

MAST ACADEMY OUTREACH

ELEMENTARY SCHOOL PROGRAM

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

On-Site Packet



**MAST Academy
Maritime and Science Technology High School
Miami-Dade County Public Schools
Miami, Florida**

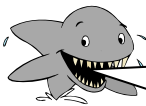
**MAST ACADEMY OUTREACH
LAND SHARC ELEMENTARY SCHOOL
ON-SITE PACKAGE
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Computer Docks

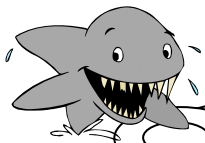
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The “shark” symbol appears beside all directions, which are always enclosed within a callout. **READ ALL DIRECTIONS CAREFULLY.**



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



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 and then writing about your photographs.
2. Look around and find something you want to photograph. If you are waiting to use the camera, you can look around, decide on what you want to photograph and start writing your story (see #3 below) before you take your photographs.
3. Write a story about each photograph. Use complete sentences. 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 an instrument is in your photograph, what is it used for?

FIRST PHOTOGRAPH

This is a photograph of _____

SECOND PHOTOGRAPH

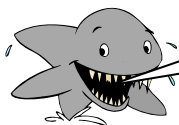
This is a photograph of _____

(When finished, turn to page 2, the “Sands of Time” Dock.)

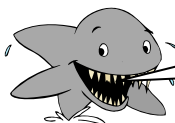
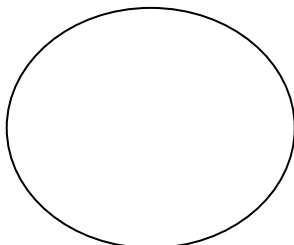
WET LAB DOCK

“SANDS OF TIME” PHYSICAL OCEANOGRAPHER

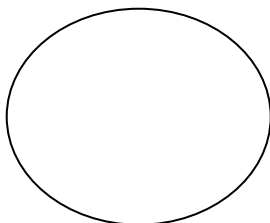
Not all sand is created equal! Sand from South Florida has shell pieces and sand grains in it while sand from other places may have only sand grains in it.



1. Look at the sand in Dish A under the stereoscope and draw what you see in the space below.



2. Look at the sand in Dish B under the stereoscope and draw what you see in the space below.

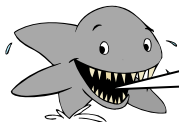


3. Which sand do you think is from South Florida? _____

4. Give a reason for your answer to question 3. _____

Hydrochloric Acid Test: Read the information about calcium carbonate before doing the next activity.

Calcium carbonate is found in 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 added to a substance containing calcium carbonate, a chemical reaction occurs releasing the gas carbon dioxide (CO_2) and 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 on the table for the hydrochloric acid test and answer the 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

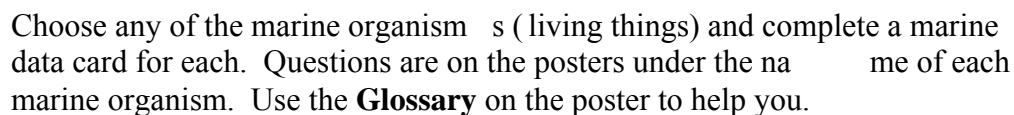
6. Which sand has CaCO_3 in it? _____

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

(When finished, turn to page 3, the “Who’s Who in the Ocean” Dock.)



WET LAB DOCK MARINE BIOLOGIST



<p align="center">MARINE DATA CARD</p> <p>Name of Organism_____</p> <p>Draw the organism here.</p> <p>Write your answer to the question here. (Question is on the poster under the organism name.)</p>	<p align="center">MARINE DATA CARD</p> <p>Name of Organism_____</p> <p>Draw the organism here.</p> <p>Write your answer to the question here. (Question is on the poster under the organism name.)</p>
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1. Marine biologists like to study interesting things about marine organisms. Pretend you are a marine biologist. Choose one of the organisms above. What would you like to find out about this organism? _____

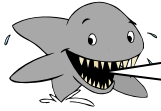
Put organisms back above their names when finished.

(When finished, turn to page 4, the “Sharks and their Relatives” Dock.)

“SHARKS AND THEIR RELATIVES”

MARINE BIOLOGIST WET LAB DOCK

Shark teeth can be triangular in shape with serrated (rough) edges or pointed in shape with smooth edges. The function of the tooth is determined by its shape.



Look through one of the plastic magnifiers on the table by holding it away from you and looking through the top until the teeth are in focus. Draw each one in the data table below and answer the questions.

Triangular serrated tooth

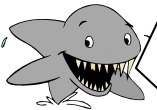
The function of this tooth is to (circle one)

a) cut prey b) puncture and hold prey.

Pointed smooth tooth

The function of this tooth is to (circle one)

a) cut prey b) puncture and hold prey.



You are going to **estimate** the number of teeth on the shark jaw by following the three steps below. (Remember, your answer will be an estimation, not the exact number of teeth on the jaw so do not count all the teeth one by one.) Use the diagrams on the poster to help you.

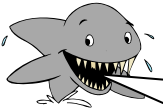
1. Count the teeth in the front row of the upper jaw from left to right. Do the same for the lower jaw. Write these numbers in the first row of the data table below.
2. Put your finger on one tooth in the front row of the upper jaw. How many teeth are lined up behind that front tooth? Do the same for the lower jaw and write these numbers in the second row.
3. Multiply the number of teeth in Row 1 by the number of teeth in Row 2 to calculate an estimate of the total on the upper and lower jaw. Write these numbers in Row 3.

	Upper jaw answers are approximations	Lower jaw answers are approximations
Row 1- Number of teeth in front from left to right		
Row 2 - Number of teeth from front to back	X (multiply)	X (multiply)
Row 3 - Total number of teeth on each jaw		

1. To calculate an estimate of the total number of teeth on both jaws, what math computation do you have to use? _____

2. What is the estimated total number of teeth on the jaw? _____

The skate and the stingray are related to sharks because they have skeletons made of cartilage but their body shapes are different from a shark's body shape.



Marine biologists study how organisms are related to each other. Look at the models of a stingray and skate and answer the questions to find out how they are related to each other and to sharks.



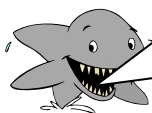
3. Name one way a shark and the skate are similar. _____


4. Name two ways a shark and the skate are different. _____

(When finished, turn to page 5, the “Coral Reefs: Living Communities” Dock.)

“CORAL REEFS: LIVING COMMUNITIES”

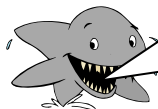
Before you is the command deck of your coral reef exploring submarine.



1. Turn on and put on headphones before you begin.
2. Click on the 5th orange lab icon from the left in the middle of the screen, called “Adaptations.” 
3. Click on the seahorse in the aquarium on the left to see the video “Camouflage,” then answer the following question.

Question 1 – Marine organisms use camouflage in order to (Circle the correct answer.)

- | | |
|----------------------------|-----------------------------|
| a. become energy efficient | c. produce more offspring |
| b. avoid becoming dinner | d. all of the above answers |






4. In the lower right corner of the screen, click on the black arrow to go to “Becoming Invisible: Find the Creature.”
5. Starting with the photo at the upper left, click on each photo.
6. Follow the directions on the screen and complete the matching questions for each photo.

Question 2 – Match each sea creature in the first column with its way of camouflaging by placing the appropriate number next to its name.

- | | |
|-------------------------|--|
| _____ A. scorpion fish | 1. Looks like a sea whip |
| _____ B. lionfish | 2. Looks like a piece of debris |
| _____ C. trumpetfish | 3. Attaches other creatures to its shell |
| _____ D. seahorse | 4. Looks like a sunlight striped reef |
| _____ E. octopus | 5. Burrows in the sand |
| _____ F. decorator crab | 6. Looks like algae-covered coral |
| _____ G. crab | 7. Changes skin texture, color and shape |



7. In the lower left corner of the screen, click on the icon called “Adaptations.” 
8. In the lower left corner of the screen, click on the submarine icon. 
9. Click on the 3rd orange icon from the left called “Living Communities.” 
10. Click on the top right aquarium called “Underwater Wonderland.”
11. **Do not watch the video.** At the bottom right side, click on the black arrow.
12. Move the mouse around the picture (do not click) to see names of each marine creature shown.
13. Find 3 marine creatures you learned about in question 2. Write their names below.



Question 3

Creature 1 _____

Creature 2 _____

Creature 3 _____



14. Click on the icon at the bottom left of the screen, called “Living Communities.” 
15. At the lower left of the screen, click on the sub icon. 
16. Turn off the headphones. Return them to the pegs on the wall.

(When finished, turn to page 6, the “Sink the Reef” Dock.)

“SINK THE REEF”

WET LAB DOCK MARINE BIOLOGIST

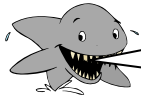
Artificial or man-made reefs are made by placing materials on the ocean bottom. In this lesson you will experiment with different artificial reef designs using concrete blocks. Their rough surface encourages the growth of corals, algae and barnacles which are food for many kinds of fish. Your objective is to see which design is the most effective for attracting fish.



1. Click on the word “Height” and choose 1 meter.
2. Click on the word “holes” and choose none.
3. Click on “spacing” and choose 5 meters.
4. Click on “done” to determine the fish catch for this reef design.
5. Record the height and the fish catch in the table below.
6. Click on the word “height” and choose 2 meters.
7. Click on “done” to find out how this changed the fish catch. Record the height and the fish catch below.
8. Change the height and choose 3 meters.
9. Click on “done” and record the height and the fish catch below.

Height	Holes	Spacing	Depth	Fish Catch
	None	5 Meters	12 Meters	
	None	5 Meters	12 Meters	
	None	5 Meters	12 Meters	

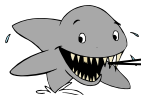
1. How did increasing the height affect the fish catch? _____



10. Click on “holes” and choose small.
11. Click on “done” and record the catch.
12. Do the same for “large” holes and for “combination.”

Height	Holes	Spacing	Depth	Fish Catch
3 Meter		5 Meters	12 Meters	
3 Meter		5 Meters	12 Meters	
3 Meter		5 Meters	12 Meters	

2. How did adding small holes affect the fish catch? _____
3. How did increasing the size of the holes affect the fish catch? _____
4. How did adding a combination of holes affect the fish catch? _____



13. Click on “spacing” and find the catch for 5, 10, and 20 meters.
14. Record the catch.

Height	Holes	Spacing	Depth	Fish Catch
3 Meter	Combination		12 Meters	
3 Meter	Combination		12 Meters	
3 Meter	Combination		12 Meters	

5. How did increasing the spacing affect the fish catch? _____



6. Now that you know how changing height, holes and spacing affects fish catch, how would you design an artificial reef so that it attracts the most fish?

When finished, turn 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 strives affirmatively to provide equal opportunity for all as required by:

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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.

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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.

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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