

Discuss:

1. Identify some of the animals and plants that exist in the ocean.
2. How are they adapted for survival?
3. Compare the life that exists in the tidal zone (define) with that that exists in the surf zone (define).

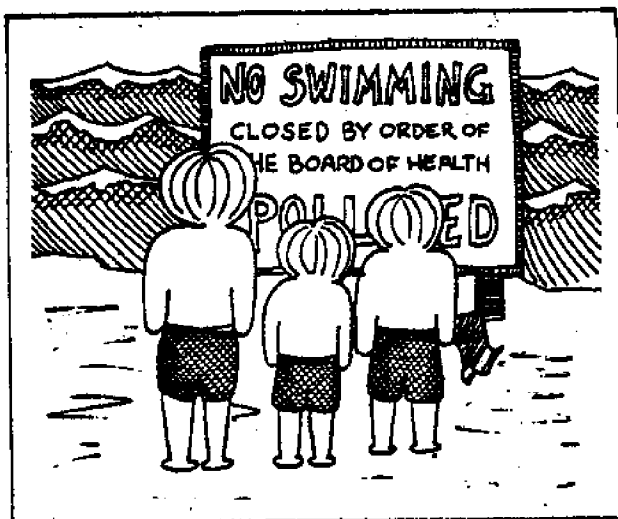
Sci activity: Beach Trip

(See Field Trip Guide.)

Sci activity: Guest Lecturer on Beach Erosion

Contact Oceanographic Study Station at Sandy Hook, New Jersey (now part of Gateway National Park), and/or U.S. Army Corps of Engineers for further information on beach erosion. Arrange for expert to talk to class.

Sci activity: Discussion on Pollution



Study effect of pollution on recreational use of water. For motivation, exhibit picture.

Discuss: 60 years ago, very few (if any) beaches had signs like that. Why do so many beaches now have similar warnings? Elicit possible answers:

1. oil spills
2. lack of sewage treatment
3. increased pollution due to increased population density
4. on-shore drift of sewage sludge or dredge

SS activity: Observation Trip to South Beach

(See Field Trip Guide.)

2. Fishing and Boating

Background: Refer to map of waterfront parks on p. 72 for location of all marinas. There are more than 100 marinas in all five boroughs. Some specialize in pleasure boating, others in fishing boat charters, and some accommodate both interests. There are 34,000 boats registered in the city; the minimum total gross of local marinas is estimated at \$20 million annually.¹

LA activity: Career Interview

Interview a marina operator or fishing boat captain on tape. Teacher can get listings and phone numbers in sports section of New York Daily News. Students can be encouraged to use tape as basis for student newspaper article. Key questions:

1. Why did you become a fisherman (marina operator, etc.)?
2. Has your occupation undergone any changes in recent years? If so, how?
3. Did you have any training?
4. Is it easy to enter your profession?
5. What would you recommend as changes in New York City waterfront policy to benefit your profession?

LA-SS activity: Sheepshead Bay Observation Trip

(See Field Trip Guide.)

LA-SS activity: City Island Observation Trip

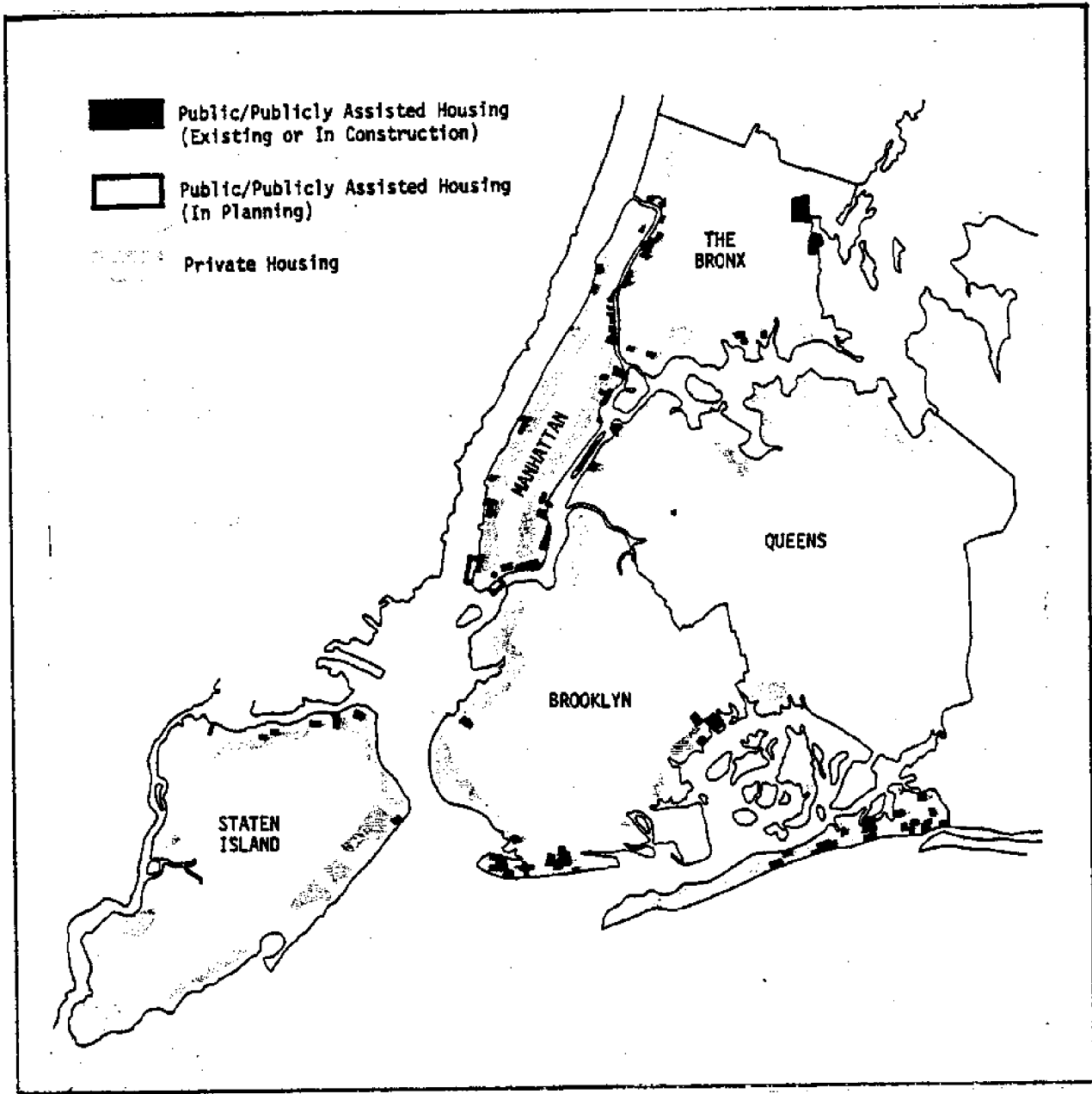
(See Field Trip Guide.)

LA-SS activity: Riverside Park 79th Street Marina Observation Trip²

(See Field Trip Guide.)

¹Statistics from "The New York City Waterfront", City Planning Commission, June, 1974, p. 77.

²These trips would also be appropriate during the discussion on waterfront housing usage, see p. 77.



Housing on the Waterfront

From: "The New York City Waterfront", New York City Planning Commission, June, 1974, p.88.

D. How has the Waterfront Been Used for Housing?

Background: With the exception of the houseboat communities at 79th Street Boat Basin (Manhattan), Flushing Bay (Queens), and City Island (Bronx), waterfront housing refers to private homes and apartments built along the waterfront.

SS activity: Waterfront Housing Map Study

Examine the use of the waterfront for housing, using map on p. 78.
Key questions:

1. Which type of housing (public or private) dominates the waterfront? Why do you think this is so?
2. Very often housing has no closer relationship with the waterfront than a view. Why do you think this is so? (separation by highway, railroad, industry, etc.)
3. What can be done to allow access to the waterfront for housing that is separated by highway, railroad, etc.? (decks, promenades)

SS-LA activity: Carl Schurz Park Observation Trip

(See Field Trip Guide.)

SS-LA activity: Brooklyn Heights Observation Trip

(See Field Trip Guide.)

LA activity: Battery Park City Development

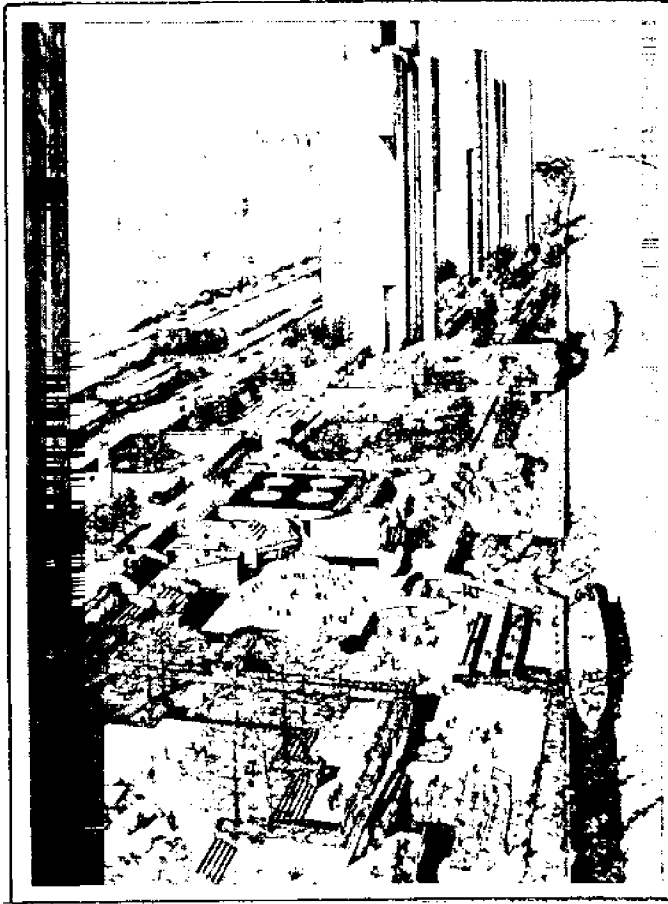
Read and discuss the following excerpt on the proposed housing development, Battery Park City:

"Battery Park City will be built on some 100 acres of land along the Hudson River, between Battery Park and Duane Street. A city within a city, the development will ultimately include some 14,000 dwelling units, 5 million square feet of office space and 1 million square feet of retail space. It, too, will provide approximately 30 acres of open space, including a waterfront esplanade linked to Battery Park. In addition, the feasibility of a new "people mover" system is being investigated, which would link Manhattan Landing and Battery Park City, and provide a Lower Manhattan loop service."¹

Questions for discussion:

1. look up the following vocabulary words: dwelling, retail, esplanade, feasibility
2. Why is this proposed housing development called a "city within a city"? (housing, offices, stores all included)

¹"The New York City Waterfront", City Planning Commission, 1974, p. 91



3. What do you think a "people mover" is?
(moving sidewalk)

SS-LA activity: Roosevelt Island Observation Trip (See Field Trip Guide.)

SS-LA activity: Waterside Observation Trip
(See Field Trip Guide.)

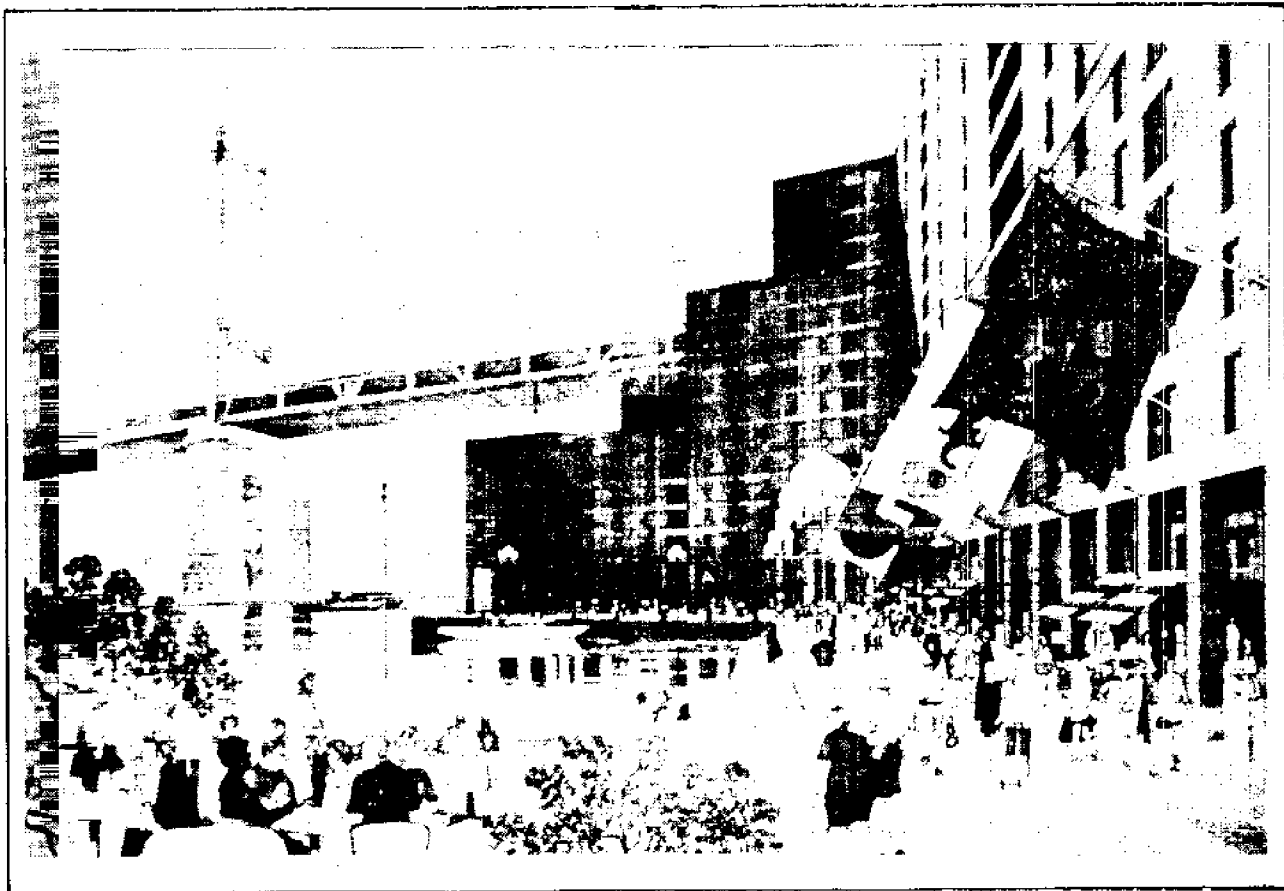
SS-LA activity: Roberto Clemente Observation Trip (See Field Trip Guide.)

SS-LA activity: Flushing Meadow Park Marine Observation Trip (See Field Trip Guide.)

SS-LA activity: Riverside Park 79th Street Marina Observation Trip
(See Field Trip Guide.)

Above: Artist's drawing of Harlem River Houses and Roberto Clemente State Park

Below: Artist's drawing of Roosevelt Island housing



Sci activity: Loss of Wetlands From Housing Construction

Study how housing construction affects salt marsh environment.
Background: According to the City Planning Commission, only 400 acres of wetland remain in the Bronx of 2000 that existed in 1954. (See table of coastal wetland losses below. Notice that housing accounts for 29% of wetlands loss -- almost 1/3.)

1. Recall the importance of the salt marsh as a breeding, feeding, and nesting ground (see pp. 31-35). Discuss the impact of this loss.
2. Why were marshlands used for this type of development? (answer: low tax, odorous, thus undesirable for other use; until recently, undervalued)

Table
CAUSES OF COASTAL WETLAND LOSSES
1954 - 1964

<u>Cause of Loss</u>	<u>New York City</u>	
	<u>Acres</u>	<u>Percent</u>
Miscellaneous Fill	616	14%
Waste Disposal	101	2%
Industry	589	14%
Airports	475	11%
Housing	1,246	29%
Recreation	1,271	30%

Source: U. S. Fish and Wildlife Service, 1965.
Includes only wetlands valuable for wild fowl.



Coop City during construction. Pelham Bay marshland is seen in foreground.

E. What Cultural Impact Has the Waterfront Effected?

1. The fact that New York City is an immigration port of entry has made it a multi-ethnic city and an international center.

LA activity: Multi-Ethnic Character of New York City

Read the following quote from Here Is New York, by E. B. White:

"The collision and the intermingling of these millions of foreign-born people representing so many races and creeds make New York an exhibit of the phenomenon of one world. . . The City has to be tolerant, otherwise it would explode in a radioactive cloud of hate and rancor and bigotry. . . In New York smolders every race problem there is, but the noticeable thing is not the problem but the inviolate truce."¹

Questions:

1. vocabulary: intermingling, phenomenon, creed, tolerant, rancor, bigotry, smolder, inviolate.
2. Do you agree with Mr. White that New York City people are tolerant of each other? Why (not)?
3. Can you think of any examples of tolerance? intolerance?
4. What imagery is used by the author?

SS activity: Ethnic Groups -- Discussion

Teacher makes a history of ethnic groups in New York City on board, starting with groups identified in ethnic survey (see p. 24). Teacher then adds other ethnic groups. A complete listing can be found in Around the World in New York (see footnote). Discuss:

1. What is an ethnic group? Distinguish between race, nationality, creed.
2. Do these groups live together or in separate "ghettos"? Explain.
3. Do these groups speak the same language?
4. Are some of these groups larger than others? What effect does this have on the New York City population? (more acceptance, fear of dominance, etc.)
5. Did these groups come to New York City for the same reason? If not, what were some of the reasons?

¹Quoted in Around the World in New York, Caroline Zachry Institute on Human Development. New York: 1950, p. 7

An excellent follow-up homework assignment is to write an essay on one of the following topics:

- a. New York City is often called a "melting pot". This implies that eventually all the ethnic groups mix and form a composite culture. Do you agree with this statement? Why (Not)?
- b. Some people feel that when ethnic groups intermingle and assimilate, cultural traditions and values are often lost. Do you agree or disagree with this? Why (not)?

SS-LA activity: UN Plaza Observation Trip

(See Field Trip Guide.)

THEME IV

HOW IS NEW YORK CITY TRYING TO DEAL WITH ITS WATER RESOURCES PROBLEMS?

A. Governmental Agencies

Background: The city alone is not responsible for water resources management and development. Numerous federal, state, city, and regional agencies share jurisdictions and often overlap.

SS activity: Management Flow Chart

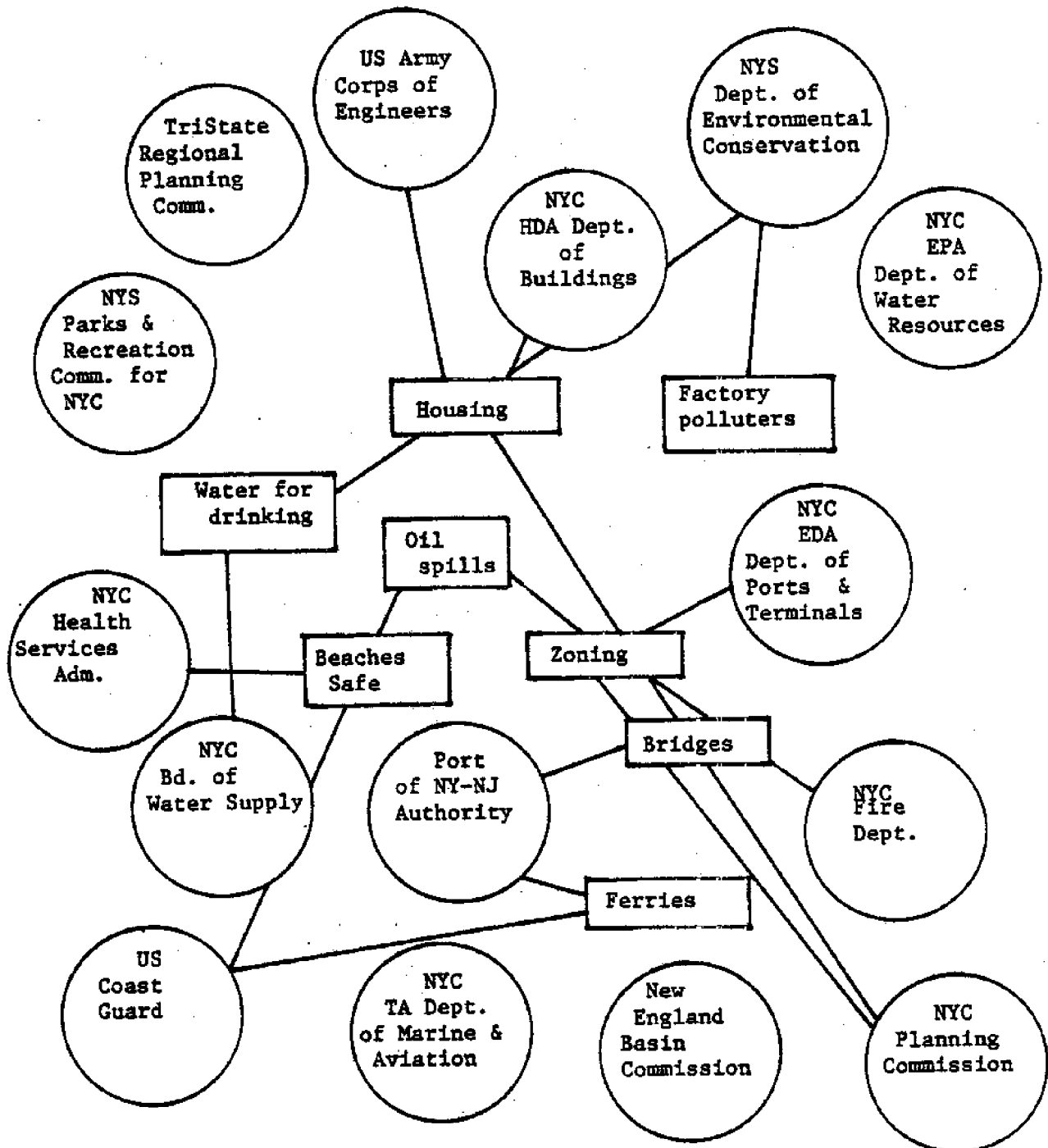
Construct a management flow chart for various waterfront problems. Teacher prepares a list of agencies and addresses; students write letters or call requesting information on jurisdiction and function. (This should be done approximately 2 to 3 weeks prior to this lesson.) Following is a suggested list of agencies. See resource list for address and phone number.

1. federal
 - U.S. Army Corps of Engineers
 - U.S. Coast Guard
 - Environmental Protection Agency
2. state
 - Department of Environmental Conservation
 - Parks and Recreation Commission for New York City
3. city
 - Department of Environmental Protection, Department of Water Resources
 - Health Services Administration
 - Economic Development Administration, Department of Ports and Terminals
 - Fire Department
 - City Planning Commission
 - Housing & Development Administration, Department of Buildings
 - Board of Water Supply
 - Transportation Administration, Department of Marine & Aviation
4. regional
 - Port of Authority of New York and New Jersey
 - Tri State Regional Planning Commission
 - New England River Basin Commission

Teacher shows students how to make a simple flow chart. Have students write issues, projects, or problems on index cards (e.g. factory is polluting river, mother wants to know if Orchard Beach is safe for swimming, real estate firm wants to build apartment house complex along waterfront, etc.). Pin these cards in the middle of the bulletin board.

Label circular cardboard or paper discs with agencies from list. Place these around the board. Take string and thumbtacks and connect problem to agency. (Note: In some cases, more than one agency will be connected to a single issue.)

Summary: This activity shows how many governmental agencies overlap in jurisdiction and responsibilities. The partial network of strings demonstrates the complications of governmental bureaucracies. See sample flow chart following.



LA activity: Water Supply Board -- Pro and Con

Background: Two city agencies have responsibilities for water supply: the Board of Water Supply and the Department of Water Resources (Division of D.E.P.). Some experts have argued that this leads to conflict of interest and overlapping responsibilities. Read article below and discuss:

1. These two letters represent opposing views on the abolition of the Board of Water Supply. With which do you agree? Why?
2. Which letter is most likely to be biased? Explain.
3. What problems might result from the conflict over jurisdiction between the Water Supply Board and the Department of Water Supply? Explain.

Water Supply Board: Vital Force in Our City's Life

To the Editor:

In an April 10 editorial you describe the City Board of Water Supply as "useless" and advocate its abolition.

This "useless" board has built the city's entire Catskill and Delaware water supply systems, part of an overall system recognized by water-supply authorities as the finest in the world.

This "useless" board is currently building a vitally needed water-supply tunnel, which will ultimately extend from Kensico Reservoir down through the city where it will connect with the tunnel running from Brooklyn to Staten Island (also built by us).

The budgeted money for the next fiscal year is mainly to pay for the design of sections of the tunnel and for investigations of new water-supply sources. Without the tunnel extension, the city would not be able to provide water for the large construction projects in progress or planned for lower Manhattan as well as for the growing demand of the people of Staten Island, Brooklyn and Queens. Regardless of what agency were to perform this work, the city would still have to pay for design work, construction and engineers' salaries.

Your proposal for transferring the functions of this board to the Water Resources Department has as much merit as a converse transfer would

have. Each agency has its specialized function, and whoever were to perform the functions of this board would have the same expenses.

Before 1903, the functions of our board were performed by the predecessor agency of the Water Resources Department. The Legislature created our board that year because of the inefficiencies in planning and development handled by a department where commissioners come and go.

On taking office, Mayor La Guardia probably had the same opinion as you do, but before reaching hasty conclusions, he ordered an investigation to determine the merit of the board. The findings confirmed that the Board of Water Supply was a vital force in the life and progress of the city.

In cooperation with Mayor La Guardia and his successors, the board has continued to carry out its work efficiently and has continued to construct essential water facilities to maintain a system that has no peer in this country.

HEBERT M. ROSENBERG
President

New York City Board of Water Supply
New York, April 11, 1974

To the Editor:

There is one argument against abolishing the Board of Water Supply,

as a recent Times editorial suggested doing.

No one reasonably acquainted with the city's water system could deny that the Board of Water Supply performs no useful function that could not be handled better by the coexisting Department of Water Supply. It is true that the board exists only because of a political deal made in 1904, when the almost equally useless Croton Aqueduct Commission was being phased out. It is further true that almost any waterworks engineer would give New York a prize as having the worst water policy of any major American city.

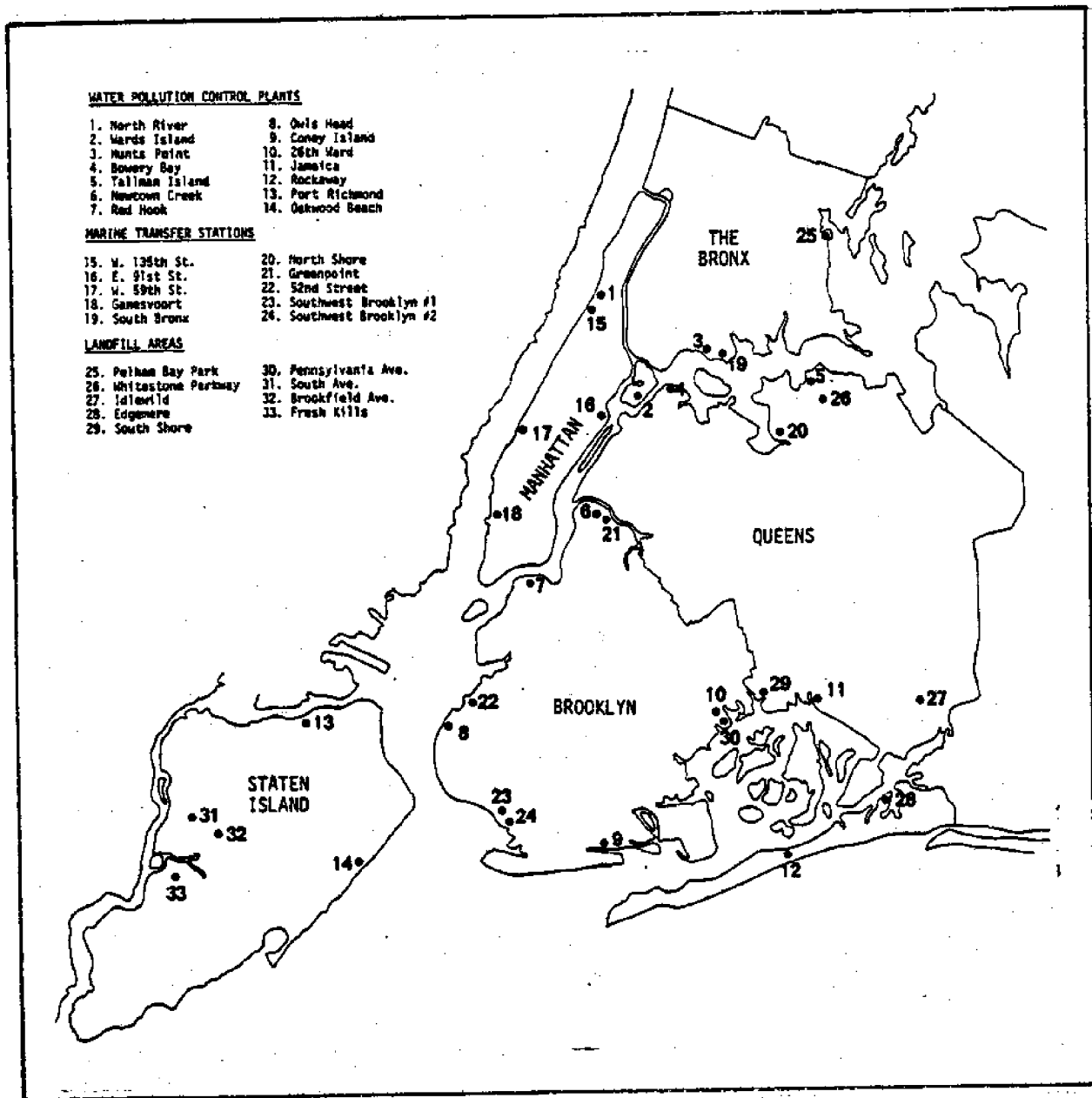
But the board perhaps ought to survive as a piece of living history. It is the last remaining link to the old nineteenth-century Tammany Hall. Boss Tweed himself was involved in a scandal over water meters in 1873. (The 10,000 meters on which he took kickbacks were never installed; 99 years later the city still doesn't use meters, which must be some kind of record.)

I don't say the three members of the board should get a \$12,000 raise. A \$19,999 cut (\$24,999 in the case of the chairman) might be more appropriate, leaving them \$1-a-year men.

But just as the city preserves a few old buildings here and there as landmarks, perhaps it should preserve the Board of Water Supply as a monument to the long history of patronage.

NOEL PERRIN
Hanover, N. H., April 10, 1974

New York Times 4/22/74



ENVIRONMENTAL FACILITIES

From: "The New York City Waterfront", City Planning Commission, June, 1974, p. 42.

Sci activity: Water Conservation

Study need for conserving water. Use motivating poster such as, "Take a Shower with a friend." Why is it necessary to conserve water?

Teacher writes on board: "We use over one billion three hundred million gallons a day." (Important! Write out figure 1,300,000,000.)

Between 1968 and 1972, average consumption increased by 32%. Based on that figure, if the same rate of increase continues, what will be the consumption now? The city's present system can meet a maximum of close to 2 billion gallons per day. We are almost to the limit now. Why must something be done? Can you think of ways the city can deal with the problem? Divide the class into four brainstorming sessions for fifteen minutes. Teacher should roam around the room asking leading questions, such as "Could the city build more tunnels to far away reservoirs? Could city somehow convince people to cut down consumption? How? By advertising?"

Have groups present their solutions and let class act as critics. A good following activity would be to invite an expert from the DEP and/or the Board of Water Supply to come to class as a guest speaker.

LA activity: Letter to DEP and/or Board of Water Supply

Have students write a letter to DEP or Board of Water Supply. Use formal letter format. In student's own words, ask what plan has been developed for meeting the future water needs of New York City.

When response is received, have students go back to science class and in same groups, discuss the feasibility of solution (if any). If no response, or if no solution presented, have students write to local Congressman, State Senator, City Councilman, etc., to exert pressure on Commission to ACT.

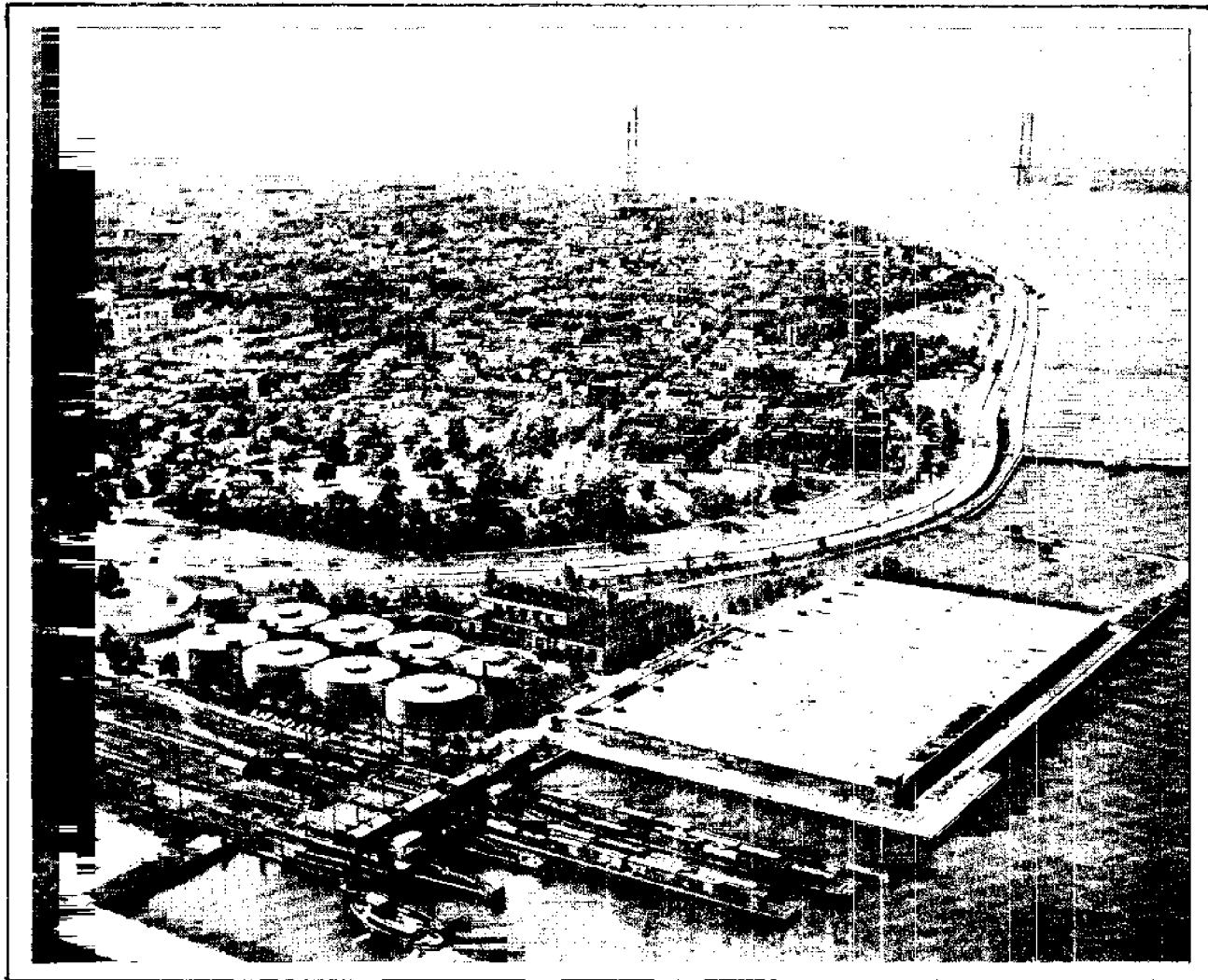
Sci activity: Expansion of Water Pollution Control Facilities

Study how the city can expand its sewer treatment facilities to combat water pollution.

Background: Review how water is treated (see pp. 69-70). Make distinction between water treatment and sewage treatment. Examine the chart on the status of water pollution control plants and the map of locations on pages 88 and 91.

Questions:

1. Where are the plants located? Are there any near you? Which ones?
2. How is location related to population density and residential areas?
3. Why are plants located on the waterfront?
4. Why do you think so many plants are being expanded?
5. What long-range effect will this expansion have on the water quality of New York City's waterways? Explain.



Owl's Head Water Pollution Control Plant. Courtesy Dept. of Water Resources.

STATUS OF WATER POLLUTION CONTROL PLANT

Facility	Original Construction		Present Capacity (MGD) ¹	Planned Extension or Upgrading		Estimated Cost
	Date	Capacity (MGD)		Capacity (MGD)	Status	
Coney Island	1935	70	110	110	Awaiting State and Federal Aid	\$ 82,200,000
Wards Island	1938	180	220	290	Under Construction	141,300,000
Tallmans Island	1938	40	60	80	Under Construction	43,200,000
Hart Island	1942	1.5	1.5		To be Phased Out in 1977	
Jamaica	1943	65	100	100	Under Construction	27,700,000
Bowery Bay	1949	40	120	150	Under Construction	85,500,000
26th Ward	1949	60	60	85	Under Construction	48,700,000
Rockaway	1951	15	30	45	Under Construction	48,800,000
Hunts Point	1952	120	150	200	Under Construction	101,800,000
Owls Head	1952	80	80	160	Awaiting State and Federal Aid	187,900,000
Port Richmond	1953	10	10	60	Under Construction	174,000,000
Oakwood Beach	1956	15	15	40	Under Construction	263,400,000
Newtown Creek	1967	310	310	410	Awaiting State and Federal Aid	N.A.
North River	--	--	--	220	Under Construction	814,900,000
Red Hook	--	--	--	90	Awaiting State and Federal Aid	329,000,000

¹ Million gallons per day.

B. Private Organizations

Background: Many private agencies are involved in waterfront planning and development. Some examples are the Parks Council, the South Street Seaport Museum, the Bronx River Restoration Project, and the New York City Council on the Environment.

LA activity: Citizen Involvement in Waterfront Planning

Read and discuss the significance of the following quote:

"What is needed are serious second thoughts from planners, and a consistent citizen campaign to save the waterfront. In a sense, it is saving the city; for whatever its tragic faults, and dangers,¹ it is a unique and beautiful City of steel and sea and rivers. . ."

1. Does the author suggest waterfront planning be done by city planners alone?
2. From this excerpt, would you say the author thinks the waterfront is in good or bad shape? Why? ("save the waterfront")
3. How do you think citizens could "campaign"? (write letters to the editor of a newspaper, contact political representatives, join a citizen's organization concerned with waterfront planning and development, etc.)

Homework assignment: Choose a particular environmental issue as it relates to the waterfront (e.g. offshore oil drilling). Write to a Washington lobbying group for information on this issue. (See resource list.)

SS activity: Guest Speaker -- Citizen Involvement

Contact the Parks Council or another private agency involved in waterfront planning. Arrange for a guest speaker to discuss how private citizens can become involved in waterfront planning, e.g. streetend development.

¹N. Y. Times editorial quoted in "At Last a Waterfront Committee", Waterfront News, Vol. III, No. 1, South Street Seaport Museum, October, 1973.

C. Coordinated Efforts

Background: Government officials and citizens alike have finally recognized the chaos and waste resulting from overlapping governmental responsibilities and the lack of coordinated planning efforts. Future efforts will be to gather loose strings into an organized overall plan.

SS activity: Seminar

Invite representatives from city and private agencies (see resource list) to attend a seminar. Students prepare questions ahead of time. The seminar is taped and/or filmed for future analysis and use. It is suggested that each agency invited be given a copy of questions to be discussed so that experts can come prepared on those subjects of interest to the students. Sample questions might include:

1. How does a City Planner go about making decisions on what to plan for the New York City waterfront? To whom does he go for approval?
2. What are some major problems New York faces related to the waterfront?
3. What are some of the jobs open to high school graduates (jobs related to waterfront)? to college graduates?
4. Why is most of the Bronx waterfront industrial?
5. How practical would an off-shore airport anchored island be?
6. Do you think hydrofoils might ever be used in New York City as they are in Southern Spain? Hovercraft?
7. Do you think there should be more houseboats in New York City as in Amsterdam and Paris?
8. Do you approve of using open land (e.g. salt marshes near Pelham Bay) for housing or industrial use?
9. Why are so many of the industrial docks moving to Staten Island, Brooklyn and New Jersey from Manhattan?
10. What industries must be on the waterfront? Why?
11. Can water pollution ever be controlled? How? When?
12. What would happen to Long Island shores if there were off-shore oil drilling?
13. Many experts point out that New York City residents are cut off from the waterfront because of the highways and industrial plants along the shores. How could residents be brought closer to (in touch with) the waterfront?
14. Is the Port of New York Authority responsive to the needs of New York?

15. How has the filling of salt marshes affected ocean life and the food chain?
16. Why must New York City get its drinking water from as much as 150 miles away?

Students should be encouraged to relate their findings to community groups. Perhaps they can contact community organizations and ask if they can present a half-hour talk on what the community can do about water resource problems. They can take their tape and/or film as audio-visual enrichment.

Art activity: Posters -- Water Resource Complaints

Students are asked to make large, colorful posters that list agency addresses and phone numbers to contact in case of emergency or complaint about water resources. These should be displayed around the neighborhood, e.g. community library bulletin boards, apartment house lobbies, store windows, community center bulletin boards.

THEME V:

WHAT ARE SOME CREATIVE USES AND POLICY OPTIONS FOR THE WATERFRONT?

Background: Several creative uses of the waterfront will be examined as to feasibility, desirability, and environmental impact. After studying several creative options, students will be assigned a final project: design a given section of the New York City waterfront.

A. Off-Shore Multiport

SS activity: Brainstorming on Air Traffic

Teacher either reads aloud or hands out a repro of a proposed solution to the air traffic congestion problem in New York City.

"The three major airports are overcrowded. There is no more room for landfill expansion of these jetports. Calverton, Long Island, and Maguire Air Force Base, New Jersey, were considered and rejected as sites for a fourth jetport. Stewart Air Force Base near Newburgh, New York, is still under consideration but there is considerable opposition from environmental groups. A consultant commissioned by the Federal Aviation Administration has suggested that an off-shore multiport facility be built that would include an airport, a deep-water port for oil tankers, a nuclear generating plant, and solid waste and sewage treatment plants."

Teacher asks students to break into small groups to react to the problem and solution presented. Key questions to consider:

1. How would it be constructed and anchored?
2. Where could it be located?
3. Would it solve the congestion problems of the other three airports? If so, how?
4. How could the people get to and from the facility?
5. Would it be expensive?
6. How would it affect the environment?

When class reassembles, it will become obvious that there are no clear-cut answers to some of these problems. The object of the lesson is to stimulate students to consider all the angles of any solution. Students could be directed as a follow-up homework assignment to write or call the New York City Planning Commission or the Federal Aviation Administration for their views.

Sci activity: Environmental Impact of Off-Shore Multiport

Study the environmental impact of an off-shore multiport. A few relevant newspaper articles are available on this subject, but as not much has been researched or written, teacher must present information to students.

Teacher puts pro and con impact on a repro master. Divide class into two groups. Give them two days to prepare for debate. Sample pros and cons:

Pros

- | | |
|---|--|
| 1. pilings provide feeding ground for fish | 1. necessity of link (causeway) of airport and land; if road, oil slick runoff, traffic congestion |
| 2. reduction of air traffic congestion in other three airports | 2. breakwater interferes with free movement of sea life |
| 3. may reduce air pollution and noise pollution in high density areas | 3. high cost |
| | 4. untried |

Teacher should do research to provide at least five or six sample pros and cons. Debate should be videotaped and/or taped if possible. Students should be encouraged to develop charts, diagrams and colorful illustrations to support their point of view.

B. Off-Shore Oil Drilling

SS activity: Debate on Off-Shore Oil Drilling

Prepare for a debate on the pros and cons of off-shore oil drilling. Students can research the issue in the library, using the Reader's Periodical Guide. Relevant news articles on off-shore oil drilling follow on pp. 97 and 98. Students should answer the following questions:

1. Where in the New York area is off-shore oil drilling proposed?
2. Why do some people feel it is necessary? Do you agree?
3. What will be the environmental impact? the aesthetic impact? the economic impact?

The actual debate is not held until the science lesson on environmental considerations (following activity) is completed. Debate can be filmed on videotape.

Sci activity: Environmental Impact of Off-Shore Oil Drilling

Study environmental impact of off-shore oil drilling. This subject is best taught using a film for strong visual impact. Suggested film, "The World Beneath the Sea", available for free from Modern Talking Picture Service, Inc., 315 Springfield Avenue, Summit, New Jersey, or 1212 Avenue of Americas. (Note: this film is produced by Exxon, thus, some bias should be expected.) Film must be ordered six months in advance.

Hearings slated on bill to delay ocean drilling

The Record-Tribune Bureau
WASHINGTON — Congressional hearings were to begin today on legislation which would delay oil exploration off the Atlantic Coast, now tentatively scheduled to start by the end of next year.

The bill, cosponsored by Rep. Henry Helstoski, D-N.J., would prohibit the Department of Interior from granting leases for offshore oil development until each affected state develops a comprehensive coastal zone management plan.

That restriction would end June 30, 1976, if the states have not developed a plan.

(A spokesman for the New Jersey Department of Environmental Protection said that the state's plan, the Coastal Area Facility Review Act, which became law on June 20, 1973, is being implemented in stages, and won't become fully effective until June 1977.)

Hearings set for today and tomorrow are being sponsored by the subcommittee on oceanography of the House Merchant Marine and Fisheries Committee, and Helstoski is preparing testimony for the hearings.

The White House last month announced a tentative offshore

oil development program, under which exploratory drilling off the New Jersey Coast could begin as early as next December.

While Interior Secretary Rogers C. B. Morton reaffirmed the federal government's assurances that it would not allow drilling in areas where the environmental risk was unacceptable, some critics, including Helstoski and Gov. Byrne, said these assurances weren't entirely acceptable.

"The decision by the Interior Department to accelerate oil and gas leasing," Helstoski said yesterday, "should provide the impetus for Congress to act quickly to see that our need for energy does not conflict with our need to preserve our coastal waters and land areas."

He said, "I think the coastal states should have the opportunity to prepare a management program for the coastal zone area, and to consider the location of facilities and their impact prior to any gas and oil leasing off the Atlantic seaboard."

Helstoski said that the states should have the right to veto offshore drilling altogether — although this provision is

not in the bill which he cosponsored — if it is determined that drilling would be detrimental to the resources and the environment of the state.

"Before we begin tearing up the floor of the Atlantic Ocean, let us explore fully all existing sources of energy," Helstoski said. "We still don't know for example, how much oil the Alaska pipeline will be able to provide."

The primary sponsor of the bill, Rep. Robert Bauman, R-Md., said yesterday that although the bill has no chance of passage in the final two weeks of the 93rd Congress, the hearings should focus public interest on the measure so that it can get more prompt consideration when it is reintroduced early next year.

A spokesman for the Interior Department said yesterday that although the department would oppose any bill that would prohibit the government from proceeding with development of offshore resources, he isn't sure what the department's policy is on the Bauman measure.

An aide to Bauman said, however, that he expects the Interior Department, which will send a representative to testify at the hearings, will oppose the bill.

Tuesday, January 7, 1975

Offshore drilling due soon

By Bob Cunningham
The Record Washington Bureau

WASHINGTON — The Interior Department has given its final approval for six oil companies to drill exploratory wells in the ocean off southern New Jersey.

Spokesmen for the federal agency and the oil industry said yesterday that they expect drilling to begin early next year. The companies need one more permit — a minor one — from the Environmental Protection Administration.

Geologists have estimated that there are billions of barrels of oil under the ocean floor in the Atlantic, and oil companies have gambled billions of dollars that those estimates are correct. But no one has drilled into the sediment to see if oil will gush out.

In August 1976 the federal government sold leases on 93 tracts in the Baltimore Canyon centered about 75 miles east of Atlantic City. Permits for nine of the leases — held by six companies — have been granted, the Interior Department announced last night.

Exxon, the high roller in the lease sale in spending \$348 million on 31 leases, holds one of the approved permits. A company spokesman said last night that the tract it plans to explore first was one of three Exxon geologists believe are the most promising of the 34. Exxon expects approval of the permits for the other two shortly.

The Interior Department issued two permits each to Mobil, Shell, and Gulf Oil and one each to Texaco, Exxon, and Houston Oil and Minerals. Each lease covers about 5,700 acres of seabed.

One-year delay

The permits had been delayed for about a year by a court battle over the validity of the lease sale. U.S. District Court Judge Jack Weinstein voided the sale last year, but in August the 2nd U.S. Circuit Court of Appeals overturned that decision. Long Island's Suffolk County, which fears shoreline damage, is appealing to the U.S. Supreme Court, but the permits have not been delayed pending that appeal.

Weinstein had ruled in Suffolk's favor because of potential danger of environmental damage, but the appeals court said that the Interior Department could control the problem of oil spills.

The nine exploratory permits reflect U.S. approval of environmental, safety, and technical aspects of test drilling. Each application covers items such as the depth of each well, plans to contain spills, and strategies for shutting down and evacuating drill ships for storms.

If the companies discover oil or natural gas, they must return to the Interior Department for petroleum production permits. Those would be far more complex and would deal with plans for bringing the oil ashore, the impact on New Jersey and other states, and more-elaborate measures to prevent and contain oil spills.

The Baltimore Canyon was the first Atlantic area opened to oil companies. The Interior Department also is moving to sell federal leases in the Georges Bank off Cape Cod and in the Atlantic off the Florida coast.

The Record, November 11, 1977

Questions for discussion:

1. What measures can an oil company take to insure environmental protection?
2. Are these foolproof measures?

If no information is provided on damaging effect on environment of oil, show the film, "Invasion by Oil" (24 minutes), available from U.S. Army Corps of Engineers. It dramatically portrays methods used to remove oil spill from harbor.

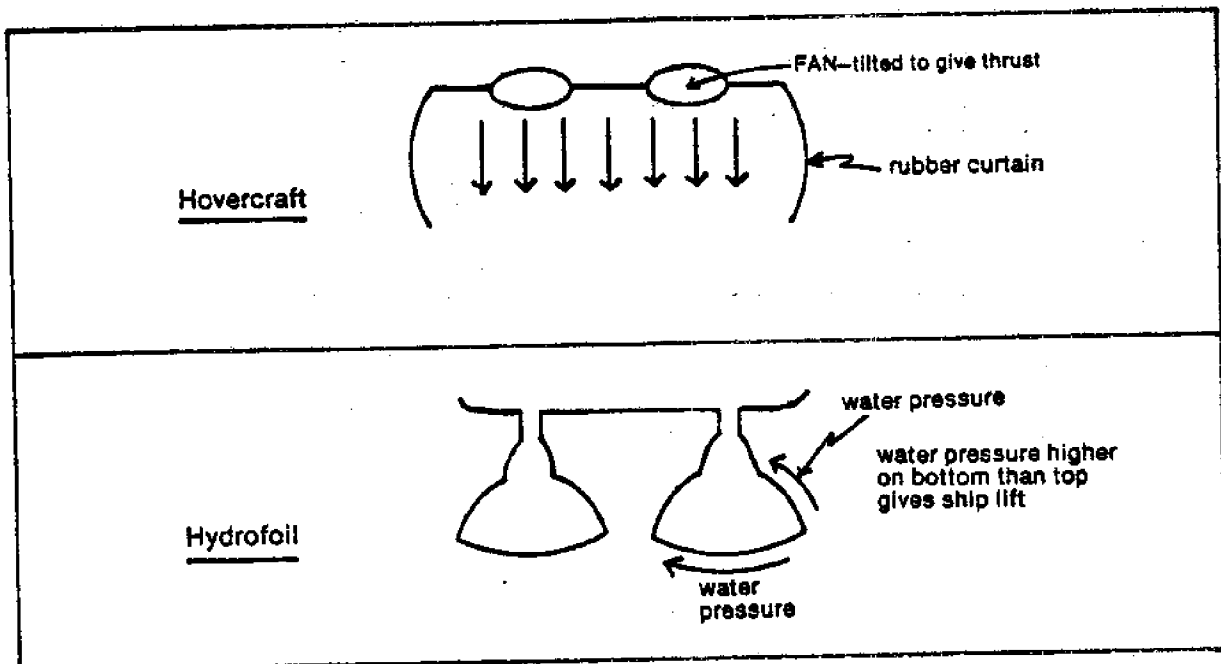
C. Waterborne Transportation

Background: Hovercrafts (air cushion vehicle) carry 250 passengers and 30 cars across the English Channel. Hydrofoils (vehicles with submerged wing-like foils) ferry passengers and cars between Spain and Morocco, Denmark and Sweden. If safety, environmental, and cost factors could be worked out, these vehicles might be used in addition to the conventional ferry.

Sci activity: How Hovercraft and Hydrofoil Work

Study how a hovercraft and a hydrofoil work.

Students should be given three days to research this in the library. Ask talented class artists to prepare large diagrams to display on the bulletin board to show how machines work. Sample diagrams follow. Class can compare the operation of the two craft.



Questions:

1. How does the hydrofoil work?
2. What works on the same principle as the hydrofoil? (answer: airplane wing. Bernoulli's principle.)
3. Why can the hydrofoil go faster than a regular ship? (answer: less friction)
4. Why does the hydrofoil have less friction than conventional ship? (answer: rides on four pods rather than the whole ship body submerged)
5. How does the hovercraft work?
6. Why would this give a smooth ride, even in choppy water? (answer: riding on cushion of air)
7. Why can hovercraft go in any direction? (answer: because of fan tilt)
8. Why is heavy curtain required? (answer: to contain cushion of air under craft)

Harbor Hydrofoil

Saying Staten Island ferryboats would be able to "take care of Manhattan-bound commuters only until the late 1970's," New York City began in 1970 to investigate new ways to move people between the island and Manhattan. The Planning Commission said at the time that a major part of the study was an "entirely new waterborne system, such as hovercraft and hydrofoil vessels."

Eight years have passed since New York undertook the study, and as of yet no hydrofoils have been spotted on the horizon.

"Nothing moved on the idea under

the Beame administration," says Al Silver of the city's Transportation Department. But now, he adds, with a \$1 million Federal grant, the city "is requesting proposals from companies interested in leasing to the city two or three craft for demonstration purposes."

The aim is to have hydrofoils replace the regular 3,000-passenger ferryboats from 11 P.M. to 6 A.M., when there are so few passengers that the boats are run at a great financial loss. The hydrofoils would carry about 275 people.

Mr. Silver says that, if existing hydrofoils were used and new ones did not have to be designed, test runs "could begin by the end of this summer or early fall."

New York Times, July 2, 1978

By Hovercraft to Gateway?

By POLLY KLINE

"While strolling through the park one day. In the merry, merry month of May . . ."
No doubt, the anonymous writer of that old ditty arrived at the park by trolley or horse-drawn hack. How truly "taken by surprise." The writer would be to board a late 20th century marvel—a highspeed hovercraft—for such a trip.

It isn't just fantasy. A suggestion has been made to "work out" a system of regular hovercraft runs to the scattered beaches, dunes, marshes and woods of Brooklyn, Queens, Staten Island and Sandy Hook, N.J., that make up the Gateway National Recreation Area.

Gateway, one of the world's most unconventional parks that skip-jumps across 28,000 acres of the harbor's shorelands—20,000 acres under water—could fall short of full development unless someone figures out how the anticipated millions of visitors are going to get there.

The hovercraft idea, complicated like most other facets of the nation's first urban national park, is one of the more glamorous proposals for helping to solve the transportation problem. Another is the establishment of a "highly sophisticated bus system," according to the Draft General Management Plan for Gateway.

Residents Fear Influx

Residents of areas near the various segments of the park, such as Floyd Bennett Field, have started clamoring against the feared influx of tens of thousands of cars on summer weekends and holidays.

And with the growing emphasis on austerity in the use of fuel, the need for mass transit alternatives to "gas guzzling" private cars will become more acute, planners said.

New legislation may come to the rescue, according to Inna Kovacs, coordinator for Gateway planning in the City Planning Department.

At the federal level, hearings are expected this summer on a bill that would permit Congress to authorize \$6 million over three years for transportation systems to and from nine national parks, including Gateway. There is no existing source for such funding said an aide to Rep. Jonathan B. Bingham (D-L.N.Y.), sponsor of the bill in the House.

"Now, we can't ask for \$10,000," the legislative assistant, Mike Rosenberg, said in Washington.

The role of the National Park Service, the arm of the U.S. Interior Department which runs the national park areas, "always has been seen as preserving natural wild lands and providing recreation opportunities," he said, adding the transportation service would be "a landmark."

"In a time of scarce fuel," Rosenberg said, "people won't go to the parks. Anyhow, the pollution from cars is already said to be ruining the parks."

Scheuer Is Oppositor

The bill already has met opposition from Rep. James H. Scheuer (D-Brooklyn, Queens), but is supported by Rep. Elizabeth Holtzman (D-L-Brooklyn) who urges even more money be authorized. Sen. Harrison A. Williams Jr. (D-N.J.) is the sponsor in the Senate.

The Gateway hovercraft service, for example, couldn't get off the ground without the legislation, it was said. Operating costs and the outlay for new docking facilities would have to come from the Gateway budget. That will eventually be over \$21 million annually (on top of a requested \$232 million in capital development funds), but it could not cover external transportation needs under present law.

For the hovercraft trips between South Ferry and newly installed floating docks at Floyd Bennett Field, Breezy Point or other Gateway points, three vessels, that are to be built for the city's Marine and Aviation Department, would be used.

The 84-passenger craft (it's not a boat, not a plane, but rides on air cushions just above the water) will be in service by next fall, it is hoped. They have been financed by a \$1 million grant from the federal Urban Metropolitan Transportation Administration to conduct trial commuter runs under a pilot program.

Patricia Green, who is working on the program with executive director Carl Berkowitz of Marine and Aviation, said, "We are ready to sit down and discuss the possibility (of Gateway service). The pilot program includes some recreational trial runs if there is no conflict with commuter testing."

Favors Review by City

Kovacs, the city's Gateway planning coordinator, welcomes the Williams-Bingham bill and also proposes action by the state that would subject the National Park Service's plans for Gateway to review by the city's Community Planning Boards in the respective areas affected. This would be in the form of an amendment to proposed legislation for transfer to the Interior Department of the last remaining Gateway section still in city hands. It consists of extensive beach lands on Staten Island from Great Kills Park to Miller Field and embracing South and Midland Beaches.

State Sen. John Marchi (R-C.S.I.) will hold a public hearing on the measure at 7:30 p.m. Thursday at New Dorp, S.I. High School.

Assemblyman Gerdi Lipschutz (D-Queens), a sponsor of the amendment, said: "We insist that local community boards must know what Gateway intends to do, one way or the other." Kovacs noted, "Supposing the Bingham-Williams funding goes through, who says they (Gateway) are going to be using it in the right way? They don't have to account to anyone now."

Meanwhile, the spring season of nature and marine science studies got under way last week for 60 Brooklyn school children in "Operation Explore" at Floyd Bennett Field, Gateway, in conjunction with city and state agencies, sponsors the program for 3,000 youngsters.

New York Daily News, May 1, 1977

SS activity: Hydrofoil Trials

Examine the abortive hydrofoil experiments of 1963 and 1970 in New York and discuss the feasibility of another such experiment. Teacher describes the two experiments orally or hands out written synopsis on rexos:

1963: A 20-month demonstration hydrofoil experiment carried 50,000 passengers between Port Washington, Nassau County, and Lower Manhattan, but the operation ran a continuous deficit.¹

1970: The New York Hydrofoil Company ran a 28-passenger vessel up and down the East River three times daily during the summer. The trip cost \$3.75 one way. East Side residents complained of excessive noise and spray. The operation closed after two months when its 90th Street float sank.¹

Key questions:

1. Why did the 1963 operation fail? the 1970 operation?
2. What advantages might a hydrofoil have over a conventional ferry? (speed, maneuverability, novelty)
3. What disadvantages would it have? (cost, noise, spray, safety, hampered by oil and debris, passenger capacity)
4. Do you think a hydrofoil experiment could work now? Why (not)?
5. Could a hovercraft experiment work? Why (not)?
6. Read the article on p. 100 and describe the present aim of the city in regard to hydrofoils.
7. Do you agree with the city's views?

SS activity: Hovercraft -- Mass Transportation Alternative

Teacher duplicates following news article. Discuss:

1. Why is mass transportation such a critical issue with regard to Gateway National Park?
2. What two means of mass transportation are proposed?
3. Which system do you think is most practical? Why?
4. Do you think hovercraft could be used for commutation runs? Why (not)?
5. Which do you think is most practical for New York City waterways, the hydrofoul or the hovercraft? Why?

¹described in "The New York Waterfront", City Planning Commission, January, 1971, p. 69.

D. Floating Structures

SS activity: Creative Uses of Barges and Boats

Teacher displays on bulletin board a variety of pictures showing the following activities: eating at a restaurant table, swimming, a doctor examining a patient, ice-skating, people looking at paintings, students studying, actors on a stage, people watching a movie, people dancing, etc. Teacher asks students to pick out which activities could be serviced by a boat or barge. After much discussion, class will see that all of these activities are possible. Teacher writes a summary list on the blackboard:

floating theatre
floating restaurant
floating discotheque
floating school, etc.

Check off those items that are already in existence (school, restaurant, concert and exhibit barge, floating hospital, discotheque).
Discuss:

1. Why do you think these kinds of boats and barges are popular?
2. Would you like to see more of them? Why (not)?
3. What other activities can you think of that a boat or barge could service?
4. Would all people be able to use these floating structures? (No, docking facilities not available everywhere and presently public transportation to riverfront not always available.)
5. What are some of the disadvantages of having these activities on a barge or boat as opposed to on land? (subject to weather and season, often hard to get to waterfront by mass transit)
6. What are some of the advantages of having floating structures? (ambiance, tax advantage)

SS activity: Creative Uses of Waterfront in Other Cities

Show slides from a.v. kit of waterfront usage in other cities, e.g. San Antonio, Amsterdam, Venice. Discuss for each slide: Could this be put to use in New York City? Explain.

E. Creative Recreational Use of Waterfront

SS activity: Snug Harbor, Staten Island Cultural Center

Teacher reproduces news article that follows. Students read and then work in small groups to plan the specific educational and cultural projects that could be carried out at Snug Harbor.

SS-LA activity: Snug Harbor Observation Trip

(See Field Trip Guide.)

Culture Finds Snug Harbor on S.I.

Lincoln Center move over. There's another "new kid" on the block. The name is Snug Harbor Cultural Center on Staten Island and plans are under way to link the city's schools to the former 80-acre retired home for seamen to offer the New ABC's — art, ballet and culture.

James F. Regan, Staten Island Board of Education member, unveiled plans for the educational-cultural campus, a landscaped parkland dotted by 28 buildings bordering New York Bay.

The board's aim is to open the Harbor to the city's 1.4 million public and non-public school students to "see, feel, taste and learn," Regan said.

Eventually, the Harbor will showcase music, the dance, theater, painting, sculpture, crafts and folks arts and extensive educational programs, including environmental studies.

Long range goals call for a music hall, museum, botanic garden, marina and refurbishing the landmark buildings constructed between 1830 and 1900. The state already has pumped \$4.7 million into the facelift job. The city purchased the entire complex for \$9.8 million in 1975.

A three-hour outdoor preview highlighting the potential of the Harbor as an "educational campus" will be staged May 18. In case of rain, it will be held the next day.

We want to show the districts "up close" what the Harbor holds for their children, Regan said.

To exhibit Harbor's assets

To spark that theme, speakers will pinpoint the Harbor's assets, backed up by performances by student music, drama and dance groups and exhibits of paintings, arts and crafts and other visual outlets spotlighting youthful talent.

The May 18 celebration is designed to "showcase" student activities and programs in all the boroughs, Mrs. Carlin Gasteyer, the Harbor's planning director, stated.

"We would hope to capture and involve in the arts and the humanities all the present generation of young people growing up in New York," she added. "We are not an arts school. We like to see ourselves as a Renaissance city-state in which the workshops are open to all."

Invitations to the ceremony went to the 32 districts, high schools, Governor Hugh Carey, Mayor Edward L. Koch, parents' groups, com-

munity school boards, educators, the borough presidents and a host of other city and state officials.

The concept of turning the Harbor into a giant outdoor classroom and cultural resource center takes on greater meaning with the loss of many art and music teachers in the schools due to the city's fiscal crunch.

Harbor, schools already linked

The city school system and the Harbor already are linked under three federally funded projects, totaling \$150,000, including one that involves students at McKee and Curtis High Schools who get on-the-job training while renovating the Harbor gatehouses. The youths get paid and receive school credit. This project has been approved. The other two are pending.

Another project falls under the National Endowment for the Humanities and would be handled by Frank Braynard, organizer of Op Sail. Geared for Grade 4 teachers, the in-service course would focus on the maritime history of the Port of New York. The classes would be given at the Harbor which opened as a home and haven for retired seamen in 1801.

The third program, environmental in nature, would involve high school students and deal with such problems as oil spills, and getting into the legal ramifications and effectiveness of the governmental process regarding damages and responsibility.

Many talks on 'marriage'

Members of the Snug Harbor board, headed by Thomas Schleier, have been conferring with top educators regarding what Regan called the "marriage" between the schools and the Harbor.

Sailors Snug Harbor was founded through a bequest of Robert Richard Randall, a sea captain and New York merchant. Facing the Kill van Kull, a body of water on Staten Island's North Shore, the Harbor's first building opened in 1833 to 37 retired seamen. The resident population swelled to 1,000 over the years.

By the late 1960's, spiraling costs forced a curtailment in operations and only 150 residents remained. Eventually, the home was moved to Sea Level, N.C. and the Harbor site was sold to the city.

SS activity: Redevelopment of Waterfront

Have students read the following article and develop questions on Mayor Koch's proposal for redeveloping the waterfront. Contact the City Planning Commission office and/or the Office of the Mayor and arrange for a guest speaker to further outline the mayor's commitment to waterfront redevelopment.

(Note to Teachers: Be sure to point out the mayor's view that the harbor is the city's "greatest treasure".)

Koch Promises Redevelopment For Waterfront

By MAURICE CARROLL

A redevelopment of New York City's waterfront — with marinas, seafood restaurants and recreation and commercial projects — was promised yesterday by Mayor Koch.

Within a week, a specific \$150 million project, including a marina and retail and residential facilities, is to be announced for the East River at 23d Street, south of the Waterside apartments, Robert F. Wagner Jr., chairman of the City Planning Commission, added later.

"If there is one capital project I want my administration to be identified with," Mr. Koch said, "it is that we brought the harbor back to the City of New York, that we built on our greatest treasure, that we opened the waters to the people of the city."

A crowd at a planning conference in Cooper Union's vaulted Great Hall applauded as the Mayor, apparently to the surprise of his staff, volunteered his promises of a waterfront revival.

Waving at Boats From His Mansion

"It's unbelievable," he said. "We have the greatest harbor in the world, but very few New Yorkers know they're living in a port city. I do. I live in Gracie Mansion. I wave at the boats."

He intends to give similar opportunities to others, he said, "not just in Manhattan but in all the five boroughs."

"Isn't it a shame that we use our waterfront facilities as parking garages? To park trucks?" he asked. "We should all be in tears. There's something wrong with that."

Earlier yesterday, the Mayor announced that 300 Model Cities Workers would be transferred to the Department of Housing Preservation and Development, where they would be assigned to

programs dealing with the city's foreclosure of tax-delinquent properties.

After a year's training, the Mayor said, the workers would be given a Civil Service examination and those who passed would be offered municipal jobs, such as real estate managers and repairmen. The city now owns about 9,500 slum-area properties through foreclosure, over half of them occupied, and expects the number to increase dramatically in coming months.

At Cooper Union, Mr. Koch had been scheduled simply to bring greetings to the conference marking the 40th anniversary of the City Planning Commission.

Beginnings of a Renaissance

But he ignored his prepared text — "when I read them, they come out dull," he said — to ad-lib about his hopes for the waterfront, along with a variety of other topics, as follows:

"The city is entering a renaissance, but it is not yet a true renaissance because it affects only the Borough of Manhattan, in terms of construction."

"Current signs of revival along 42d Street are 'marvelous,' although the Mayor is not yet prepared to accept the proposal put together with the sponsorship of the Ford Foundation for a massive visitor-center development along the street between Seventh and Eighth Avenues."

"Private, rather than governmental, development is usually preferable because so many safeguards against corruption are built into government processes 'that the cost is generally equal to the corruption.'"

New York Times, January 19, 1979

SS-LA activity: Grand Street Streetend Observation Trip

(See Field Trip Guide.)

SS-LA activity: Tiffany Street Streetend Observation Trip

(See Field Trip Guide.)

SS-LA-Sci-Math-Art-Shop activity: Final Project

Students are assigned a final project. They can work individually or in small groups. They are given a small section (three to five blocks) of the waterfront in their borough. They are told to fully and accurately describe what is there. It is suggested that a walking tour of the area be part of the preparation. Follow observation trip guidelines (see Field Trip Guide).

It is suggested that the teacher request copies of the latest Coastal Zone Management Study from the Department of City Planning. There are several pamphlets which include "Identification of Conflicts", "Geographic Areas of Particular Concern", "Analysis of Permissible and Priority Use Methodologies", etc.

They are then asked to design what they would like to see in its place. They must follow these steps in their report:

1. What do you propose to build?
2. Why did you choose that structure for this location?
3. What steps must you take to obtain permits for construction?
4. How will your structure look: (Use maps, diagrams, pictures and models to illustrate.)
5. What physical, social, and environmental impact will your project have on your neighborhood?
6. How will you finance this operation? What do you estimate will be the cost?

This project can take anywhere from one to three weeks. It is suggested that all subject teachers coordinate efforts to allow for full implementation and creativity; e.g. a student can research the feasibility of a floating restaurant in social studies and language arts, study the waste and sewage problem in science, design a sample menu in home economics, work out costs of such a project in math, design the layout in art, and build a model in shop.

The finished models should be displayed in the school library or in a community center. Students can tape a demonstration lecture or write out a full description to accompany the model. Local planning board members, the Borough President, and other officials should be invited to visit the display and perhaps judge the exhibits and award prizes for feasibility, creativity, etc.

RESOURCE AGENCIES AND EXPERTS

Aquarium, New York
Boardwalk & West 8th Street
Brooklyn, New York 11224

Information: 266-8500
Reservations: 266-8540

Army Corps of Engineers, U. S.,
New York District
26 Federal Plaza
New York, New York 10007

Public Affairs Officer
264-9113

Bargemusic Ltd.
Fulton Ferry Landing
Brooklyn, New York 11201

624-4061

Beach Channel High School
100-00 Beach Channel Drive
Rockaway Park, New York 11694

Robert Rappaport, Principal
Max Cohen, Chairman, Science
Department
945-6900

Botanical Garden, The New York
Bronx Park
Bronx, New York 10458

220-8700

Buildings, New York City
Department of
120 Wall Street
New York, New York 10005

248-8770

Circle Line Sightseeing Boats
Pier 83, West 43rd Street
New York, New York 10005

Group Reservations
563-3200

City Planning Commission
2 Lafayette Street
New York, New York 10007

Joe Ketas
566-3887

City Planning Commission Borough Offices:

Bronx Planning Office
1780 Grand Concourse
Bronx, New York 10451

993-8400

Brooklyn Planning Office
185 Montague Street
Brooklyn, New York 11201

843-9855

Queens Planning Office
29-27 - 41st Avenue
Long Island City, New York 11101

392-0656

Staten Island Planning Office
56 Bay Street
Staten Island, New York 10301

727-8453

Coast Guard, U. S. Governor's Island, New York 10004	668-7196
Environmental Action 1346 Connecticut Avenue, N.W. Room 731 Washington, D. C. 20036	
Environmental Conservation, New York State Department of 2 World Trade Center New York, New York 10047	488-2755
Environmental Protection, New York City Department of 2358 Municipal Building New York, New York 10007	Public Relations 566-0108
Federal Aviation Administration Federal Building JFK International Airport Jamaica, New York 11430	995-3333
Ferry & General Aviation, Bureau of New York City Department of Transportation Battery Maritime Building New York, New York 10004	248-8060
Fire Department, New York City 110 Church Street New York, New York 10024	566-2043
Floating Foundation of Photography West 79th Street Boat Basin New York, New York 10024	737-0766
The Floating Hospital St. John's Guild 101 Park Avenue New York, New York	685-0193
The Floating Hospital Pier 15, East River New York, New York	943-6535
Food and Maritime High School 208 West 13th Street New York, New York 10011	924-7270
Friends of the Earth 917 - 15th Street, N.W. Washington, D. C. 20005	

Gateway National Recreation Area Headquarters Building Floyd Bennett Field Brooklyn, New York 11324	252-9150
Health, New York City Department of 125 Worth Street New York, New York 10013	566-7711
Hudson River Sloop Restoration, Inc. Market Street Poughkeepsie, New York 12601	914-265-2888
Hudson River Sloop Restoration (Clearwater) 3 Melody Lane Schenectady, New York 12309	
International Longshoremen's Association, AFL-CIO Local #856 17 Battery Place New York, New York 10004	233-8665
Moran Towing and Transportation Co. 1 World Trade Center New York, New York 10048	466-3600
The Museum of the City of New York Fifth Avenue at 104th Street New York, New York 10029	534-1672, ext. 23
National Maritime Union of America AFL-CIO 346 West 17th Street New York, New York 10011	924-3900
New York Stock Exchange 11 Wall Street New York, New York 10005	623-3000 Daily 10-3:30
Parks Council 80 Central Park West New York, New York 10023	Norman Cohen 799-6000
Parks & Recreation, New York City Department of 830 Fifth Avenue New York, New York 10021	360-8111
Parks & Recreation, New York State Commission for the City of New York 1700 Broadway New York, New York 10019	977-8265

Petrel Sailing Battery Park New York, New York	825-1976
Port Authority of New York & New Jersey 1 World Trade Center New York, New York 10048	466-7000
Ports & Terminals, New York City Department of Battery Maritime Building New York, New York 10004	248-8011
Rockaway Boat Line 2016 Emons Avenue Brooklyn, New York	743-1573
South Street Seaport Museum 203 Front Street New York, New York 10038	766-9020
T R E E The Resource Center for Environmental Education 26 Wall Street New York, New York 10005	264-9466
Tri-State Regional Planning Commission 1 World Trade Center New York, New York 10048	938-3300
United Nations Guided Tours Unit New York, New York 10017	754-7713
Water Resource Development, Bureau of Department of Environmental Protection 1250 Broadway New York, New York 10001	971-6800

AUDIO-VISUAL RESOURCES

Denoyer Geppert Audio-Visuals Co. 355 Lexington Avenue, New York,
New York
"New York City: An Environmental Study." (sound
filmstrip)

Still Film, Inc. "New York - Ellis Island." (silent filmstrip)

Encyclopedia Britannica Corp., 425 N. Michigan Ave., Chicago, Ill. 60611
"Water Pollution." (16 mm. film)
"The Marine Biologist."

Modern Talking Picture Service, 315 Springfield Avenue, Summit, N. J. 07901
"The One-Man Band That Went to Wall Street."
"Harvest of the Sea."
"The Lady and the Stock Exchange."
"The Trouble With Trash."
"The Sea Is My Home."
"Sea Venture."
"Seaprobe."
"The World Beneath the Sea."

BAVI, Board of Education, 110 Livingston Street, Brooklyn, New York.
"Water Pollution: A First Film."
"Problems of Conservation: Water."
"Man's Problem."
"Between the Tides."
"Seashore Life."
"Animals That Live in the Surf."
"The Community."
"People Who Fight Pollution."

U.S. Army Corps of Engineers, 26 Federal Plaza, New York, N. Y.
"Invasion By Oil."
Careers Films.

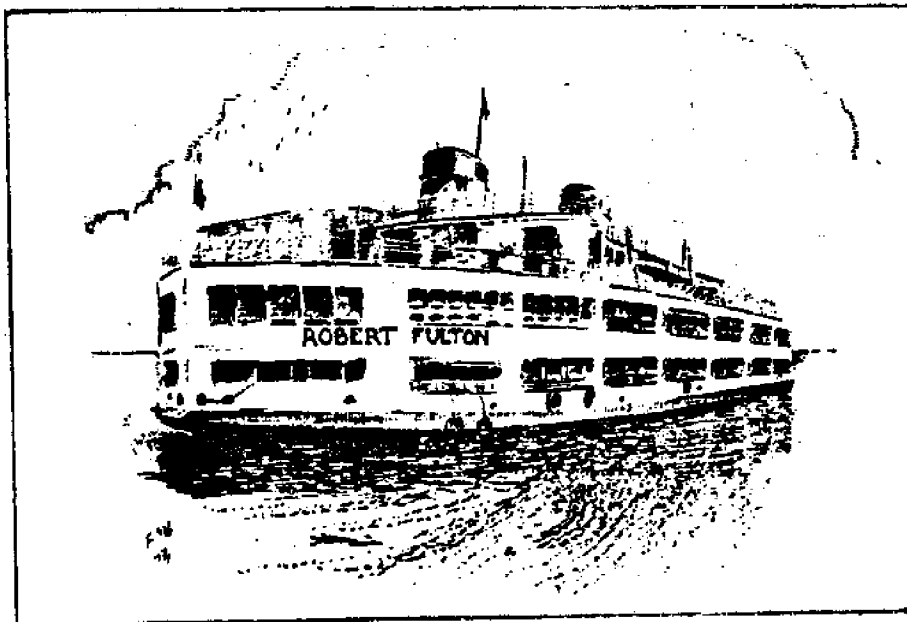
BFA Educational Media, 2211 Michigan Ave., Santa Monica, Cal. 90404
"Food Chains in the Ocean."

U.S. Department of Commerce, NOAA Motion Picture Films, Rockville,
Maryland 20852
"Ship Explorer, Oceanographic Cruise."

Educational Direction, Inc. (sound filmstrip)
"Pollution - Water."

Eye Gate House, Inc., 146-01 Archer Ave., Jamaica, Queens, New York.
"New York - Growth of a City." (sound filmstrip)

Ealing Corporation. (silent film loops)
"The City as a Human Habitat."
"Water in the City."
"Ethnic Group Series (Jewish Americans, Irish Americans, Chinese Americans, Italian Americans, etc.)"



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APPENDIX

CRITERION REFERENCE TEST

Note to Teachers: If your class is not reading at the 6th grade level, you may want to administer this test orally.

1. Ferries are no longer used to transport people, cars, and goods from one borough to the next. Only the Staten Island Ferry and the Governor's Island Ferry are still in use. This has occurred because:
 - a) the ferries used to break down too often
 - b) tunnels and bridges provided faster transportation
 - c) ferries were not large enough to carry all the people, cars, and goods
 - d) none of these answers

 2. Waterfront land was used as the site to develop Kennedy Airport because:
 - a) large areas of waterfront land could be bought very cheaply
 - b) nobody would ever live there
 - c) it's easier to land planes near the water
 - d) it's easier to build an airport when it is near the water

 3. Careers related to the waterfront and water environment require:
 - a) a college diploma
 - b) a high school diploma
 - c) on the job training
 - d) may be any or all of the above

 4. An example of a career related to the waterfront is:
 - a) auto mechanic
 - b) sewage treatment engineer
 - c) highway construction worker
 - d) camp director
-
-
-

5. The waterfront environment is a very large area of study which offers great opportunities for:
 - a) careers
 - b) recreation
 - c) housing
 - d) all of these answers

6. One of the main reasons fishing has deteriorated off the New York coast is:
 - a) people are doing too much fishing
 - b) most of the salt marshes have been destroyed
 - c) water pollution has killed most of the fish
 - d) none of these answers

7. A food chain shows how one form of life depends on other forms of life for food. At the base of every food chain is:
 - a) fish
 - b) shellfish
 - c) plants
 - d) cows

8. Many industries located on the waterfront because:
 - a) it was cheaper to build there
 - b) the workers would have a nice view of the water
 - c) both a and b
 - d) none of these answers

9. Steamships replaced sailing ships for transporting goods because:
 - a) they polluted the water less
 - b) they were faster and more reliable
 - c) they were prettier than sailing ships
 - d) they were smaller than sailing ships, which made them easier to dock

10. New York City grew rapidly and became the financial and trade center of the U. S. In 1827, the Merchant's Exchange was formed. This later became:
 - a) the New York Stock Exchange
 - b) the Fulton Fish Market
 - c) the New York Trade Exchange
 - d) the New York Chamber of Commerce

11. When raw data is collected, it can be described easily and quickly by making a:
 - a) movie
 - b) short story
 - c) graph
 - d) mathematical formula

12. New York City is often called "the melting pot of the world" because:
 - a) New York is famous for its many different kinds of soups
 - b) people from all over the world came to work in the pots and pans factories
 - c) the summers are so hot that even the roads start to melt
 - d) people from almost every country in the world came here to live

13. Most of the immigrants who came to the United States were processed at:
 - a) Washington, D. C.
 - b) the Statue of Liberty
 - c) Kennedy Airport
 - d) Ellis Island

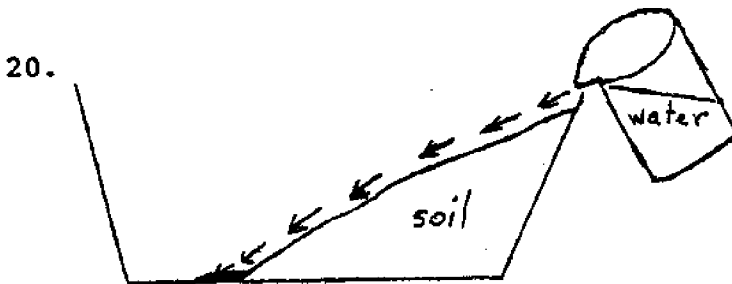
14. An immigrant is a person who:
 - a) goes to a new country to live
 - b) is usually poor and dirty
 - c) commits many crimes
 - d) doesn't want to live in a new country

15. The main difference between actual distance and straight-line distance is:
 - a) straight-line distance is usually less than actual distance.
 - b) straight-line distance is usually more than actual distance
 - c) there is no difference between actual and straight-line distance
 - d) actual distance is never used in measurement.

16. Landfill started in New York City because:
 - a) the ships in port dumped their garbage overboard
 - b) the government wanted to increase the size of the land
 - c) the government used it as a cheap way to fill pot-holes
 - d) it was a good fertilizer for the farmers to use on their crops

17. The government agency that performs most dredging projects is the:
 - a) Coast Guard Navigation Corps
 - b) Navy Seabees
 - c) Army Corps of Engineers
 - d) U. S. Department of Shipping

18. New York City grew rapidly because it:
- a) had a lot of iron, oil, and coal
 - b) had an excellent harbor
 - c) had good beaches
 - d) was far from any ocean
19. The main problem caused by dredging is:
- a) it usually has a bad effect on the water environment
 - b) it is often necessary
 - c) both a and b
 - d) none of these answers



This experiment demonstrates:

- a) how to make mud
 - b) how sediment collects in a channel
 - c) how to make a mountain
 - d) how to get rid of sewage
21. Navigation channels often get filled in because:
- a) soil washes down from the surrounding land
 - b) people throw garbage in the water from their boats
 - c) the land rises from pressure in the earth
 - d) boats sink and drop to the bottom

22. New York City is located in the state of:
- a) United States
 - b) Brooklyn
 - c) New York
 - d) New Jersey
23. Dredging is usually done to:
- a) provide jobs for the unemployed
 - b) improve the quality of the water
 - c) make a navigation channel deeper
 - d) change a hill into flat land
24. Many forts were built at the Battery and the Narrows because:
- a) this strategic location made it easy to protect New York harbor
 - b) there was a lot of free building material near there
 - c) it was easier to build the forts there
 - d) it was close to a big Army base
25. If you were with Henry Hudson when he first saw New York harbor, you would probably have seen:
- a) many factories, stores, and docks
 - b) polluted air, polluted water, and a lot of garbage
 - c) many cows, horses, farms, and farm houses
 - d) dense forests, some canoes, very few people, and no large buildings

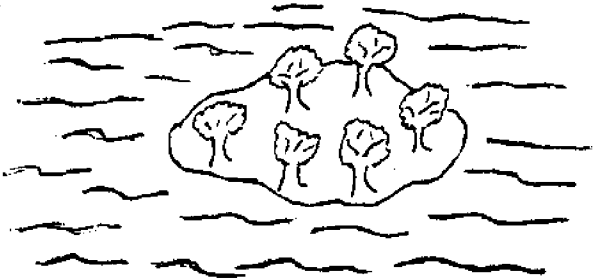
26. The opening of the Erie Canal in 1825 was important to the growth of New York City because:

- a) it made the harbor and the Hudson River cleaner
- b) it opened up the interior of the United States to easy shipping and trading from the city
- c) it made transportation of goods more expensive from the city
- d) it improved the fishing grounds

27. The most important industry in New York City in the 1700's and 1800's was:

- a) coal mining
- b) shipping
- c) farming
- d) paper mills

28.



This picture shows an example of:

- a) an ocean
- b) a peninsula
- c) an island
- d) a river

29. Manhattan is called an island because:

- a) it is surrounded by water
- b) it has bridges and tunnels
- c) there are many ponds and lakes in it
- d) many boats dock there

30. One of the reasons New York City is an excellent harbor is:
- a) it doesn't need any docks
 - b) it is bigger than all the other harbors
 - c) it has only a 4-1/2' tide change
 - d) the water doesn't have any waves
31. New York City contains 5 boroughs. All but one of these boroughs:
- a) are on the mainland
 - b) are joined to each other
 - c) are islands
 - d) have highways
32. The river that New York is most famous for is the:
- a) East River
 - b) Hudson River
 - c) Harlem River
 - d) Kill Van Kull
33. The first people to inhabit the New York area were:
- a) the Dutch
 - b) the French
 - c) the Indians
 - d) the English
34. The New York City waterfront:
- a) has always been a rundown "slum"
 - b) has always been a dumping ground for garbage
 - c) has always been New York's greatest natural resource
 - d) has always been the place where poor people live

35. One of the best ways to see a great variety of ships is to:
- a) go to the boat show
 - b) take a trip on the Staten Island Ferry
 - c) make observations from the Lincoln Tunnel
 - d) stand in the middle of the George Washington Bridge
36. A good place to visit to get a "feel" for the history of the New York waterfront and shipping is:
- a) the Museum of the City of New York
 - b) South Street Seaport Museum
 - c) both a and b
 - d) none of these answers
37. There are two methods for handling cargo on ships. They are called:
- a) internal and external
 - b) break-bulk and containerization
 - c) crane and manual
 - d) Hagstrom and Jetty
38. When a pier is no longer used, it becomes run-down and can become:
- a) vandalized
 - b) a place where criminals hang out
 - c) an eyesore which depresses the surrounding area
 - d) all of these answers
39. New York City's water gets polluted by:
- a) industrial wastes
 - b) residential wastes
 - c) oil and garbage spills
 - d) all of these answers

40. Those guilty of contributing to New York City's water pollution problems are:
- a) large industries
 - b) you
 - c) almost everyone
 - d) none of these answers
41. Polluted water:
- a) makes the beaches unsafe
 - b) can kill fish
 - c) looks ugly and unhealthful
 - d) all of these answers
42. An important measure of the quality of water is:
- a) dissolved oxygen
 - b) fish count
 - c) water pressure
 - d) all of the above
43. The only borough that has no public beach is:
- a) Brooklyn
 - b) Manhattan
 - c) Staten Island
 - d) Queens
44. A semi-enclosed body of water that has alternating concentrations of fresh and salt water is:
- a) an ocean
 - b) a tidal pool
 - c) an estuary
 - d) a lake

45. The main difference between a river, stream, and creek is:
- a) water velocity
 - b) size
 - c) the amount of fish
 - d) how safe they are for swimming
46. A private agency which is concerned with waterfront planning and development is:
- a) the Department of Water Resources
 - b) the Parks Council
 - c) the Environmental Protection Agency
 - d) all of the above
47. The water supply of New York City is regulated by:
- a) the Board of Water Supply
 - b) the Department of Water Resources
 - c) both a and b
 - d) none of the above
48. A very fast type of water transportation that operates on the principle of air cushions is called:
- a) hydrofoil
 - b) jet ferry
 - c) hovercraft
 - d) none of the above
49. Which of the following is not found in New York City?
- a) floating hospital
 - b) floating school
 - c) floating restaurant
 - d) floating casino

50. A streetend that was recently developed into a park by community organizations is:
- a) Grand Street
 - b) Tiffany Street
 - c) Dyckman Street
 - d) 125th Street
51. The process of water evaporating to form clouds, which in turn deposits water as rain, is called the:
- a) Rain Cycle
 - b) Hydrologic Cycle
 - c) Cloud Cycle
 - d) Evaporation Cycle
52. New York City gets its drinking water from:
- a) underground wells
 - b) upstate reservoirs
 - c) the Hudson and East Rivers
 - d) none of these answers
53. A salt marsh is:
- a) an important breeding and feeding ground for fish
 - b) always a place that has bad odors
 - c) the worst kind of polluted water
 - d) the best place to build an airport
54. The water table is:
- a) a place where lakes and rivers form
 - b) a place where water collects under the ground
 - c) a new kind of waterbed
 - d) the machine weather men use to measure rainfall

55. It is very difficult to get to the waterfront in most parts of the city because:
- a) highways cut off access to the water
 - b) the land is privately owned
 - c) there are too many factories in the way
 - d) none of these answers
56. Many of the beaches in New York City cannot be used for swimming because:
- a) the undertow is too strong
 - b) the waves are very big and dangerous
 - c) the water is too polluted
 - d) the sand has been eroded away
57. Which word best describes New York City's population:
- a) homogeneous
 - b) multi-ethnic
 - c) riotous
 - d) bilingual
58. Which is not an example of waterfront housing:
- a) Roosevelt Island
 - b) 79th Street Marina
 - c) Harlem River Housing
 - d) Wall Street Housing
59. Many people choose to live on houseboats because:
- a) the rent is cheap
 - b) they like the view of the water
 - c) they like the close-knit community "feeling"
 - d) all of the above

60. The quality of the drinking water in New York City is considered by national EPA standards to be:

- a) excellent
- b) relatively safe
- c) safe only when boiled
- d) polluted

CRITERION REFERENCE TEST

ANSWER KEY

1. b)	21. a)	41. d)
2. a)	22. c)	42. a)
3. d)	23. c)	43. b)
4. b)	24. a)	44. c)
5. d)	24. d)	45. b)
6. b)	26. b)	46. b)
7. c)	27. b)	47. c)
8. a)	28. c)	48. c)
9. b)	29. a)	49. d)
10. a)	30. c)	50. a)
11. c)	31. c)	51. b)
12. d)	32. b)	52. b)
13. d)	33. c)	53. a)
14. a)	34. c)	54. b)
15. a)	35. b)	55. a)
16. a)	36. c)	56. c)
17. c)	37. b)	57. b)
18. b)	38. d)	58. d)
19. c)	39. d)	59. d)
20. b)	40. c)	60. a)