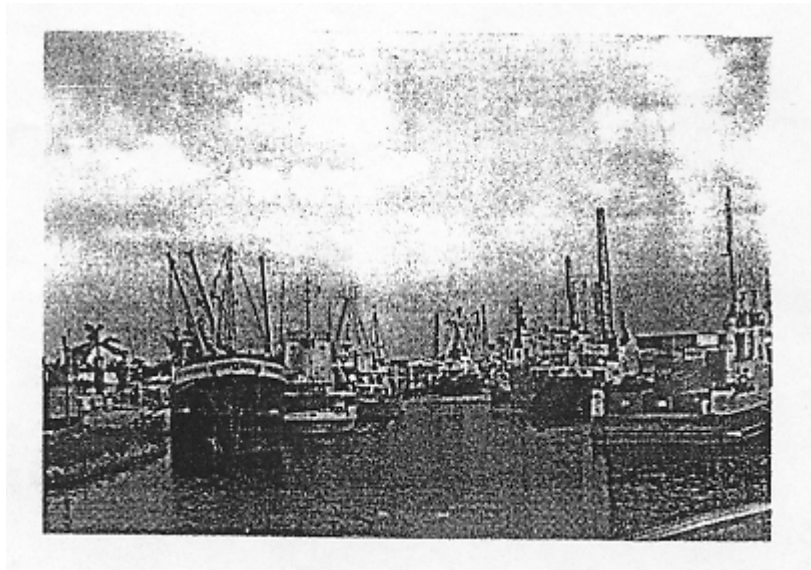


MAST ACADEMY OUTREACH

MIDDLE SCHOOL PROGRAM

Miami River Run

Pre-site Package



MAST Academy

Maritime and Science Technology High School

Miami-Dade County Public Schools

Miami, Florida

MAST ACADEMY OUTREACH PROGRAM

Miami River Run Pre-Site Packet

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Teacher Instructions

At least two weeks prior to your trip, fax a completed copy of the **Request Form for Water Related Field Trips** (FM-6614) to the MDCPS Department of Safety (Mike Webb, fax 305-995-4924) and the Office of Risk Management (Michael Fox, 305-995-7199). A copy of the form is included in this packet, or it may be completed online.



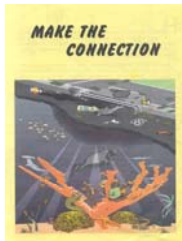
Select the appropriate CBC's and Sunshine State Standards on pages 2 and 3 for your class. Make a copy of the pre-site package for each of your students. **Do not copy the answer key starting on page 31.**

Show the video of the Miami River twice. (It is only 6 minutes long.)
Have students watch the first time without answering the questions.
Have students answer the questions on p. 4 the second time they watch it.
Review the answers with your class.



Have students complete the pre-site activities individually or in cooperative groups. For the activity on page 5, students will need scissors, paste, and construction paper or poster board. For the activity on page 13, students will need colored pencils or markers to complete the bar graph. Review the answers with your students using the answer key starting on page 31.

Make a copy of the on-site package for each of your students. **Do not copy the answer key.** Review the Miami River maps on pages 2-4 before the trip so your students are familiar with sites they will see on the river. Students must have the on-site package and a pen or pencil with them the day of the trip. Clipboards are recommended.



Included with the on, pre, and post-site packets is a copy of the booklet, Make The Connection, created by a grant from Miami-Dade County to Youth Environmental Programs, Inc. Please copy and use any or all of the activities to supplement those found in the MAST Outreach packets.

Student directions are preceded by the icon to the right.



Critical thinking questions will be preceded by the icon to the left.

<p style="text-align: center;">MIAMI RIVER RUN COMPETENCY BASED CURRICULUM – GRADE 8</p>
--

Earth/Space Science - Honors

- III. 4. Describe the effects of different cycles on the biotic and abiotic characteristics of the earth.
- 3. Knows the ways in which humans today are placing their environmental support systems at risk.
- 1. Explain the interconnectedness of the systems on Earth and the quality of life.
- 2. Describe how the world ecosystems are shaped by physical factors that limit their productivity.

Algebra I - Honors

- II. 9. Solve real-world and mathematical problems involving exact/estimates of measurement and effects of measurement errors on calculations.
- V. 1. Collect, organize, analyze, and interpret data by constructing charts, tables, and graphs to predict and explain outcomes.
- 7. Demonstrate the use and limitations of statistics in real-world problems and justify the conclusions or lack of conclusions through valid arguments.

M/J U.S. History

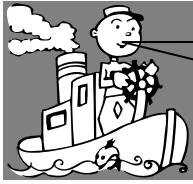
- VI. 1. Use appropriate skills and resources to access, analyze, and synthesize information.

M/J Language Arts 3- Advanced

- I. 16. Interprets functional reading material, such as newspapers, periodicals, manuals, instructions, schedules, common forms, maps, graphs, charts, tables.
- III. 2. Extends the vocabulary development expectations for the seventh grade using eighth grade or higher vocabulary in reading, writing, and speaking.
- 4. Acquires and strengthens a personal, active vocabulary in speaking and writing in Interdisciplinary/integrated contexts.
- IV. 1. Follows verbal directions.
- 5. Asks appropriate, challenging questions for elaboration or clarification during activities such as interviews and discussions.

11. Demonstrates appropriate listening and/or viewing skills in a variety of settings, such as viewing film, television, drama, music and dance.
- V. 2. Interprets and/or constructs questionnaires and graphics, such as charts, tables, graphs, maps, labels, and signs.

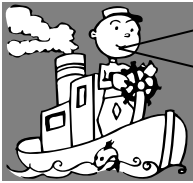
Miami River Video



As you watch the video, circle the correct answer to each of the questions below.

1. How long is the Miami River?
a. 2 miles b. 5-1/2 miles c. 11-1/2 miles d. 15 miles
2. Safe and efficient navigation of the Miami River is impeded by
a. pollution b. contamination c. sediment build-up d. a & b
3. The Miami Circle near the mouth of the river is
a. part of an ancient Indian city b. a hotel c. a restaurant d. a park
4. The original inhabitants of Miami are the
a. Seminole b. Miccosukee c. Tequesta d. Calusa
5. The name Miami comes from an Indian word meaning
a. sweet water b. big water c. hot water d. salt water
6. The Miami River, if it were considered a port, would be the _____ in Florida.
a. largest b. 2nd largest c. 3rd largest d. 4th largest
7. The Miami River generates _____ in business every year.
a. \$10 million b. \$1 billion c. \$4 billion d. \$10 billion
8. Only the following cannot be seen on a cruise along the Miami River:
a. residential areas b. hotels c. parks d. all can be seen on the river
9. What is being done to allow deeper draft vessels to use the river?
a. widening the river b. dredging c. both a and b d. none of the above
10. The Miami River Greenway or Riverwalk will provide access to
a. cafes and entertainment areas b. residential areas
c. water-dependent industries d. a, b, and c

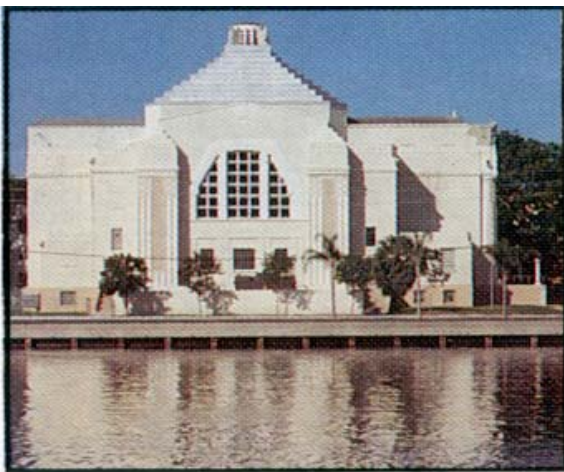
Miami River History: A Photographic Timeline



From this page to page 11 are photos showing the history of the Miami River. Cut out each photograph and make a photographic timeline by reading each caption and placing the photos in chronological order. Paste the photos on construction paper or on poster board.



**Brickell Bridge and Brickell Point
looking southeast, 1940.**



Scottish Rite Temple 8

This 1922 building was designed and built by architects Kiehnel and Elliot, an important Miami firm. The Art Deco, Egyptian inspired temple is noteworthy for combining classical detail with Art Deco abstraction in elements such as two headed eagles and a ziggurat roof. The original and present owner is the Miami Scottish Rite Temple Association.

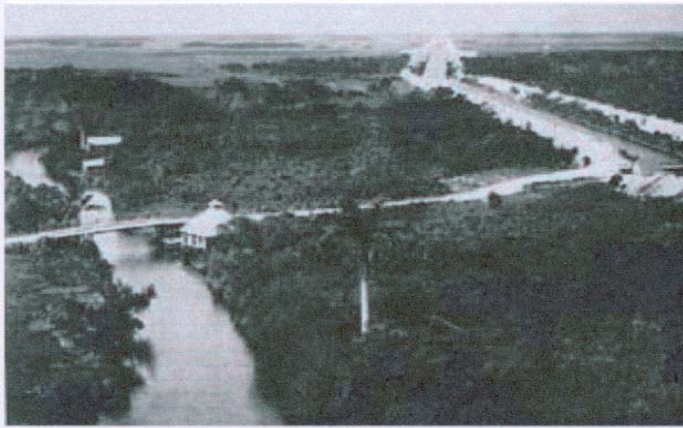


H.A.S.F. Photo

Coppinger's Indian Village 9

Florida's first commercial Indian village was Coppinger's Tropical Gardens, Alligator Farm and Seminole Indian Village. It opened in 1917 on land bought in 1911 by Henry Coppinger, Sr., a noted horticulturalist who came to Miami to plant the grounds of Flagler's Royal Palm Hotel. With his son, he developed the gardens as a botanical showcase. Indians camping on the grounds were allowed to stay. More chickees were added and the area opened to tourists to provide income, food and medical attention for the Indians. Henry, Jr. learned to wrestle alligators and taught this skill to the Seminoles.

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INTENTIONALLY



Looking west with Miami River on left and newly excavated Miami Canal on right, ca. 1913.

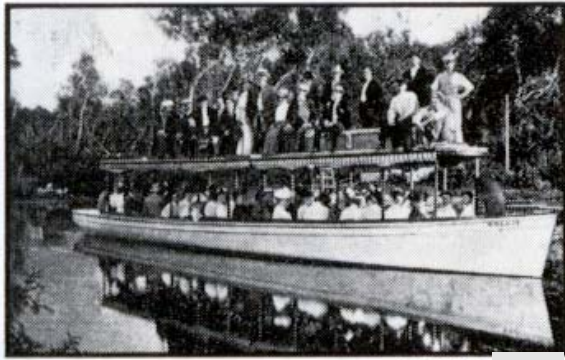


The rapids of the north fork of the Miami River, ca. 1896.



Aerial of the Florida East Coast Hotel Co. property and Bayfront Park, looking west, ca. 1925.

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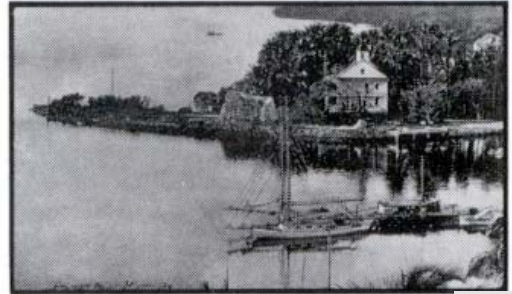


H.A.S.F.

Musa Isle

Otis Richardson established a fruit grove here in 1896. Later, the area's first mail order fruit business operated as Musa Isle after the botanical name for banana. It was the last stop of a 50¢ "jungle cruise" on a paddle-wheel boat running 4½ miles from the mouth to the rapids where the river began. A 1907 wooden tower enabled tourists to view the Everglades.

A Seminole village was added in 1919. A trading post, craftwork, alligator wrestling, tropical plants and a zoo were featured. Musa Isle operated until 1964 as one of the successful operations that helped preserve Miccosukee and Seminole cultures.



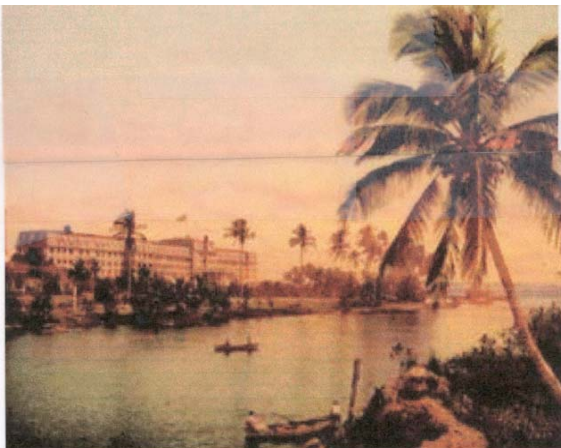
H.A.S.F.

Brickell Point

The south bank at the mouth was a Tequesta Indian village and burial mound, circa 750 B.C. The point was settled by American pioneers after the U.S. acquired Florida in 1819. In 1855, a two story frame house built by Duke Reason was the county courthouse.

William Brickell built a store in 1871 which traded with Seminoles until about 1900. The Indians traded meat, alligator skins and egret plumes for beads, cloth and sewing goods.

The Brickell house was razed in 1964. Future archaeologists can find its cellar beneath the hotel built in 1980. The park to the south was deeded to the city by William's daughter Mary, provided it not be developed. Descendants have since agreed to a land swap to move the park north to the river mouth, a move likely in the early 1990s.



The Royal Palm Hotel on the north bank ca. 1898.



Mouth of the Miami River 2000, looking west toward Brickell Bridge.

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Ralph Munroe's 1884 photo of the mouth of the Miami River (Miami Circle site at right).



Indian trading post below the rapids, by today's 27 Avenue, ca. 1901.



Nuta's Boat Yard, looking north with river in foreground, ca. 1943.

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INTENTIONALLY

THE WORKING RIVER

The Miami River is the fourth largest port in Florida. The shipping industry alone employs 1,200 people with a total of \$35 million payroll, almost \$30,000 a year per job. The table below shows information about the different types of businesses/industries found on the river.



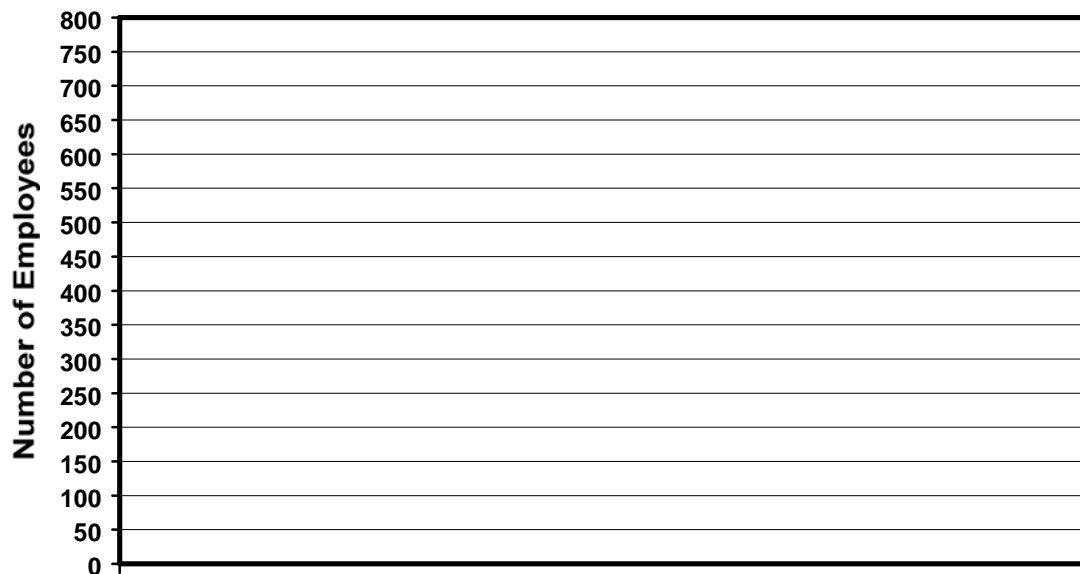
Using the table, complete the bar graph below to show the number of full time (FT) employees in each type of business.

Businesses and employers along the Miami River

Industry	FT employees	Payroll	Revenues
Commercial shipping	577	\$15.9 million	\$92.0 million
Commercial marine sales/service	367	\$8.8 million	\$10.7 million
Commercial fishing	36	\$1.9 million	\$2.2 million
Recreational marine	216	\$6.6 million	\$35.1 million
Entertainment/Hospitality	748	\$12.5 million	\$68.7 million
TOTAL	1,941	\$66.8 million	\$285.8 million

SOURCES: Dr. Kenneth Lipner, Miami River Commission

Employers Along the Miami River



Commercial shipping
Commercial marine sales/service
Commercial fishing

Recreational marine
Entertainment/Hospitality

WORKING ON THE RIVER

Jobs on the Miami River have tripled in the last 10 years among reporting marine-related industries - from 400 to 1,200. Companies such as Merrill Stevens (boat yard), Jones Boat Yard, and Antillean Marine Line (shipping) are stable, home-grown businesses who are here for the long haul. Businesses such as Big Fish, Joe's Seafood, Club Rio, and Garcia's Seafood employ Miamians for their restaurants and fish markets. Hotels along the river such as the Mandarin Oriental Hotel, Hyatt Regency, Clarion Hotel, Holiday Inn, Sheraton Biscayne Bay, Ramada Dupont Plaza, and the historical Miami River Inn also employ hundreds of people.



Listed in the first column of the table below are the many different kinds of jobs found on the Miami River. For each job, place a check in the column of the industry that would use each type of employee. Keep in mind that these employees may be used by more than one industry.

Job	Type of Business/Industry					
	Commercial shipping	Commercial marine sales/service	Commercial fishing	Recreational marine	Entertainment /Hospitality	Other
Bait shop workers						
Boat builder						
Boat catering						
Boat pilots						
Boat mechanic						
Boat painter						
Boat salvager						
Bridge tender						
Charter boat captain						
Commercial boat captain						
Coast Guard Patrol						
Customs officer						
City of Miami Marine Patrol						
Diesel repair person						
Ecologist						
Fuel docksman						
Florida Marine Patrol						
Health care workers						
Hotel employees						
Longshoreman						
Marine worker						
Metro-Dade Patrol						
Pleasure boat captain						
Restaurant workers						
Seafood process workers						
Sight-seeing boat captain						
Shipyard worker						
Boat welders						

RIVER TRADING PARTNERS

The river shipping industry does over \$4 billion in trade with 29 nations and territories in the Caribbean serving 100 ports of call in the region, up from 62 in 1991. Nearly 20% of the nation's \$22.1 billion in trade with the Caribbean Basin passes through the Miami River.

The Miami River's role in the region is about to become even more important. The Caribbean Basin Trade initiative passed in 1999 is expected to increase trade dramatically with this diverse region as it takes effect. The Miami River stands to gain because it is the only nearby American shallow-draft port that can serve these smaller nations as free markets develop.



Using the information in the table below, answer the questions about trade with the Miami River's partners.

Significant Miami River trading partners

Export trade from United States 1995-1999:

Country	1999 Exports	1995 Exports	Dollar Change
Dominican Republic	\$4.1 billion	\$3.0 billion	\$1.1 billion
Costa Rica	\$2.4 billion	\$1.7 billion	\$645 million
Honduras	\$2.4 billion	\$1.3 billion	\$1.1 billion
Guatemala	\$1.8 billion	\$1.7 billion	\$166 million
Panama	\$1.7 billion	\$1.4 billion	\$352 million
Bahamas	\$842 million	\$661 million	\$181 million
Haiti	\$614 million	\$550 million	\$64 million

SOURCE: U.S. Commerce Dept. Represents total trade with United States

1. In 1999, what country received the greatest amount of U.S. exports? _____
2. In 1999, what country received the least amount of U.S. exports? _____
3. What country or countries had the greatest dollar change in exports from 1995 to 1999? _____
4. How many billions of dollars in exports were sent to these Caribbean Basin countries in 1999? (Hint: To change millions to billions, move the decimal point three places to the left.) _____
5. What was the total dollar change in exports from 1995 to 1999 for all these Caribbean Basin countries? _____
6. How did the change in exports from 1995 to 1999 affect the number of available jobs on the river? _____



Manatees and the Miami River

How do you describe a manatee to someone who has never seen one? Their wrinkled, whiskery faces, and paddle-like tails have led some people to call them homely. And yet there is an endearing charm to these animals.

Manatees are gentle and slow-moving. They spend most of their time feeding (six to eight hours a day) and resting (two to twelve hours a day). They graze for food along water bottoms and on the surface. Research shows the manatee to be a gentle animal with few enemies. So why are they endangered? Unfortunately, most of their problems are human-related. As our cities expand, their natural habitat is decreased.



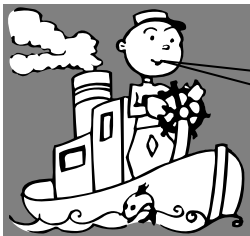
Manatees can be found in estuaries, saltwater bays, canals, and shallow, slow-moving rivers such as the Miami River. These habitats provide them with sheltered living and breeding areas, a steady, easily obtainable food supply, and warm water – all of which manatees need to survive.

The most critical problem for manatees is boating accidents. They like to rest just below the water and are often hit by speeding boats. As a result, most manatees in the wild bear prop scars on their backs. Nearly all but the youngest manatees have these scars and individuals can be recognized by the patterns of their injuries. For many, the cuts lead to infections that later prove fatal. Broken ribs and punctured lungs resulting from collisions also cause many deaths.

Fortunately, the Miami-Dade Manatee Protection Plan adopted by Miami-Dade County has been instrumental in protecting the manatees in the Miami River. This plan prohibits the building of new docks and boat slips on the river. It also created a four-foot safety zone between seawalls and boats to prevent manatees from being crushed in-between them. Since the adoption of this plan in 1995, only one manatee death has been reported on the Miami River.

To alert boaters and protect the manatee in its sanctuaries, the law provides a number of cautionary and regulatory speed zones. When you tour the Miami River, you may see some or all of the signs. To familiarize yourself with these signs, complete the activity on the next page.

Manatee Boating Speed Zones



Draw a line that best matches each speed zone sign with its description.

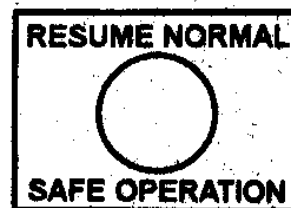
1. A zone frequently inhabited by manatees, requiring caution on the part of boaters to avoid disturbing or injuring the animals.



2. A protected zone that prohibits boating, swimming and diving for the protection of manatees.



3. A minimum-wake zone where boats must be level in the water.



4. A sign indicating that you may resume safe boating speed; visible as you leave a protected area.



Stormwater Runoff: The Problem in Words



Read the passage below about stormwater runoff and the Miami River. Then use the information in the passage to complete the concept map on page 19 and the activity on page 20.

Miami-Dade County has many roadways, parking lots, and other solid surfaces. These surfaces make it difficult for rainwater to naturally seep into the ground. Because of this, rainwater travels to ground or surface water systems, such as the Miami River, by traveling over land or other surface areas including lawns, streets, and parking lots. This is called stormwater runoff and is not a problem until it becomes polluted, causing our waterways to become polluted.

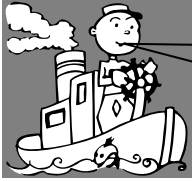
Stormwater runoff can contain pesticides and fertilizers from lawns and gardens, street litter, and oil and grease from parking lots and roadways. It can also contain pet waste, grass clippings, and yard waste, dirt and soil from erosion or construction, as well as paint and other chemicals which are disposed of improperly. According to the Department of Environmental Protection, most of Florida's water pollution comes from contaminated stormwater runoff.

Eighty percent of pollution found in the Miami River is from the stormwater system which serves a 69 square mile area. Modern drainage systems provide on-site retention and treatment for most stormwater runoff to prevent pollutants from reaching surface waters. Old systems are gradually replaced through redevelopment and county and city drainage improvement projects. However, portions of the Miami River watershed still have old drainage systems, which allow runoff to flow directly from street catch basins to the River or overland into the River.

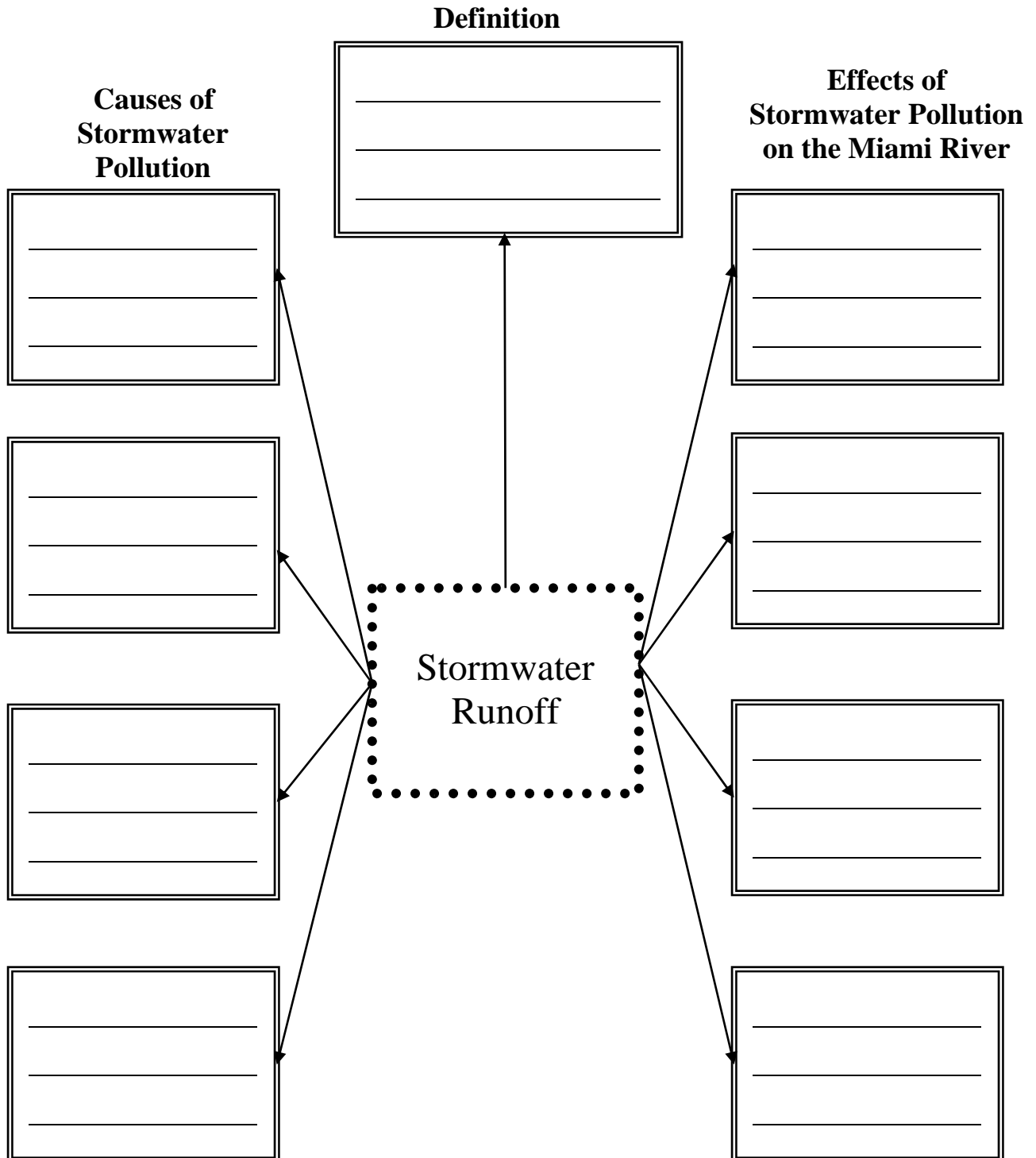
Studies have also documented cross-contamination of the storm drainage system with sewage from improperly connected buildings, leaking or broken sewage pipes, and backups or overflows of sewage systems during flooding. Additionally, illegal discharges and dumping also introduce pollutants into the storm sewer system.

Pollution from the stormwater system affects ecological, economic, recreational and aesthetic values of the Miami River and downstream areas of Biscayne Bay. The River and Bay are a state aquatic preserve, and provide important habitats for fisheries and wildlife, which are impacted by poor water clarity, nutrient enrichment, and potentially harmful substances, such as trace metals, in the water and sediment. Pollutants from urban stormwater runoff have contributed to the build up of contaminated silt, which limits navigation and has increased the costs of maintenance dredging. Bacteria levels exceed concentrations considered safe for recreational uses such as swimming or fishing. Litter and trash degrade the aesthetic experience of River neighborhoods and businesses. Improving stormwater quality is thus a critical link in improving not just the environmental health, but also the quality of life in water-front communities and the economic potential of the River.

Stormwater Runoff: A Concept Map



Use the information in the passage on page 18 to complete the concept map below and the activity on page 20.



Stormwater Run-Off: The Problem in a Picture

How can you help prevent stormwater runoff? First, you must understand how people in everyday life pollute stormwater.



Study the picture below. Place an **X** over the seven scenes in this picture that cause contaminated stormwater run-off. Then complete the sentence below.



Illustrated by 7-Dippity, Inc., Coral Gables



The sources of stormwater run-off in the picture are:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

The Future of the Miami River

In 1998 the Florida legislature established the Miami River Commission and gave the commission the following guidelines.

**To act as the official coordinating clearinghouse for all public policy and projects related to the Miami River;
To develop coordinated plans, priorities, programs, projects, and budgets that might substantially improve the river area;**



Jose Marti Park

To unite all governmental agencies, businesses, and residents in the area to speak with one voice on river issues;

To act as the principal advocate and watchdog to ensure that river projects are funded and implemented in a proper and timely manner.

The Miami River Commission includes shipyard owners, government officials, small business owners, Coast Guard personnel, neighborhood activists, and concerned private citizens. The Commission works with an annual operating budget of about \$100,000.

The Commission's immediate priority is to get the river dredged and thereby purge it of dangerous pollutants and return the navigable channel to its original depth. The Miami River has not been dredged since 1933 and, without dredging, true cleanup of the river and Biscayne Bay cannot happen, and ship traffic can proceed only at high tide.

Answer the following questions:

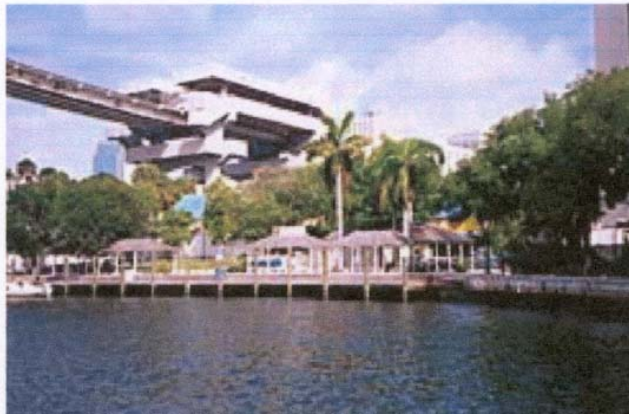
1. Why will dredging have a positive effect on trade between Miami and the Caribbean nations? _____
2. Why will dredging have a positive effect on the number of jobs available on the River? _____



The Future of the Miami River

The second priority of the Miami River Commission is to monitor and guide the completion of the Greenways project with the help of the Trust for Public Land. The Trust for Public Land is an active partner in nearly all quality of life issues. Working in cooperation with the Commission and river business community members and developers, the TPL is creating a greenway/riverwalk friendly to pedestrians and bicyclists. They want to ensure that the river is friendly for residents and visitors alike.

The Commission created an Urban Design Center to harmonize the river's physical appearance and initiate an action plan to improve blighted areas. The Commission helped get parkland dedicated in the Spring Gardens residential neighborhood and have been instrumental in preserving all parks along the River, such as Fort Dallas Park shown below.



Fort Dallas Park, in the heart of downtown Miami. Its centerpiece is an old river house from 1906, preserved amid the hemispheric bustle of downtown Miami. It is a center of The Miami Riverwalk, and a jewel in the Miami River's Greenways plan

For the Miami River to become an attraction for both residents and tourists, there must be easy access to the River. This is provided by the MetroRail and the People Mover.



Miami Avenue bridge opens. That's the Metrorail Bridge in the background, speeding passengers to and from downtown Miami



3. What types of businesses along the River will benefit from the Greenway/riverwalk? _____



4. Why will the Greenway/riverwalk have a positive effect on available jobs along the River? _____


<p>Miami River Run Bingo (Optional-Do Not Score)</p>
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Teacher Instructions

1. Make one copy of the Bingo game card on the next page for each member of your class.
2. Make several copies of the vocabulary word list to distribute through your class.
3. Students are to follow directions on the vocabulary word list to set up their game card.
4. To play, randomly choose a word to read to the class or read the definition of a word and have the students guess the word.
5. If a student has the word on his/her card, he/she is to use a marker (use buttons, pennies, paper, etc.) to cover the word.
6. Continue until someone gets “Bingo.”
7. If possible, provide prizes (pencils, erasers, extra credit grade, etc.) for winners.

Miami River Run Bingo Game Card

B I N G O

Miami River Run Vocabulary Word List

Student Directions – Randomly choose 5 vocabulary words from the B SECTION and write them in the squares under the B column.

Do the same for Sections I, N, G, and O. (Except choose 4 words for N.)

B SECTION

AESTHETIC	Of or pertaining to the sense of the beautiful.
AFT	Toward the stern of the ship.
ALGAE	Any of a large variety of primitive chlorophyll – bearing plants widely distributed aquatic and moist habitats.
ALIEN	Of another country or people; foreign.
ARTIFACT	An object showing human workmanship or modification.
AQUATIC	Pertaining to water.
BACTERIA	Unicellular organisms of the class Schizomycetes having a wide range of biochemical, often disease-producing properties.
BARGE	Boat with flat bottom used in inland and coastal waters for carrying freight.
BASCULE BRIDGE	A kind of drawbridge counter-weighted so that it can be raised and lowered easily.
BOW	Front end of a boat or ship.
CARCINOGEN	A chemical or form of radiation (energy) that either directly or indirectly causes a form of cancer.
CARCINOGENIC	Cancer-producing.
CATAMARAN	A boat with two parallel hulls.
CHANNEL	Man-made course which a stream or river passes through.
COAST GUARD	The branch of the U.S.'s military defense that guards the coast, enforces shipping and immigration laws, and carries out rescue operations.

I SECTION

CONTAMINATE	To make impure.
CONTRABAND	Illegal or forbidden trade.
COMMUNITY	A group of plants and animals population living and interacting in a given locality.
CORMORANT	A large voracious diving bird with webbed toes and a hooked beak.
CULTURAL	Relating to man and his special way of reacting to the environment.
CUSTOMS	Taxes or duties on goods brought into a country.
CUSTOMS SERVICE	The government agency in charge of collecting customs duties. Their major duties include inspecting imported and exported merchandise/cargo. They are also responsible for taking appropriate enforcement actions such as seizing improper merchandise/cargo, detaining or arresting violators and the interception of contraband – laden vessels.
DECAY	The breakdown of organic matter into simpler compound due to the digestive action of microorganisms such as bacteria or other decomposers.
DEMOGRAPHY	The statistical study of human population especially with reference to size and density, distribution, and vital statistics.
DERELICT	Anything cast away or forsaken; especially, a ship abandoned at sea.
DREDGE	Ship or barge equipped with machinery to deepen ship channels, clean harbors, etc.
DYNAMIC EQUILIBRIUM	A state of balance with respect to environmental factors and populations of organisms.
ECOSYSTEM	The interacting system of a biological community and its nonliving environment.

N SECTION

ENDANGERED	Faced with the danger of extinction.
EVERGLADES	Low, swamp area in south and central Florida.
EXPORT	To send or ship goods out of a country.
FAUNA	The animal population of a particular region.
FIXED BRIDGE	Bridge that does not open.
FLORA	Plants of a particular region.
FLOTSAM	Floating wreckage.
FOOD CHAIN	A sequence of organism in which each uses the next, usually lower, member of the sequence as a food source.
FORE	At or towards the front: the fore part of a ship.
FREIGHTER VESSEL	Ship for carrying goods rather than passengers.
HABITAT	The sum total of environmental condition that make up the surroundings for an organism or a community.
HAZARDOUS WASTE	Waste materials which by their nature are inherently dangerous to handle or dispose of such as old explosives, radioactive materials, some chemicals and some biological wastes; usually produced in industrial operations.
HERON	Any of a large group of wading birds with a long neck, long legs and a long tapered bill, living along marshes and river banks.
HYDROCARBONS	Compound found in fossil fuel that contains carbon and hydrogen and may be carcinogenic.
IMPORT	To bring goods into a country.
KNOTS	Units of speed used by ships, equal to a rate of one nautical mile per hour.
LEACHING	The process by which nutrient chemicals or contaminants are dissolved and carried away by water.

G SECTION

LIMITING FACTOR

The physical need that determine the survival of a species temperature, water air supply, light, food.

MANATEE

Large, plant-eating mammal that lives in rivers and bays; (sea cows).

MARINA

Dock or area of a harbor where sailboats and motorboat are moored and serviced.

MERCURY

A heavy metal, highly toxic if breathed or swallowed. It can accumulate in the environment.

MUCK

A dark, finely grained peat.

NAUTICAL

Having to do with ships, sailors, and navigation.

ORGANIC

Referring to or derived from living organisms. In chemistry, any compound containing carbon.

PELICAN

Water birds with complete webbed feet and an extendable pouch which hangs from the large lower bill and is used to scoop up or store fish.

PESTICIDE

Any substance used to control pests ranging from rat, weeds, and insects to algae and fungi. Pesticides can accumulate in the food chain and can contaminate the environment if misused.

POLLUTION

Something that makes the environment unclean or impure, as by introducing wastes.

POPULATION

Any group of organisms of the same species that occupies a given space at a particular moment in time.

RECYCLING

Reprocessing for reuse; the process by which waste materials are transformed into raw materials which are then used in new products.

SALVAGE

Rescue of a ship or cargo.

SEDIMENT

Particles of earth, sand, or similar matter that settles to the bottom of rivers, lakes, etc.

O SECTION

SHIP	Large vessel built for ocean or other deep-water travel.
SHIPYARD	Place where ships are built or repaired.
SILT	Very fine particles of earth, sand, clay or similar matters, carried by moving water.
SILTATION	To become choked or obstructed with silt.
SLUDGE	Slush, mire; sticky mud.
SOLID WASTE	Useless, unwanted, or discarded materials with insufficient liquid to be free-flowing.
STARBOARD	The right side of a ship or boat as one faces the bow.
STERN	Aft, or rear, end of a ship or boat.
STORMWATER RUNOFF	Rainwater that travels over land to ground or surface water systems.
TOXICITY	The degree of danger posed by a substance to life.
TRIMARAN	A boat similar to a catamaran, but with three parallel hulls.
TUGBOAT	Small, powerful boat used to tow or push heavier vessels.
VESSEL	Boat larger than a rowboat; ship.
WAKE	Track left behind a moving ship.
YACHT	Any of various sailing or engine-driven vessels for pleasure cruises or racing.

Acknowledgements

We would like to thank the Board of County Commissioner, the Miami-Dade County Department of Resource Management (DERM), Miami-Dade Water and Sewer Department (MDWASD) and the Department of Solid Waste Management (DSWM) for funding the environmental Miami River Tours. We would also like to thank the Miami River Commission with support from the City of Miami for their partnership in providing the Miami River tours.

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Miami River Commission's Stormwater Subcommittee's "Water Quality Improvement Report," available at www.miamirivercommission.org.

"Miami River Map and Guide," Seaport Map Company, 1990, available through the Miami River Commission, e-mail, mrc@rsmas.miami.ed.

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Answer Key (100 Total Points)

Miami River Video (10 total points - 1 point for each question.)

1. B
2. C
3. A
4. C
5. A
6. D
7. C
8. D
9. B
10. D

The History of the Miami River: A Photographic Timeline (The photos should be in the following order; 13 total points – 1 for each correct order)

Brickell Point photo showing store built in 1871

1884 photo of mouth of the Miami River

Musa Isle in 1896

Rapids in 1896

Royal Palm Hotel in 1898

Indian Trading Post in 1901

Miami Canal in 1913

Coppinger's Indian Village in 1917

Scottish Rite Temple built in 1922

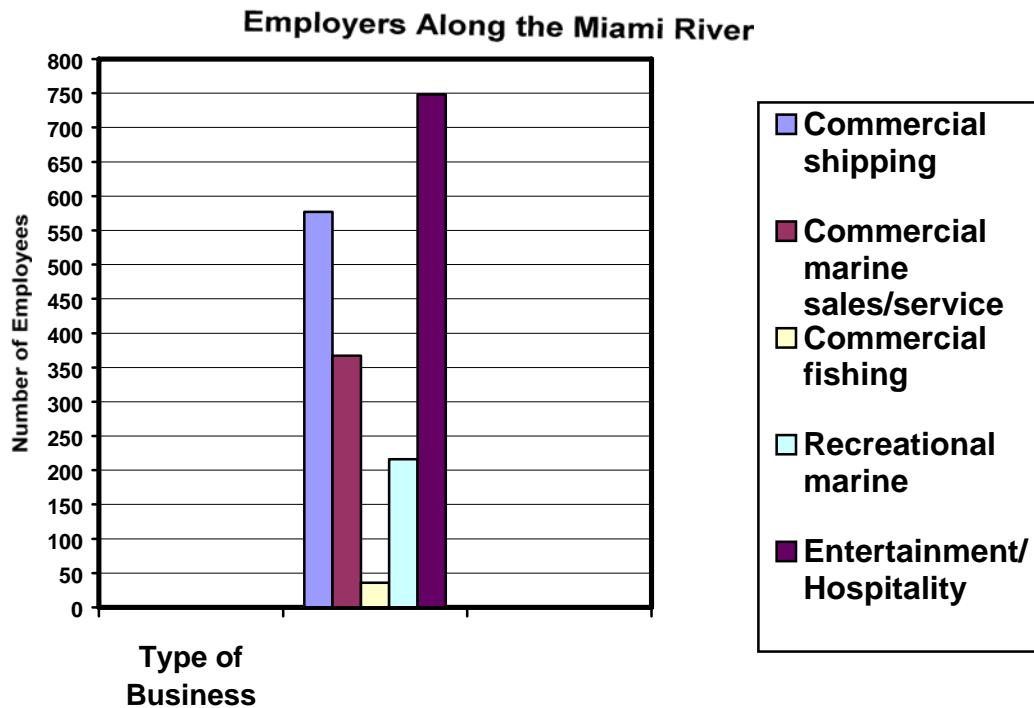
Florida East Coast Hotel in 1925

Brickell Bridge and Brickell Point in 1940

Nuta's Boatyard in 1943

Mouth of Miami River in 2000

Working on the River (9 points for graph)



Working on the River (14 points total – ½ point for each job type)

Job	Type of Business/Industry					
	Commercial shipping	Commercial marine sales/service	Commercial fishing	Recreational marine	Entertainment /Hospitality	Other
Bait shop workers			X	X		
Boat builder	X			X		
Boat catering				X	X	
Boat pilots	X		X	X	X	
Boat mechanic		X		X		
Boat painter		X	X	X		
Boat salvager	X					
Bridge tender						X
Charter boat captain				X	X	
Commercial boat captain	X	X	X			
Coast Guard Patrol						X
Customs officer						X
City of Miami Marine Patrol						X
Diesel repair person	X	X	X	X		
Ecologist						X
Fuel docksman	X		X	X		
Florida Marine Patrol						X
Health care workers						X
Hotel employees					X	
Longshoreman	X		X			
Marine worker	X	X	X	X		
Metro-Dade Patrol						X
Pleasure boat captain				X	X	
Restaurant workers					X	
Seafood process workers			X			
Sight-seeing boat captain				X	X	
Shipyard worker	X		X			
Boat welders		X				

River Trading Partners (6 points total – 1 for each question)

1. Dominican Republic
2. Haiti
3. Dominican Republic and Honduras
4. \$13.856 billion
5. \$17.464 billion
6. The number of jobs increased.

Manatees and the Miami River (8 total points – 2 for each matching question)

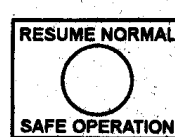
1.



2.



3.



4.



Stormwater Runoff: A Concept Map (18 total points – 1 for each box)

Definition: Rainwater that travels to ground or surface water systems by traveling over land or other surfaces.

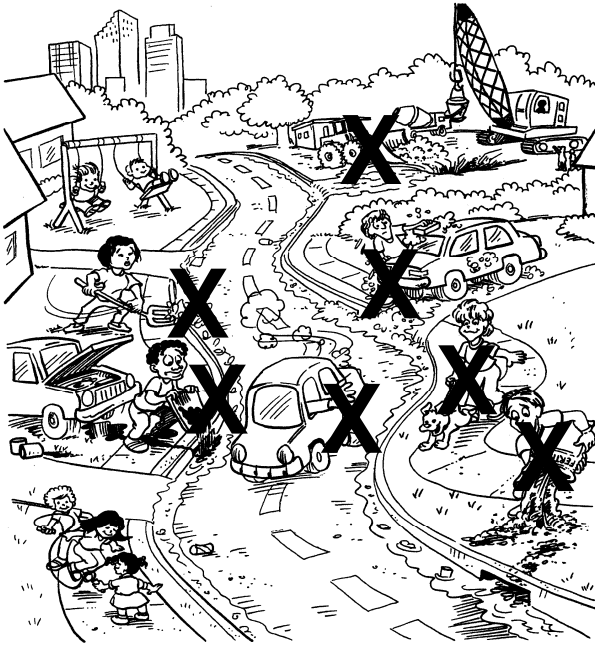
Causes of Pollution can include 4 any of the following:

pesticides and fertilizers from lawn and garden;
pet waste;
grass clippings and yard waste;
dirt and soil from erosion and construction;
paint and chemical; sewage; illegal dumping

Effects of Pollution can include any 4 of the following:

poor water quality;
nutrient enrichment;
harmful substances in water and sediment;
limitation of navigation due to sediment build-up;
high bacteria levels;
litter and trash degrade aesthetics of river
increased cost of dredging;
fish and other wildlife lose their habitat

Stormwater Runoff: The Problem in a Picture (14 total points – 1 for each X and 1 for each part of sentence completion)



Sources of stormwater runoff:

1. dumping oil from car;
2. raking leaves into the street;
3. soil from construction running into the street;
4. soap and suds from washing car into the street;
5. pet wastes;
6. pesticides from lawn;

The Future of the Miami River (8 Total Points – 2 for each question)

1. Dredging will enable ships to navigate the river not only during high tide but also during low tide. This will increase the amount of trade between Miami and the Caribbean which in turn will increase business revenues.
2. If trade is increased, the number of jobs available on the river will also increase. Since dredging will also help cleanup the river, more tourist businesses will open and/or thrive also increasing the number of available jobs.
3. More people (tourists and residents) will visit the Miami River so businesses such as restaurants and hotels will thrive. More tourist businesses will open. Also, fishery business will increase to keep restaurants supplied with seafood, etc.
4. Since businesses will thrive and more businesses will open, there will be more jobs available on the river.



DEPARTMENT OF SAFETY, ENVIRONMENT
& HAZARDS MANAGEMENT

REQUEST FORM FOR WATER RELATED FIELD TRIPS

SCHOOL: _____	PRINCIPAL: _____
ADDRESS: _____	TELEPHONE: _____
REQUESTING PERSON: _____	TITLE: _____
NUMBER OF STUDENTS: _____	NUMBER OF CHAPERONES: _____
DATE REQUESTED: _____	DATE OF FIELD TRIP: _____

NOTE: Requests must be submitted to the Department of Safety and the Office of Risk Management at least two weeks prior to the trip. The request should be submitted during the planning stage.

ACTIVITY(S) PLANNED FOR THIS FIELD TRIP - PLEASE CHECK APPROPRIATE LINES		
IN WATER ACTIVITON	ON WATER ACTIVITIES	UNDERWATER ACTIVITIES
<input type="checkbox"/> Recreational aquatic field trip <input type="checkbox"/> Aquatic environment field trip <input type="checkbox"/> Field trip to swimming pool	<input type="checkbox"/> Canoeing <input type="checkbox"/> Kayaking <input type="checkbox"/> Sailing	<input type="checkbox"/> Snorkeling <input type="checkbox"/> Dive Boat <input type="checkbox"/> SCUBA activities

Description of planned activities:
 Students travel up the Miami River aboard the Island Queen to explore the maritime industries along the river, the career opportunities available and the history of the river. The trip begins and ends at Bayside Marketplace.

COMMERCIAL VESSELS	
NAME OF VESSEL: <u>Island Queen</u>	ADDRESS: <u>401 Biscayne Blvd, Miami</u>
CONTACT PERSON: <u>Ryan Guerra</u>	TITLE: <u>Tour Sales Manager</u>
TELEPHONE: <u>(305) 379-5119</u>	CELL/BEEPER: _____

M-DCPS DEPARTMENT OF SAFETY USE ONLY	
INSPECTOR ASSIGNED TO CONDUCT INSPECTION: _____	
DATE ASSIGNED: _____	DATE COMPLETED: _____
COMMENTS: _____ _____ _____	
DATE OF FAX (APPROVE/DISAPPROVE) TO SCHOOL SITE ADMINISTRATOR: _____	

FM-6614 (09-03)

The School Board of Miami-Dade County, Florida, adheres to a policy of nondiscrimination in employment and educational programs/activities and strives affirmatively to provide equal opportunity for all as required by:

Title VI of the Civil Rights Act of 1964 - prohibits discrimination on the basis of race, color, religion, or national origin.

Title VII of the Civil Rights Act of 1964, as amended - prohibits discrimination in employment on the basis of race, color, religion, gender, or national origin.

Title IX of the Education Amendments of 1972 - prohibits discrimination on the basis of gender.

Age Discrimination in Employment Act of 1967 (ADEA), as amended - prohibits discrimination on the basis of age with respect to individuals who are at least 40.

The Equal Pay Act of 1963, as amended - prohibits sex discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Section 504 of the Rehabilitation Act of 1973 - prohibits discrimination against the disabled.

Americans with Disabilities Act of 1990 (ADA) - prohibits discrimination against individuals with disabilities in employment, public service, public accommodations, and telecommunications.

The Family and Medical Leave Act of 1993 (FMLA) - requires covered employers to provide up to 12 weeks of unpaid, job-protected leave to "eligible" employees for certain family and medical reasons.

The Pregnancy Discrimination Act of 1978 - prohibits discrimination in employment on the basis of pregnancy, childbirth, or related medical conditions.

Florida Educational Equity Act (FEEA) - prohibits discrimination on the basis of race, gender, national origin, marital status, or handicap against a student or employee.

Florida Civil Rights Act of 1992 - secures for all individuals within the state freedom from discrimination because of race, color, religion, sex, national origin, age, handicap, or marital status.

School Board Rules 6Gx13- 4A-1.01, 6Gx13- 4A-1.32, and 6Gx13- 5D-1.10 - prohibit harassment and/or discrimination against a student or employee on the basis of gender, race, color, religion, ethnic or national origin, political beliefs, marital status, age, sexual orientation, social and family background, linguistic preference, pregnancy, or disability.

Veterans are provided re-employment rights in accordance with P.L. 93-508 (Federal Law) and Section 295.07 (Florida Statutes), which stipulate categorical preferences for employment.

REVISED 8/1/01