MAST ACADEMY OUTREACH

ELEMENTARY SCHOOL PROGRAM

Adventures Aboard

The

Land SHARC (Science Hands-On And Related Careers)

Post-Site Packet



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

Teacher Instructions

Elementary Program

Land SHARC Post-Site package

- 1. Make copies of the post-site lessons for each student and have them complete each one. "Dangerous Doings in the Open Ocean" is a play and should be a class activity and should not be graded.
- 2. Grade the lessons. An answer key is provided. Incorporate this score into a total score for all pre-, on-, and post-site activities. A Participation Data/Certificate request form will be mailed to you. Record percent scores for all participating students on this form. Certificates of Recognition will be awarded to all students earning a percent score of 80% or above.

MAST ACADEMY OUTREACH PROGRAMS

ELEMENTARY PROGRAM

LAND SHARC POST-SITE PACKAGE

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How Low Can You Go?

Hundreds of years ago, sailors on ocean going ships discovered that the ocean was thousands of feet deep. Scientists hypothesized that conditions in the deep ocean were so unfavorable that living creatures would not be found there. Much to their surprise, many different kinds of creatures were found. Why did scientists think no life could exist?

Ocean waters reach greater depths than any fresh water body. For example, the Mariana Trench in the Pacific Ocean is about 35,800 feet deep (about 6,000 feet deeper than Mount Everest is tall). What effect do these great depths have on the life found on the bottom? Let's look at a bottom dwelling fish and see.



This fish is a deep-sea angler fish. It is found from 11,500 feet down in both the Atlantic and Pacific Oceans.

A cubic foot of fresh water weighs 62.4 pounds. Salt water weighs slightly more, about 64 pounds per cubic foot. A cubic foot is a block one foot high by one foot long by one foot wide. A fish that has a surface area of one square foot will have a force of about 64 pounds pressing down upon it at a depth of one foot. The same fish would have a force of 640 pounds per square foot at a depth of ten feet.

1. What would the force be on this same fish at a depth of 300 feet? Please show your work.

2. If the angler fish shown in the drawing has a surface area of one square foot, how much pressure will the fish be under at a depth of 20,000 feet? Please show your work.

At a depth of 3,000 feet the pressure is high enough to squeeze a block of wood to half its volume so that it will sink. Why isn't the deep-sea angler fish squeezed? The answer lies in the fact that there is pressure inside of the fish pushing outwards. The two pressures equal each other so the fish keeps its shape.



What happens as the fish moves up and down? The pressure changes on the outside of the fish. To keep its shape, it must be able to change the internal pressure, too.

3. What would the outside pressure on a deep-sea angler fish be at one foot in depth?

4. If the fish could not change its inside pressure, what would probably happen to the fish at the surface if the internal pressure remained the same?

The sunlight never penetrates to the depths where the angler fish lives. If it's always dark, how does the angler fish find its food? Look at the fish's "nose." The strange appendage glows in the dark. The angler fish remains still or slowly moves through the water. As it moves, it dangles the glowing "bait." The structure looks like wiggling worms

5. What color do you think the rest of the deep-sea angler fish is? Why?

Curious fish move in for a closer look. The angler fish dangles the bait more invitingly. The fish moves closer. Suddenly, the angler fish opens its mouth wide. This causes water to rush into the mouth and the curious fish is sucked in with the water. Hello, dinner!

- 6. Which way do the angler fish teeth point?
- 7. What is the advantage of this tooth arrangement?

Occasionally, an angler fish attracts a fish too big to eat. If the angler fish cannot let go of the big fish, both fish die. There is no light at the depths which angler fish live.

8. Does the angler fish have eyes?

Angler fish are sensitive to light. This fact makes scientists wonder if angler fish do occasionally move up into the lighted zones of the ocean.

9. Describe an experiment to test the hypothesis that angler fish move up into lighted ocean zones.

The tremendous pressure and no light coupled with very low temperatures help explain why scientists thought no life would be found in the deep ocean. Angler fish are just one of many strange and fascinating creatures found at great depths of the ocean.

SEA SIDE RIDDLES

The riddles refer to plants and animals found on the coasts of the United States. Choose from the list below to solve each riddle.

pelican	sea turtle	starfish
barnacle	hermit crab	kelp
fiddler crab	horseshoe crab	-

1.

Five pairs of legs this critter has for Helping it to walk the sea shore. Domed and slow, it could use many more.

Its tail is sharp, but will not stab. Its claws are small and will not grab.

On its back it's quite a sight Cause its legs don't help Its tail turn it right.

2. ____

At the water's edge where they can't be blown, Sometimes shells walk on their own!

But if you watch them carefully, Two eyes and many legs you'll see.

These are animals that dwell Inside another creature's shell.

And when this shell gets too tight They find another that's just right.

3.____

In muddy sand banks these abound. Digging holes into the ground.

At low tide you'll see them all, With one claw large and one claw small.

To dig their holes I'm sure they yearn, To carry sand out in an urn. But since they can not use such kegs They take it out stuck to their legs. 4. ____

This animal makes its house on purpose
For protecting it above the surface.

This creature encrusts the boast that sail And also plagues the great grey whale.

On logs and docks and rocks and piers To anything hard their shell adheres.

5. ____

This plant can be found on both the coasts But the biggest type the West Coast boasts.

It grows well over one hundred feet And sea otters use it for a seat.

All types of fish do live among This ocean forest which is strung From rocky bottom to the sun.

And even people harvest this To eat it for a tasty dish.

6. ____

Slowly up the beach they crawl To dig their bell-shaped nests. Some fishermen drown them when they trawl And say that they are pests.

Once many grew to a great size But now their shell the tourist buys, To use on glasses for their eyes, And this has led to their demise.

Although they mainly live at sea Into their lungs it's air they breathe And though on land they move quite slow In the sea they're quick, you know.

Many research teams have tried To keep these animals alive But we still aren't sure if they'll survive. 7. ____

Brown and purple, orange and red, It seems as if they have no head But in the center, underneath There's a small hole with their teeth.

If you wonder how they eat Believe me, it is quite a feat. They slowly wrap around a clam And pull it open when they can.

Five arms or legs are the best clue. A broken one they'll grow anew.

8. _

You'll see these birds along the coast. Often sitting on a post. And if you get to see them dive, You'll be amazed they're still alive.

Across the waves they fly and seek Fish, which they catch in their beak.

And when they find fish-like a rocket They catch and hold them in a pocket. The pocket is part of their bill, and from it they will eat their fill.

Courtesy of Center for Environmental Education

THE TOOTH WILL TELL

Shark teeth come in many different shapes and sizes. The shape of a shark's tooth is related to the diet of that shark. Below are diagrams of teeth from seven different sharks. Notice that each one has a different shape. Carefully observe each tooth and answer the following questions.



- 1. How is the shape of the great white shark's tooth different from the shape of the sandtiger shark?_____
- 2. How is the shape of the blue shark's tooth different from the tooth of the Pacific angel shark?_____
- 3. How is the shape of the horn shark's tooth the same as the tooth of the leopard shark?_____

To the Teacher:

To find out what these sharks eat, have students work in cooperative teams to find information on each shark's diet, method of collecting and eating food, and habitat. Each group should be able to explain how the shape of the tooth is related to what the shark eats.

Resources can include encyclopedias, books, periodicals, videotapes, CD-Roms or the Internet. Below are some Internet sites to direct your students to in their search. Other resources used will depend on the availability at your school.

http://www.seaworld.org/infobooks/Sharks&Rays/diet.html

http://www.sdnhm.org/kids/sharks/shore-to-sea/leopard.html

http://www.enchantedlearning.com/subjects/sharks/species/Greatwhite.shtml

http://www.flmnh.ufl.edu/fish/Gallery/Descript/Sandtiger/Sandtiger.html

http://www.flmnh.ufl.edu/fish/gallery/descript/Leopardshark/Leopardshark.html

http://www.enchantedlearning.com/subjects/sharks/species/Baskingshark.shtml

http://www.animalport.com/animals/Angel-Shark.html

http://www.pbs.org/oceanrealm/seadwellers/sharkdwellers/horn1.html

Each group can present their information in a format chosen by the groups and in accordance with the resources available at your school.

Presentation formats can include but are not limited to:

PowerPoint presentations Dioramas Science board displays Brochures Newsletters

"Designed" Artificial Reefs **Reef Balls**



Reef balls are state-of-the-art, designed artificial reefs used to restore damaged reefs or to create new reefs. Reef Balls are not made from "materials of opportunity" such as old ships, tires, or concrete blocks. They are structures designed specifically to match a reef ecosystem with the specific goals of a project. In the past, many reefs were built simply "to improve the marine environment." Increasingly, reefs are built for very specific goals because the science

Reef Balls being deployed into the ocean.

of reef building is rapidly advancing. Reef Balls have been used in over 1,000 projects worldwide with over 100,000 Reef Balls functioning as reef ecosystems. Reef Balls are the most widely used designed reefs in the world.

Reef balls are internationally patented to allow nearly all natural reef features to be copied. Variables which can be changed to meet natural conditions include; size of holes, number of holes, stability, weight, and size. Also, the best reefs are usually a combination of several of the same or different sizes.



Note the size of the holes and the number of holes in the two Reef Balls above.

Directions: This is a role-playing activity in which you will play the role of a reef designer. You have been asked by the environmental manager at Biscayne National Park in Miami-Dade County to design two reefs using Reef Balls. The designed reefs must meet the following specifications: (Hint: each reef can be a combination of reef balls.)

Reef A

- 1. The reef must be 6 feet wide at the bottom;
- 2. The reef must be 3 feet high at its highest point;
- 3. The reef must attract smaller fish;
- 4. The reef must be moved without lifting equipment.
- 5. Reef stability is not a concern.

Reef B

- 1. The reef must be 16 feet wide;
- 2. The reef must be 6 feet high;
- 3. Reef stability is a concern due to high storm activity in the area;
- 4. The reef must attract all sizes of fish, but mainly Goliath Groupers;
- 5. The Reef Balls must be transported by a flatbed truck.

After reading the information below, decide upon the number and type of Reef Balls needed to create the two designed reefs. Create your reefs on page 14.

Reef balls come in at least 8 different sizes. The names and characteristics of each one are listed in the table below. All Reef Balls have the basic shape shown in the photos on the previous page.

Style	Width	Height	Weight	# of holes	Size of holes
Ultra Ball	6 feet	4.5 feet	4000-6000 lb.	29 – 34	Medium to large
Reef Ball	5 feet	4 feet	3000-6000 lb.	29 – 34	Medium to large
Pallet Ball	4 feet	3 feet	1500-2200 lb.	17-24	Small to large
Bay Ball	3 feet	2 feet	375-750 lb.	10 – 16	Small to large
Mini-Bay Ball	2.5 feet	1.75 feet	150-200 lb.	10 – 16	Small to large
Lo-Pro	2 feet	1.5 feet	70-100 lb.	6 - 10	Small to medium
Oyster	1.5 feet	1 foot	30-45 lb.	6 - 8	Small to medium

The Pallet Ball is the largest size that can be rolled down a beach without lifting equipment. The Bay Ball is the largest size that can be moved underwater without lifting equipment. The Pallet Ball is the best size for stacking because it has a flatter top. It also fits well on flatbed trucks for efficient transportation on land. The Ultra Ball is best for beach protection or breakwater applications because it is the tallest and fits together with other Ultras. The Lo-Pro Ball will fit nicely on top of a Pallet Ball and an Oyster Ball will fit nicely on top of a Bay Bakll.

Stability or resistance to destruction by storm or time has only been calculated for the Bay Ball and larger sizes. Smaller sizes should not be used where stability is an issue.

Some other guidelines to use when choosing Reef Balls are: kelp prefers Bay Balls; Goliath Grouper prefer Pallet, Reef or Ultra Balls, pelagic species (living in the open ocean) prefer Pallet or larger sized Reef Balls. As might be expected, the larger size holes tend to house larger fish and the smaller holes house smaller fish.

Some other guidelines to use when choosing Reef Balls are: kelp prefer Bay Balls; Goliath Grouper prefer Pallet, Reef or Ultra Balls; pelagic species prefer Pallet or larger sized Reef Balls

Your "Designed" Reefs

For each "designed" reef, decide on the type and number of each Reef Ball you will use to meet the specifications. Then draw each reef and label each type Reef Ball you used.

Reef A

Number and type(s) of Reef Balls _____

Explain why you chose these Reef Balls.

Draw Reef A, including labels, in the box below.

Reef B

Number and type(s) of Reef Balls _____

Explain why you chose these Reef Balls.

Draw Reef A, including labels, in the box below.

Everglades Animal Olympics

Everglades animals have certain characteristics that make them unique. By comparing ourselves to other species, we see how truly remarkable those species are in comparison to us and to each other. Even individuals within the same species have different physical abilities. For example, one frog may be able to jump higher than another one. These differences within a species are referred to as variation.

For this activity, you are going to compare some of your characteristics to the characteristics of animals that live in the Everglades to discover how your physical abilities and characteristics differ from them and from other members of your class.

Materials:

Stopwatch or watch with second hand for each team of 4 to 5 members Metric measuring tape or meter stick for each team Material to use as a blindfold for each team

Procedure:

You can compete in all the Olympic events described below in your classroom except for numbers 7 and 8 for which you will have to go outside or to a long hallway. You will work in a team as you compete in each event. Record your individual results below. On a separate piece of paper, create a data table to record the results of all your team members.

1. A manatee can hold its breath under water for up to 25 minutes.



Use the stopwatch or watch to see how long you can hold your breath. I can hold my breath for ______ seconds.

2. A bald eagle may have a wingspan of 2 meters or

more.

Use the measuring tape or meter stick to measure the span of your outstretched arms.

I have a wingspan of ______ meters _____ centimeters.

3. A sleeping heron can stand on one leg for over one hour.

Have your partner use the material to blindfold you. Use the stopwatch or watch to time how long you can stand on one leg blindfolded.



I can stand on one leg blindfolded for ______ seconds.

- 4. A panther can leap 6 meters in one leap.
 - Leap as far as you can from a standing position. Use the measuring tape or meter stick to see how far you leaped.



I can leap _____ meters _____ centimeters from a standing position.

 Owls have the ability to stare for hours. Use the stopwatch or watch to see how long you can stare without blinking.
I can stare ______ seconds without blinking.



6. Frogs can leap 120 times consecutively without stopping.

Keep leaping down a hallway or outside to see how many times you can leap before you get tired.



I can leap ______ times without stopping.

7. An alligator can run 48 miles per hour in short spurts (about 12 meters in two seconds.)

Use the measuring tape or meter stick to measure off 12 meters outside or in a hallway.

Use the stopwatch or watch to time how long it takes you to run 12 meters.



I can run 12 meters in ______ seconds.

Conclusion: Discuss the following questions with your team members and write your answers. Then your teacher will discuss them with the whole class.

8. Comparing your team results to the Everglades animals, did anyone win any of the Olympic events? ____ Yes ____ No If yes, which one(s)? _____

9. Why do you think a manatee can hold his/her breath for so long?

10. Why do you think a bald eagle has such a big wingspan?

11. Why do you think a heron can stand on one leg for so long?

12. Why do you think a panther can leap so far?

13. Why can an owl stare for so long without blinking?
14. Why can from leap so many times without stopping?
15 Why can an alligator run so fast in short spurts?
16 What are 3 physical abilities can you do that none of these animals can do?
To what are 5 physical abilities can you do that hone of these animals can do
17 What physical characteristics do you have that enable you to do these
three things?
18. Do any of the Everglades animals in this lesson have the same
characteristics?YesNo
19. If yes, explain why they have the same characteristics.
20. If no, explain why they do not need these characteristics.
21 How do your team results illustrate the definition of the term
verietien?

Disastrous Decibels

The decibel (dB) is the unit used to measure the loudness or intensity of a sound. The faintest audible sound is assigned a value of 0 dB. The loudest sounds that can be tolerated by the human ear are about 120 dB. The level of normal conversation is about 50 to 60 dB. In the table below, are additional examples of sounds you are familiar with and their decibel levels.

Sound levels in air	Decibels (dB)
Chain saw	125 dB
Hair dryer, noisy restaurant	95 dB
Jet flyby 300 meters overhead	135-145 dB
Light traffic, 100 feet away	75–85 dB
Motorcycle, lawnmower	115 dB
Quiet library, soft whisper	55 dB
Quiet residential area	55 dB
Refrigerator	65 dB
Rock band	145 dB
Rocket launching pad	205 dB
Wilderness area	50 dB

Data Table 1

We are all familiar with noise pollution in the air. We are all so used to hearing these "noises" everyday but most of us do not realize that sounds above 90 dB can damage the human ear after extended exposure. But what about noises that are produced underwater that may be polluting our oceans? What are the sources of these noises and are these noises harmful to marine life?

Because sound diminishes more quickly in water, it's not completely accurate to compare sound levels in the water to levels in the air. Look at the chart below and compare these natural ocean sounds to the chart above to help you imagine the intensity of these natural ocean sounds.

Data Table 2		
Natural Ocean Sounds	Decibels (dB)	
Bottlenosed dolphin	150 dB	
Earthquake	135 dB	
Gray whale moan	185 dB	
Harp seal call	140 dB	
Humpback whale moan	175 dB	
Wind and waves	85 dB	

Data Table 2

Manmade underwater sounds come from several sources. SONAR (sound navigation ranging) is one type of "noise" and includes continuous low frequency pulses given off by ships worldwide. Another type of sonar is used during a scientific process known as Acoustic Thermometry. The Acoustic Thermometry of Ocean Climate (ATOC) project is

a four year study to determine the average temperature of the oceans. It uses pulses of low frequency sound (at 195 dB) to try to determine the average temperature of the oceans. Sound waves travel differently through warm and cold water so it is hoped that this device can help determine the advances of global warming. In the future there may be as many as 12 loudspeaker platforms used in the ATOC program.

At any one time there are 127 supertankers at sea, each generating 187 dB of low frequency sound. That's as loud as some military artillery explosions. Icebreaking ships, dredging boats, oil drilling rigs, sonic oil exploration and dynamite explosions from construction and demolition projects also add to the undersea racket.



Oil Rig

During the course of oil exploration, the oil companies use air guns to explore the ocean bottom for potential oil reserves. These air guns fire a pulse of sound at 250 dB that bounces off the ocean floor and returns to the ship.

"Pingers" and "ringers" are two more major sources of sound in the oceans. Pingers are devices that emit a shrill 130 dB sound to scare away marine mammals from fishing boats. It is believed that pingers are not loud enough to cause physical damage to marine organisms although scientists don not know enough about overall effects. Ringers emit a 190 dB sound to ensure that marine mammals stay away from aquaculture operations. These sounds are believed to cause physical pain to animals.

Refer to the table below for a summary of manmade ocean sounds and their levels.

Manmade Ocean Sounds	Decibels (dB)
ATOC experiment	195 dB
Dredging boat	167 dB
Icebreaker ship	183 dB
Large tanker	177 dB
Low frequency sonar	235 dB
Pingers	130 dB
Ringers	190 dB
Seismic oil exploration	210 dB
Supply ship	174 dB

Data Table 3

Make a bar graph of the data in **Tables 2 and 3**. Arrange the graph so that the sounds are arranged on the graph from the lowest dB to the highest dB. Use one color for the data in Table 2 and another color for data in Table 3. Make sure your graph has a Title, a Key, and labels on both the horizontal and vertical axes. Then answer the questions on the next page.



Refer to the graph you just made to answer the following questions.

- 1. How many manmade ocean sounds are louder than the call of the harp seal?
- If a harp seal pup (baby) uses its call to attract its mother, what might happen to populations of harp seals if noise pollution became too "loud" for the mother to hear the calls of the pups?



3. How many manmade sounds are louder than the sounds of the bottlenosed dolphin? _____



4. Dolphins depend on vocalizations to communicate with each other and to navigate. Dolphins emit and process up to 700 clicking sounds per second to detect the size and location of an object hundreds of meters away. What would happen to dolphins if manmade sounds interfered with their ability to navigate?

Refer to the on-site lesson on page 10 called "Ask the Experts About Whales" to answer question five.

5. List three reasons why humpback whales sing_____



- 6. Look at the graph. Name two manmade noises that are louder than the moan of the humpback whale.
- 7. What could be two consequences to humpback whales if manmade noises interfere with their singing?

- 8. What do you think is the most harmful manmade sound? Explain why.
- 9. If you were a United States Legislator, what could you do to help protect marine animals from ocean noise pollution?
- 10. If you worked for a shipping company, what could you do to help protect marine animals from ocean noise pollution?
- 11. If you were a scientist, describe an experiment using the scientific method to determine if SONAR is harmful to dolphin navigation.

My problem statement is:

My hypothesis is:

My procedures are:

DANGEROUS DOINGS IN THE OPEN OCEAN

This is a play which can be staged by your class. Seven students will play the different roles. Other students can participate by helping to make props, costumes and back drops. A student can also play the role of director.

Props Needed: music; trash for floor of ship such as paper, plastic baggies, old net, bits of plastic, etc.; costumes or signs for sea turtle, sea gull and dolphin; beach setting; sign for end of play.

Cast: narrator, 3 crew members, sea turtle, dolphin, sea gull, a boy, a girl.

There is background music playing. Any song related to the sea can be used.

Narrator: The USS <u>(school name)</u> is sailing on the open seas. The crew is pondering over the problem of accumulated trash on board.

1st Crew Member: We've got to do something about this trash. It's getting hard to move around on board!

2nd Crew Member: Yeah! Hey! We're in the middle of the ocean. It's a big place. Let's just throw our trash overboard!

3rd Crew Member: Good idea! Nobody will ever know the difference!

Narrator: The crew gets busy throwing all their trash overboard. they don't notice a sea turtle playing in the area.

Sea Turtle: Wow! look at all those jellyfish! Yum, Yum! My favorite food.

(The sea turtle exits. The dolphin enters.)

Narrator: a dolphin is taking a leisurely swim. He/she is very interested in a net bobbing up and down in the waves.

Dolphin: How curious! I wonder what that is? (He/ she is eyeing the fishing net.) I'll just go over and take a look.

Narrator: He swims over and gets his neck entangled in the net! He tries to shake it off without success.

Dolphin: Oh No! I'm caught! It will be hard for me to eat and breathe. I hope I can get it off soon.

(The dolphin exits. The sea gull enters.)

Narrator: A sea gull swoops down and eats bits of plastic thinking they are food.

Sea Gull: Yum! Here are some tasty tidbits for my babies back in the nest.

(The sea gull flies offstage.)

Narrator: Meanwhile back on land, a boy and a girl have walked a long distance to a so-called deserted beach.

Boy: Hey! I thought your Mom said hardly anyone ever comes to this beach. Look at all the trash!

Girl: I wonder where it all came from? It looks like it might have been washed up on shore by the ocean's waves.

Boy: Come on! Let's go home. It's no fun playing in trash.

Girl: I agree. Next time we come, let's bring some bags to pick up some of this stuff.

Girl: Good idea!

(Boy and girl exit.)

The cast all come on stage carrying a sign and reading in unison the message which says:

The moral of the story is:

PLEASE DON'T THROW TRASH INTO THE OCEAN. IT'S HARMFUL TO ANIMALS AND PEOPLE, AND IT DOESN'T GO AWAY!

Answer Keys (Total – 100 points)

How Low Can You Go? (18 total points – 2 points for each question)

- 1. 64 x 300 = 19,2000 pounds per square foot
- 2. 64 x 20,000 = 1,280,000 pounds per square foot
- 3. 64 pounds per square foot

4. If the internal pressure remained high, the fish would probably explode as it was brought to the surface.

5. The deep sea angler is usually black or dark gray. The dark color lets it remain hidden in spite of its light.

- 6. The teeth point backwards, towards the tail.
- 7. Once something is held by teeth pointing backwards, it is very difficult for it to get away 8. Yes

9. Possible suggestions: Mark fish with dye or radioactive tracers and follow their movements by radio or visually; put an angler fish in a pressurized aquarium and watch its behavior; fish for angler fish in lighted ocean zones and count how many are caught.

Sea Side Riddles (16 total points – 2 for each riddle)

- 1. horseshoe crab
- 2. hermit crab
- 3. fiddler crab
- 4. barnacle
- 5. kelp
- 6. sea turtle
- 7. starfish
- 8. pelican

The Tooth Will Tell (16 point total – 2 for each answer; 10 for report)

- 1. Answers will vary but can include: great white tooth is wider and more triangular; sand tiger tooth is pointier and narrower.
- 2. Answers will vary but can include: blue shark's tooth is wider and curved at the point; pacific angel tooth is straight.
- 3. Answers will vary but can include: Both have three points.

10 points for report and presentation.

"Designed" Artificial Reefs – Reef Balls (10 total points; 5 for each reef) Reef A

Number and type or types of Reef Balls <u>2 Bay Balls, 2 Oyster Balls</u>

Explanation: <u>The 2 Bay Balls together have a width of 6 feet</u>. Oyster Balls fit well on top of Bay Balls and the height of a Bay Ball with an Oyster Ball on top is 3 feet at the highest point. They have small holes to attract small fish, can be moved without lifting equipment, and do not have to be stable.

Draw Reef A, including labels, in the box below.



Reef B

Number and type or types of Reef Balls: <u>8 Pallet Balls</u>

Explanation: <u>4 Pallet Balls together have a width of 16 feet. Then four Pallet Balls on top of the first row</u> makes the height 6 feet. They are stable, attract all sizes of fish and can be moved on a flatbed truck easily.

Draw Reef B, including labels, in the box below.



Everglades Animal Olympics (21 points total – 1 point for each question)

Questions 1 - 7 will vary with each student.

- 8. Answers will vary but some students may be able to leap more than 1220 times.
- 9. Manatees dive under the water to look for food.
- 10. Bald eagles fly high and for long periods of time so they need the power of a wide wing span.
- 11. This is how herons rest.
- 12. Panthers watch their prey from a distance and then most leap that distance to surprise the prey.
- 13. Owls have to stare when they are watching for prey in the dark.
- 14. Frogs leap so many times because that is how they move from place to place.
- 15. Alligators run fast in short spurts to catch prey.
- 16. Answers will vary.
- 17. Answers will vary.
- 18. Answers will vary.
- 19. Answers will vary.
- 20. Answers will vary.
- 21. Answers will vary.

Disastrous Decibels (19 total points-8 points for graph; 10 point for each questions)



Decibel Range of Ocean Sounds

- 1. 11
- 2. The populations of harp seal would decrease because more pups would die.
- 3. 10
- 4. Dolphins would not be able to navigate and they could bump into things or not be able to find the directions they need to go in to find each other or to find food.
- 5. to attract males, to communicate, to drive males away
- 6. Answers could include: large tanker, icebreaker ship, gray whale moan, ringers, AOTC experiment, seismic oil exploration, low frequency sonar.
- 7. They would not mate and populations would decrease and they could not communicate with each other.
- 8. Answers will vary.
- 9. A legislator could make laws to protect marine animals, such as regulating shipping lanes and where sonar experiments can take place.
- 10. Regulate where shipping lanes go and make quieter ships.
- 11. Answers will vary.

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- <u>4A-1.01</u>, 6Gx13- <u>4A-1.32</u>, and 6Gx13- <u>5D-1.10</u> - 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 5/9/03