MAST ACADEMY OUTREACH

MIDDLE SCHOOL PROGRAM

Adventures Aboard
The
Land SHARC
(Science Hands-On And Related Careers)

On-Site Package

MAST Academy

Maritime and Science Technology High School

Miami-Dade County Public Schools

Miami, Florida

MAST ACADEMY OUTREACH

LAND SHARC MIDDLE SCHOOL ON-SITE HIGHLIGHTS PACKET

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Wet Lab Docks

Computer Docks

The "thinking" symbol appears beside all critical thinking questions. Teamwork will be required to answer these questions.

WET LAB DOCK
COMMUNICATIONS SPECIALIST

"EVERY PICTURE TELLS A STORY"

1. You will document your experience aboard the Land SHARC by using the digital camera to take two photos of any of the Land SHARC docks.
2. Look around and find something you want to photograph.
3. Write a story about each photograph. Use complete sentences in your story. Think about who or what is in your picture. If a person is in your photograph, what is he or she doing? If a computer is in your photograph, what is on the screen? If a piece of equipment or an instrument is in your photograph, what is it used for?

FIRST PHOTOGRAPH

This is a photograph of_____

SECOND PHOTOGRAPH

This is a photograph of _____

(When finished, go to page 2, the "Watery Wanderings" Dock.)

WET LAB DOCK
CHEMICAL OCEANOGRAPHER
"WATERY WANDERINGS"

Refractometer: The normal salinity of sea water is approximately 35 0/00 (35 grams of dissolved substances in 1000 grams of water.) Brackish water is a mixture of freshwater and seawater and tends to have a much lower salinity. Pure water has a salinity of zero.

Follow the directions on the table to use the refractometer to measure the salinity of the water in the beaker and then answer the following questions.

1. What is the salinity of the water you tested?_____0/00 (parts per thousand)

2. Is the water you tested seawater, brackish water, or pure water? _____

Hydrochloric Acid Test: Read the information about calcium carbonate before doing the next test. Calcium carbonate is found in many living things or parts of once living things such as shells from snails, clams, etc. It has the chemical formula $CaCO_3$. **Hydrochloric acid is used as a test for $CaCO_3$.** The chemical formula for hydrochloric acid is HCl. **If hydrochloric acid is put on a substance with calcium carbonate in it, you will see bubbling**. You are going to test two samples of sand to see if calcium carbonate is present. One sample is from South Florida which has many shell pieces in it. The other sample is quartz sand and has no shell pieces in it.

Follow the directions for the hydrochloric acid test and answer the following questions.
PUT ON GOGGLES FOR SAFETY!

5. In which test tube do you see bubbling? (Circle your answer.)
(A) quartz sand OR (B) South Florida sand

2. Which sand has $CaCO_3$ in it? (Reread the paragraph above about the Hydrochloric Acid Test.)

3.

_____

7. Where does the $CaCO_3$ in South Florida sand come from?

_____

(When finished, go to page 3, the "Sponges" Dock.)

WET LAB DOCK
MARINE BIOLOGIST

"SPONGES"

Sponges have needle-like spicules throughout their bodies that are composed of hard substances like calcium carbonate or silica. Different types of sponges have different types of spicules. Observe the sponge spicules using the compound microscope. Compare what you see to the spicule drawings below.

1. Circle the drawing that is similar to the spicules you see in the microscope.

a. 

b. 

c. 

d. 

4. Spicules help to provide support for the sponge. How would the weight of the water affect the shape of the sponge if the sponge had no spicules? _____

Sponges are in the phylum called Porifera. This is because they all have pores that create a lot of empty space inside. This allows sponges to hold large amounts of water in comparison to their size. Follow the directions to find out just how much water a sponge can hold.

5. Place a small piece of dry sponge on the scoop that is on the scale and find its weight. Directions for using the scale are on the laminated poster on the table.

How many grams does it weigh? _____g.

6. Place the piece of sponge in the beaker of water. Remove the wet sponge from the beaker and squeeze out extra water. Place the wet sponge on the scale and find its weight.

What does the wet sponge weigh? _____g

7. Subtract the weight of the dry sponge from the weight of the wet sponge to find out the weight of the water inside the sponge.

Weight of wet sponge _____g
Weight of dry sponge - _____g
Weight of water _____g

8. To find the percentage of water the sponge is holding in comparison to its weight, divide the weight of the water by the weight of the dry sponge.

weight of water (divided by) = _____ (multiply by 100) = _____%
weight of dry sponge

(When finished, go to page 4, the "Turtle Grass Community" Dock.)

WET LAB DOCK
MARINE BIOLOGIST

"TURTLE GRASS COMMUNITY"

Choose any 3 of the marine organisms (living things) and complete the chart below. Refer to the information on the poster located on the table to answer the questions in the last 2 columns.

Drawing of Organism	What phylum is it in?	What does your organism have in common with other organisms in the same phylum?

Read the information about seagrasses on the poster located on the table to answer the following questions.

1. Turtle grass (and other sea grasses) provide many things for the organisms that live in their community. Name two (2) reasons that sea grasses are so important and should be protected.

_____

_____

2. Name two reasons why Florida's valuable sea grasses are disappearing at an alarming rate.

_____

_____

(When finished, go to page 5, the "Coral Reefs: Living Communities" Dock.)

MARINE BIOLOGIST

CORAL REEFS: LIVING COMMUNITIES

Before you is the command deck of your coral reef exploring submarine. Here will learn about the environmental conditions needed for coral reefs to survive.

1. Turn on the headphones and place them on your head.
2. Click on "Living Communities,"  the third icon from the left in the middle of the screen.
3. Click on the globe at the upper left-hand side of the screen to see a video about coral reefs. Answer the following questions:

   Question 1 – There are few seasonal changes in water around coral reefs. True False

   Question 2 - Water around coral reefs must be clear for sunlight to penetrate. True False

   Queston 3 - There is little species diversity in a coral reef. True False

4. After viewing the video, click twice on the black arrow in the bottom right-hand corner of the screen.
5. You will see a map with shaded areas representing locations of coral reefs around the world. Answer the following questions:
   Question 4 – Coral reefs are primarily located between what 2 latitude lines? _____
   _____

   Question 5 – Locate and name the state in the continental U.S. where coral reefs are found. ___
   _____

6. Click on "Temperature" at the top of the screen.

   Question 6 – Most coral reefs need temperatures above _____ ^{0}C or _____ ^{0}F in order to survive.

7. Click on "Salinity."

   Question 7 – Which two salinity ranges do most coral reefs fall within? _____

8. Click "Living Communities,"  the icon in the lower left corner of the screen to go back to the lab.
9. Click on the sub icon  in the lower left corner of the screen to go back to the sub.
10. Click on "Change and Evolution,"  the 6th icon from the left.
11. Click on the aquarium at the top left of the screen to view a video about coral reefs. Answer the following questions:
    Question 8 – Where are most stressed reefs located? _____

    Question 9 - Name one natural phenomena that causes coral stress._____

    Question 10 – Name one human produced stress of corals._____

12. When you are finished, click on "Change and Evolution,"  the icon at the lower left of the screen.
13. Click on the sub icon  at the lower left corner of the screen to go back to the sub.
14. Turn off headphones and return them to the pegs.

(When finished, go to page 6, the "Tracking Manatee Movement" Dock.)

WET LAB DOCK
MARINE BIOLOGIST

"TRACKING MANATEE MOVEMENT"

Scientists study manatees using radio telemetry. A tracking device that transmits radio signals allows scientists to track the movements of manatees. In this activity, you will track 3 manatees to see their location during one month. Pay attention to the landmarks such as the power plant, marina and farm.

1. Click on Mighty Mo on the left.
2. Look at **the Monthly Tracking Chart on the table.** Select a month not yet checked off, and write this month here**.** _____
3. **Check off the month you selected on The Monthly Tracking Chart.**
4. Look to the right of the screen and click on the month shown.
5. Select the month you wrote down in step 2.
6. Look at the box that says Signal Strength.
7. Notice when you click on the black, curved arrows  on the sides of the compass that the signal strength changes.
8. Click on the black, curved arrows  until you get the highest signal strength.
9. Click on plot.
10. Click and drag the boat to another location in the middle of the open ocean. Do not drag the boat close to land.
11. Repeat steps 8 and 9.
12. The location of the manatee is where the 2 lines intersect. In the table below, check the landmark closest to the manatee.
13. Click on Pee Wee and find his location as you did for Mighty Mo.
14. Repeat these steps to find Big Dave's location.

Manatee	Open Bay (unshaded area in water)	Seagrass (shaded area in water)	Marina	Power Plant	Farm
Mighty Mo					
Pee Wee					
Big Dave					

Manatees need water temperatures of at least 68 degrees to survive so they spend winters near natural springs, where temperatures stay near 70 degrees. They also spend winters near power plants because water near power plants is above 68 degrees. This is because, as water is used to cool the power plants, it becomes warmer as it circulates through the plant. However, as coal-fired power plants age, they are either being closed down or upgraded to use cooling methods that don't require water.

1. During the month you selected, were any of the manatees near the power plant?_____
2. a. If yes, what do you think attracted them to the power plant? _____

   _____

   b. If no, during what months would you expect the manatees to be near the power plant? _____
   Why?_____

3. What do you think could happen to manatees if too many aging power plants are closed and/or upgraded?_____

   _____

   _____

(When finished, go to page 1, the "Every Picture Tells a Story" Dock.)

The School Board of Miami-Dade County, Florida, adheres to a policy of nondiscrimination in employment and educational programs/activities and programs/activities receiving Federal financial assistance from the Department of Education, 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.

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