

EcoVenture Class: Blue Whale

Teacher Guide

Overview and Resource Materials



EXPLORE, DISCOVER, LEARN

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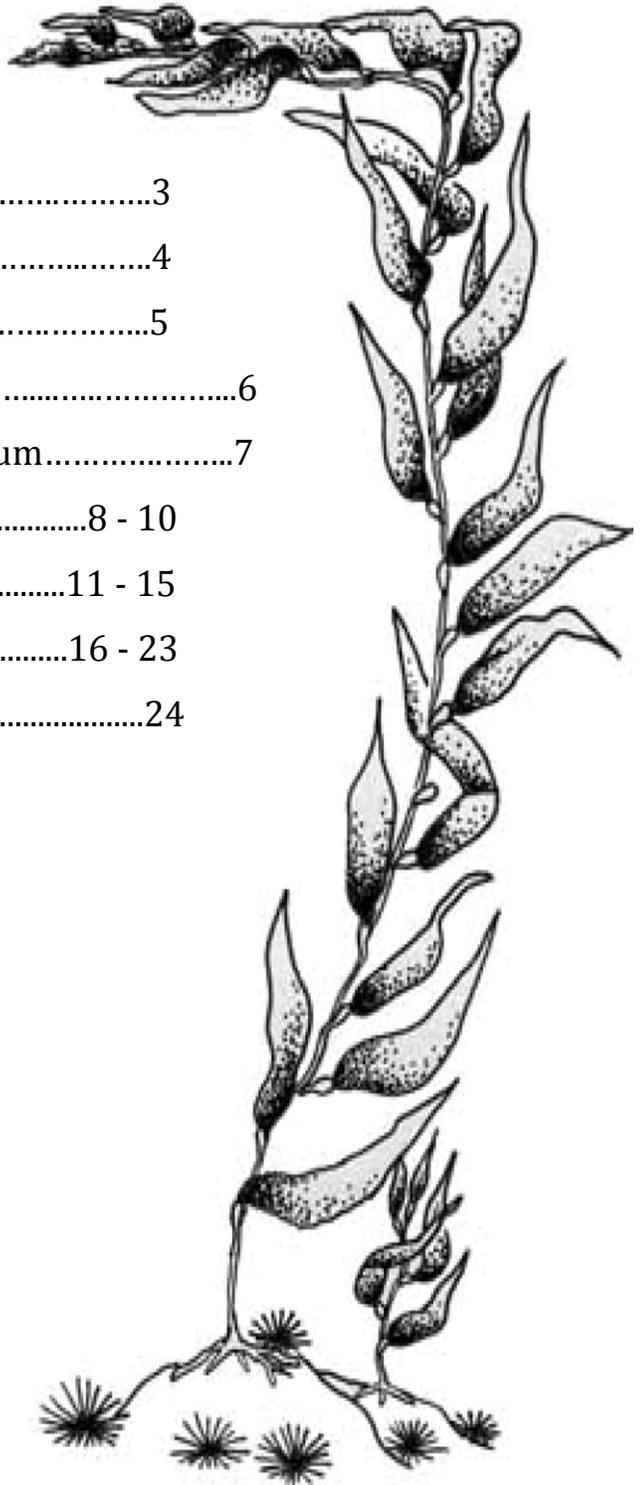
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Or visit our website

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Why Have an Aquarium in a Desert?

After all, where else in the world is water so valued and respected? It's a precious resource that defines how we live in Utah. Because we're not surrounded by oceans and immense water habitats, we have fewer opportunities to experience, understand and appreciate the water environments that cover more than 70 percent of our planet. Loveland Living Planet Aquarium brings animals to people who might not have the chance to see them or their water-based ecosystems in a natural setting.

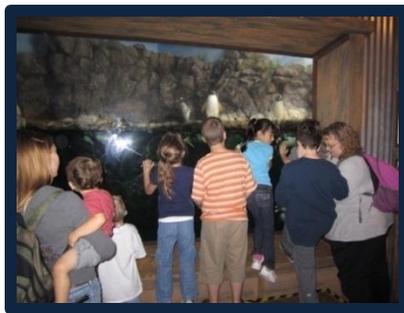
Our children are the future custodians of the environment. Yet, the majority of today's young people don't have the opportunity to understand the ocean nor their own water-dependent environments. Loveland Living Planet Aquarium provides a "living classroom," educating us all about our interdependence on the living planet's fragile ecosystems.

Loveland Living Planet Aquarium is a world-class organization that enriches lives through education outreach, dynamic exhibits and programs.

Loveland Living Planet Aquarium provides an entertaining learning experience and hands-on educational opportunities to help individuals understand and appreciate the water environments encompassing our planet, leading to an enriched personal life. Having this aquarium provides us with countless opportunities to understand and respect this precious resource and the living habitats it supports, both in Utah and in our planet's oceans.



Explore



Discover



Learn

School Visit Overview

Thank you for choosing Loveland Living Planet Aquarium for a school visit. We look forward to your arrival!

This section of the Teacher Guide provides an overview of your visit and a checklist of things to accomplish before, during and after your experience with us.

Utah State Core Connections

Our on-site programs are designed to be an exciting complement to what you are teaching in the classroom. Our education team examined the Intended Learning Outcomes and Core Standards for each grade and created our presentation and activities to reinforce the ILOs and Standards. You will find a list of related ILOs and Standards later on in this document.

EcoVenture Classes

Each EcoVenture Class lasts approximately 20-35 minutes. While the class is separate from your general aquarium visit, there is not an additional cost for the classes. To provide a quality and interactive experience for your students, we allow a maximum of 35 students per class. This means, we can present the same program several times back-to-back to accommodate larger groups.

The EcoVenture Classes take place in our Education Classrooms with one or two Education Presenters, depending on the class. There are also Education Presenters located throughout the aquarium to answer any questions you or your students may have.

EcoVenture Start Times

The contact teacher will receive an e-mail with a confirmation sheet. This confirmation sheet will list the school's arrival time and each group's EcoVenture Class start time. Please remind the chaperones to arrive promptly to the Education Classroom at their designated start time to allow the group to have the full classroom experience.

"Give people facts and you feed their minds for an hour.

Awaken curiosity and they feed their own minds for a lifetime."

(Ian Russell)



School Visit Checklist

Loveland Living Planet Aquarium



Pre-Visit

Download from our website:

___ This document (Teacher Guide)

___ Student Research Document(s) for you to copy and bring with you on your visit

Many of our documents are saved in PDF format. They require Adobe Acrobat Reader to open.

If you do not have Acrobat Reader, you can download the program for free at:

<http://www.adobe.com/products/reader/>

Please

___ Educate the students and chaperones on behavior expectations

___ Divide your students into smaller groups and assign each group a chaperone.

___ Supply each adult chaperone with a Chaperone Guide. This guide includes the rules, tips to facilitate learning and an aquarium map.

Day of

___ Bring Student Research Documents if you would like your students to use them during their aquarium visit (optional).

___ Remind the students and chaperones of the behavior expectations.

___ Remind the chaperones of their EcoVenture Class start time and location.

___ **All groups must pay in one lump sum.** Bring payment if your school is **not** a sponsored Title 1 or Head Start school. If your visit is **sponsored**, you do not pay for your students, but please remember the chaperone-to-student ratio. Any additional adults will be asked to pay.

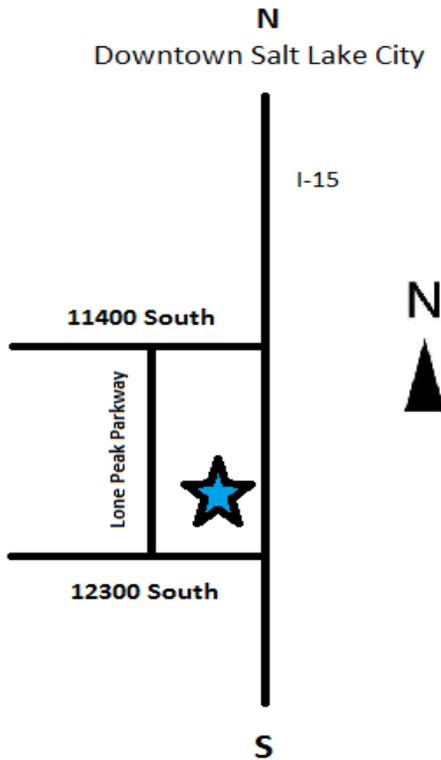
___ Have FUN and enjoy learning at Loveland Living Planet Aquarium!

Post-Visit

This document contains post-visit materials. Other materials may become available as separate downloads in the future, so check our website often.

Location of Loveland Living Planet Aquarium

12033 S Lone Peak Parkway
Draper, Utah 84020
Phone: (801) 355-3474



Directions:

- From I-15 S, take exit 291 (West 12300 South)
 - Left at fork towards Riverton (Left onto 12300 South)
 - Turn right onto Lone Peak Parkway
 - Loveland Living Planet Aquarium is on right
- From I-15 N, take exit 292 (West 11400 South)
 - Right at fork (Right onto 11400 South)
 - Turn left onto Lone Peak Parkway
 - Loveland Living Planet Aquarium is on left

Teacher Outline

Blue Whales

Duration of School Visit

EcoVenture Classes (35 students max) are scheduled in 30-minute increments unless otherwise noted on your confirmation sheet. Each EcoVenture Class is approximately 25-30 minutes. Please allow your group 2 hours for a three-class visit, or 2 hours and 45 minutes for a four-class visit.

At this time, the aquarium does not have lunch space available for field trip groups.

If you are interested in eating sack lunches nearby, we recommend Galena Hills Park which is located at 12500 South Galena Park Blvd (550 west) in Draper. Among other park amenities, there are covered picnic tables, bathrooms and a playground. This park is not within walking distance of the aquarium. If you would prefer to walk to a park, the closest one is Inauguration Park which is located at 326 West Inauguration Road. This is a basic park with a few uncovered picnic tables and a small playground. There is a large grassy area where students can sit to eat lunch. To get there, cross the street at the crosswalk outside the aquarium, then proceed to walk north on Lone Peak Parkway for 0.5 miles. Then take a left on Inauguration Road, and walk for approximately 0.1 miles. The park will be on the left. We realize weather may present a challenge and apologize for any inconvenience.

Background for Teachers

The blue whale is the largest creature in the world. In fact it is the largest animal that has ever lived as far as we know. Students will have the opportunity to learn about the blue whale and compare them to dinosaurs and to the largest land animal, the elephant. It will be a whale of a good time exploring the ocean with these majestic creatures and the aquarium friends.

Intended Learning Outcomes/Measurable Objectives

Students will demonstrate through observation, reading, group data collection and sharing, their understanding of the concepts of size, data collection and organization, interactions of various animals and plants.

Connecting \longleftrightarrow **to the** **Core Standards**

Here's where your EcoVenture Class connects with the Utah State Core Curriculum.

The main intent of science instruction in Utah is that students will value and use science as a process of obtaining knowledge based upon observable evidence.

Science Core

Standard I: The Processes of Science, Communication of Science, and the Nature of Science. Students will be able to apply scientific processes, communicate scientific ideas effectively, and understand the nature of science.

Objective 1: Generating Evidence: Using the processes of scientific investigation (i.e. framing questions, designing investigations, conducting investigations, collecting data, drawing conclusions)

- a. Framing questions: Observe using senses, create a hypothesis, and focus a question that can lead to an investigation.
- c. Conducting investigations: Observe, manipulate, measure, describe.

Objective 2: Communicating Science: Communicating effectively using science language and reasoning

- a. Developing social interaction skills with peers.
- b. Sharing ideas with peers.
- c. Connecting ideas with reasons (evidence).

Standard IV: Life Science. Students will gain an understanding of Life Science through the study of changes in organisms over time and the nature of living things.

Objective 2: Identify basic needs of living things (plants and animals) and their abilities to meet their needs.

- a. Communicate and justify how the physical characteristics of living things help them meet their basic needs.
- b. Observe, record, and compare how the behaviors and reactions of living things help them meet their basic needs.

Language Arts Core

Standard I: Oral Language Students develop language for the purpose of effectively communicating through listening, speaking, viewing, and presenting.

Objective 1: Develop language through listening and speaking.

- a. Identify specific purpose(s) for listening (e.g., to gain information, to be entertained).
- b. Listen and demonstrate understanding by responding appropriately (e.g., follow multiple step directions, restate, clarify, question, summarize).
- c. Speak clearly and audibly with expression in communicating ideas.

Standard VI: Vocabulary: Students learn and use grade level vocabulary to increase understanding and read fluently.

Objective 1: Learn new words through listening and reading widely.

- a. Use new vocabulary learned by listening, reading, and discussing a variety of genres.
- b. Learn the meaning of a variety of grade level words (e.g., words from literature, social studies, science, math).

Mathematics Core

Standard II: Students will model, represent, and interpret patterns and number relationships to create and solve problems with addition and subtraction.

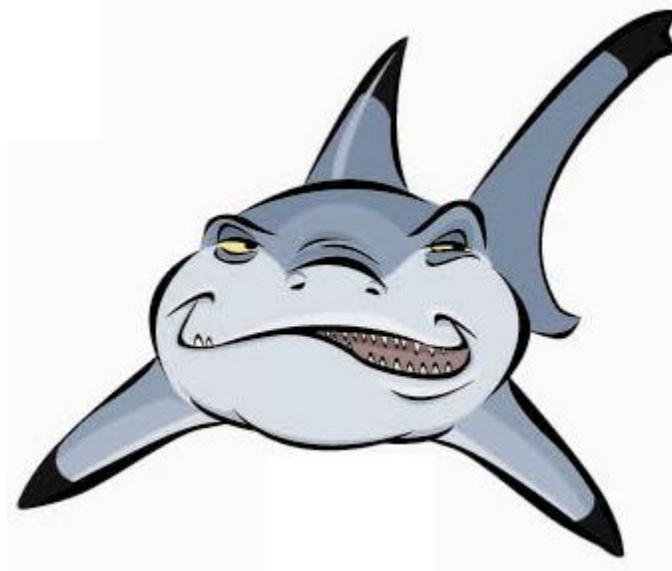
Objective 1: Recognize, describe, create, and extend growing patterns.

- b. Construct models and skip count by twos, threes, fives and tens and relate to repeated addition.

Standard III: Students will understand simple geometry and measurement concepts as well as collect, represent, and draw conclusions from data.

Objective 2: Identify and use units of measure, iterate (repeat) that unit, and compare the number of iterations to the item being measured.

- a. Identify and use measurement units to measure, to the nearest unit, length (i.e., inch, centimeter), weight in pounds, and capacity in cups.
- b. Estimate and measure length by iterating a nonstandard or standard unit of measure.



Pre-Visit Resources

The following pages offer pre-visit information you can use in the classroom before your visit to Loveland Living Planet Aquarium. These resources correlate with material that will be covered in your EcoVenture Class or in post-visit materials. There may also be links to UEN's website for additional information. As a suggestion, if you have internet access for your class, you can visit our website to let the children investigate what we have to offer. Here is the link: <http://www.thelivingplanet.com>

Fishing strategies simulation game

Adapted from New Zealand Ministry of Fisheries Resource

<http://www.fish.govt.nz/en-nz/Starfish/Kids+Zone/Games/Simulation+game.htm>



This is a two-stage game, which will help you to realize that with co-operation, a resource can last indefinitely, but if you exploit a renewable resource faster than it can recover, the resource will collapse. This game is a good connection to [2nd Grade Science Core, Standard 4](#) and [Math Core, Standard 2](#)

Teacher Background

Throughout human history, our oceans have been a wonderful source of food and useful products as well as recreation. Through the ages humans have developed more and more efficient methods for obtaining food from the sea. While this has resulted in more food being available to people around the world, it has also resulted in what many consider to be negative results as well.

Current concerns are as follows:

1. **Over fishing** – Certain fish are being taken in such large numbers that the population is threatened with not being able to reproduce fast enough to sustain it.
2. **Unintended by-catch** – By catch are those organisms that are not the intended food source but are caught and often killed or harmed in the process. An example of this is dolphins or sharks caught in nets intended for tuna. According to the [United Nations Food and Agriculture Organization](#), one in four animals caught in fishing gear dies as by-catch—unwanted or unintentional catch.
3. **Habitat loss and destruction** – Certain methods of fishing and other practices damage or destroy habitats which are vital to the survival of the very animals we want to catch.

Many organizations and governments around the world are making efforts to promote practices which will help alleviate the challenges mentioned above. In the United States, the federal government has enacted legislation like the **MAGNUSON FISHERY CONSERVATION AND MANAGEMENT ACT** to help regulate and guide the fishing industry to act in ways that can help the long term sustainability of our resources.

Below are some links to organizations involved in measures that promote sustainable fishing practices. ***We offer these links as informational resources only.***

NOAA dept. of fisheries

<http://www.nmfs.noaa.gov/sfa/sfweb/>

World Wildlife Fund

http://wwf.panda.org/what_we_do/how_we_work/conservation/marine/sustainable_fishing/

Seafood Watch - Monte Ray Bay Aquarium.

<http://www.montereybayaquarium.org/cr/seafoodwatch.aspx>

Equipment

One die to roll

30 "fish" silhouettes (printed on cardstock)

Players

Total of four - three fishers and a "banker" who looks after the resource.

Game One: The Fishing Race

Objective: To catch the most fish.

Rules:

- All 30 fish go into a "pool", looked after by the banker.
- Each player has a toss of the dice in turn. (Select or toss for the person who starts first.)
- They can "catch" as many fish from the pool as the number they toss.
- At the end of each round, the banker tallies up the catch for each player.
- If there are fewer fish left than the number you throw (eg, three left and you throw a five), you get to take all the remaining fish.
- That's the end of the game - too bad if the other players didn't have a chance to complete the last round.
- The banker does a final tally. The winner is the person with the most fish.
- The banker keeps a tally of how many "rounds" it took before all the fish were taken.

Game Two: Fishing for the Future

This game is to be partly designed by the students, and then played. A group who has just completed Game One should play it.

Objective: To work out a system for catching fish, where each player has a "fair go", and... To make the game last longer (more rounds) than Game One did.

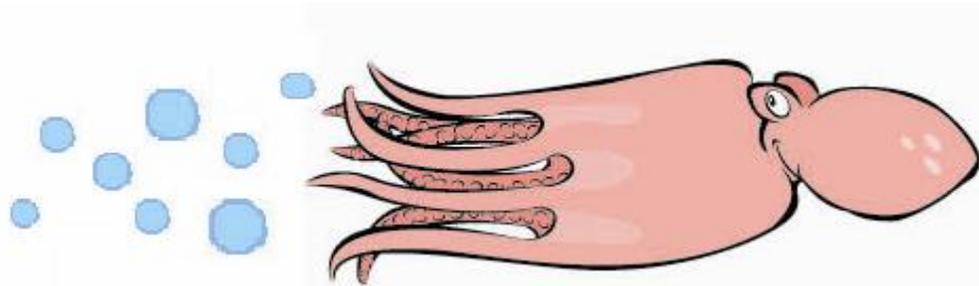
Basic rules:

- At the start of the game there are only 6 fish in the pool. The banker retains the other 24.
- After each round, the banker feeds another 6 fish into the pool.
- If, at the end of a round, there aren't enough fish in the pool, then your fishery has collapsed - the game ends.
- The banker keeps a tally of how many rounds have been played.
- The winning team is the team who has made their game last the greatest number of rounds.

Students' rules:

- Before you start, work out some rules to add to the basic rules, so that the game will last as many rounds as possible, and everyone gets a fair shot.
- When you've designed your rules, play the game and record how many rounds it lasts.
- After the game have a class discussion focusing on:
 1. What are resources?
 2. What are some examples of resources? eg. wood, plants, soil, minerals, water and sunlight.
 3. What is the difference between renewable and non-renewable resources?
 4. Are fisheries resources infinitely renewable?
 5. What did these games tell us about catching fish?
 6. Do we have rules like the rules you designed for our fishers?
 7. What are the differences between this game and the "real world"?
 8. How can we manage fisheries so they continue to be available for future generations?

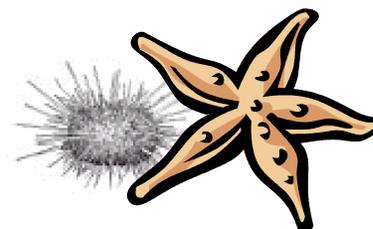




Now, you're off to Loveland Living Planet Aquarium

Remember to use your checklist to help you on this day.

You should take some time to share copies of the Chaperone Guide with each adult leader as well as the aquarium layout map. Remember that teachers are free and you get one **additional** adult free for every 10 students. Any adults above this 1:10 ratio will need to pay a fee upon arrival.



Post-Visit Resources

The following lesson materials are intended to help you extend learning from your field trip back into the classroom.

Coral Reefs Tropical rainforests of the sea

Coral reefs are home to more kinds of life than any other marine environment, rivaling even the tropical rainforests on land. In fact, coral reefs reached their current level of biodiversity fifty million years ago and have been on the planet for over 400 million years. - Reef Relief

Coral reefs can be found in 13 of our national parks, including:

- Biscayne, Florida
- Buck Island Reef National Monument, St. Croix
- Dry Tortugas, Florida
- Haleakala, Hawaii
- Hawaii Volcanoes
- Kalaupapa National Historical Park, Hawaii
- Kaloko-Honokohau Park, Hawaii
- National Park of American Samoa
- Pu'uuhonua o Honaunau National Historical Park, Hawaii
- Salt River Bay National Historical Park, St. Croix
- Virgin Islands Coral Reef National Monument, St. John
- Virgin Islands, St. John

Source: National Parks Conservation Association. http://www.npca.org/marine_and_coastal/coral_reefs/

When most people think of coral reefs, they imagine great varieties of colorful fish and other life. Many never realize that the reef structure itself is made up of millions of tiny animals called polyps. A coral polyp looks much like an anemone with tentacles surrounding a mouth and a soft body. Coral polyps come in many varieties but can be divided into two main groups.

Hard or stony corals such as brain coral or stag horn coral have the ability to form a calcium carbonate (limestone) skeleton from minerals dissolved in sea water. These hard corals are responsible for creating what we see as massive and intricate structures where other animals can live as well. Soft corals like a sea fan do not create this hard skeleton but cover the reef in an amazing array of colors and shapes.

Threats to Coral Reefs

Human activity has destroyed more than 35 million acres of coral reefs. Despite their protection in national parks, coral reefs in the United States face many of the threats suffered by reef ecosystems worldwide.

Touching, kicking, walking on, or collecting coral when snorkeling or diving; dropping anchor on reefs when boating; or fishing in reef areas cause serious damage to reef ecosystems and devastate coral.

In Florida, Biscayne and Dry Tortugas National Parks are suffering from overdevelopment of nearby lands, water pollution, boating, recreational and commercial fishing, and more than 3 million tourists yearly. Since 1930, Florida's population has increased four-fold. Mangrove trees and sea grasses that normally act as filters for coral reefs are being rapidly destroyed as development increases, leading to heightened soil erosion. Soil, fertilizers, and sewage being dumped into Florida waters smother corals and prevent them from obtaining enough light and oxygen to survive. Other forms of pollution, such as petroleum products and chemicals dumped near coastal waters, eventually will find their way to coral reefs as well, poisoning coral polyps and other marine life.

Make a Difference!

- When diving or snorkeling near coral reefs, **DO NOT** touch, stand or walk on, kick or collect coral. Make sure none of your equipment bumps into the coral.
- Don't purchase items made from coral or other threatened marine life. Avoid coral jewelry or other marine souvenirs unless you are certain that they were farmed or produced in aquaculture operations.



- If you own a tropical aquarium, demand that your aquarium store purchase only fish that have been certified "cyanide free." In many areas of the world, tropical fish are collected from coral reefs by releasing cyanide poison into the water, which kills the reef and many other marine species and stuns valuable fish for easy collection. Don't purchase coral pieces or "live rock" for your tank unless there is proof they were not removed from the wild.



- Be very careful to collect all trash from beaches when you visit. Sea turtles have evolved to eat anything in the oceans, even poisonous Portuguese Man-of-War, but when turtles and other marine life eat plastics and other garbage, they risk fatal blockage of their digestive tracts. Trash also can cover coral reefs and block the sunlight they need to survive.

- Don't order turtle, shark fin, or other restaurant dishes made from threatened wildlife.
- If you operate a boat, navigate carefully to avoid contact with coral reefs, never drop anchor onto a reef, and never dump trash or sewage into the water.

Making a Difference

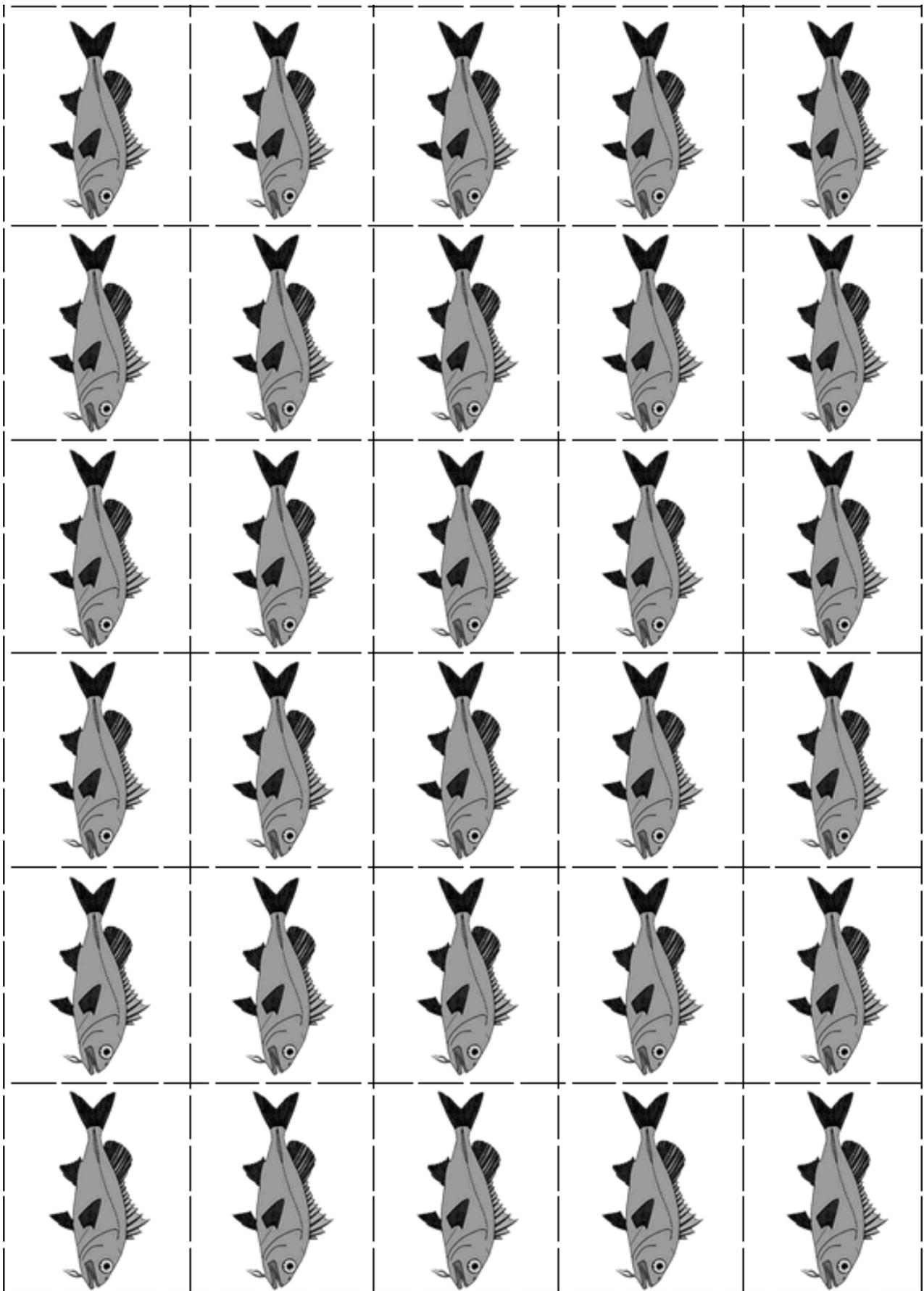
Inspiring the students to understand that each of them can make a difference for our world is a wonderful challenge and opportunity. Below is a short story you can use to illustrate this point.

The Sea Star

-Anonymous

Once upon a time there was a wise man who used to go to the ocean to do his writing. He had a habit of walking on the beach before he began his work. One day he was walking along the shore. As he looked down the beach, he saw a human figure moving like a dancer. He smiled to himself to think of someone who would dance to the day. So he began to walk faster to catch up. As he got closer, he saw that it was a young man and the young man wasn't dancing, but instead he was reaching down to the shore, picking up something and very gently throwing it into the ocean. As he got closer he called out, "Good morning! What are you doing?" The young man paused, looked up and replied, "Throwing starfish in the ocean." "I guess I should have asked, why are you throwing starfish in the ocean?" "The sun is up and the tide is going out. And if I don't throw them in they'll die." "But, young man, don't you realize that there are miles and miles of beach and starfish all along it. You can't possibly make a difference!" The young man listened politely. Then bent down, picked up another starfish and threw it into the sea, past the breaking waves and said- "It made a difference for that one."





How Big Is a Blue Whale?

Objectives

- Students will gain better appreciation for the size of a Blue Whale
- Students will utilize predicting and measuring skills.

Materials

- 110 feet of rope, twine or tape measure (Remember that 110 ft is the largest ever recorded. Average is closer to 100)
- American Cetacean Society website on blue whale.
<http://www.acsonline.org/factpack/bluewhl.htm>
- Markers or crayons
- Butcher paper
- Calculator rolled paper or cash register paper
- A long hallway or wall

Procedures

- Review resource information about the blue whale and use the poster given to you during your visit to Loveland Living Planet Aquarium to help you make a head and a tail (fluke) to be placed on a long wall, floor or ceiling. This could be an art activity where all the students help to draw or color the head and fluke out of two large sheets of butcher paper.
- Using measuring device, mark off 110 ft and place your whale head and tail (Fluke) at opposite ends.
- Have students buddy up and cut a length of calculator paper to match each buddies height. Write the student's name on the paper.
- Have all of the students predict how many "students" it will take to equal the length of the blue whale and record the predictions.
- Lay out the named strips end to end and record how many students it takes to reach the length of the blue whale. Are there combinations of students that change that number?

Extensions: Let students research other marine animals and cut a length of calculator tape to match that animal's average length. Have them get a picture of that animal from a magazine, internet or other source and put it up with the length of paper next to the blue whale for a compare and contrast activity.

The students can write characteristics about the other animals on their respective strips of paper and compare and contrast the characteristics other than length with the blue whale. A Venn diagram activity could also be used. Some characteristics to look closely at are: Food sources, where the animal is found in the world, lifespan, feeding behavior, status (non-threatened, threatened, endangered etc.)

Web Sites for Fun

All links are suggested resources only. Loveland Living Planet Aquarium does not specifically endorse any of the following sites or organizations. If a link does not work you can try copying and pasting the URL into your web browser.

Good resource on corals and nautical charts. Designed for upper grades but can be adapted for lower.

<http://coralreef.noaa.gov/education/outreach/>

Learn about the interesting names for groups of animals and their babies.

<http://www.enchantedlearning.com/subjects/animals/Animalbabies.shtml>

Reef Relief – Good resource for coral reef education and conservation.

<http://reefrelief.org/learn/educational-material/>

Make a life size inflatable blue whale (plans and material lists) – Needham Science Center.

http://rwd1.needham.k12.ma.us/Science_Center/Teaching_Tools



American Cetacean Society

<http://www.acsonline.org/>

Coral Reef Alliance

http://www.coral.org/index.php?option=com_frontpage&Itemid=1

NOAA Year of the Ocean Web site

<http://www.yoto98.noaa.gov/kids.htm>

Steve Spangler Science

<http://www.stevespanglerscience.com/>

This site has a large number of hands-on science experiments and materials for students and teachers. There are videos, tutorials and products that can be purchased for activities and science fair projects.

Sheppard Software

<http://www.sheppardsoftware.com/>

Lots of games, activities, and articles for elementary school students.

Books to Include

Big Blue Ocean

By Bill Nye – Ages 8 & up

Coral Reef

By Barbara Taylor – Ages 7 & up

Coral Reef: A City that Never Sleeps.

By Mary M. Cerullo

Ocean (Eye Wonder book)

By Samantha Gray - Ages 7 & up

Sign of the Seahorse

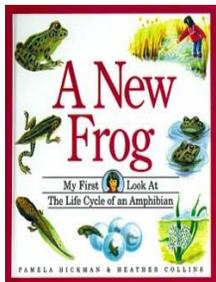
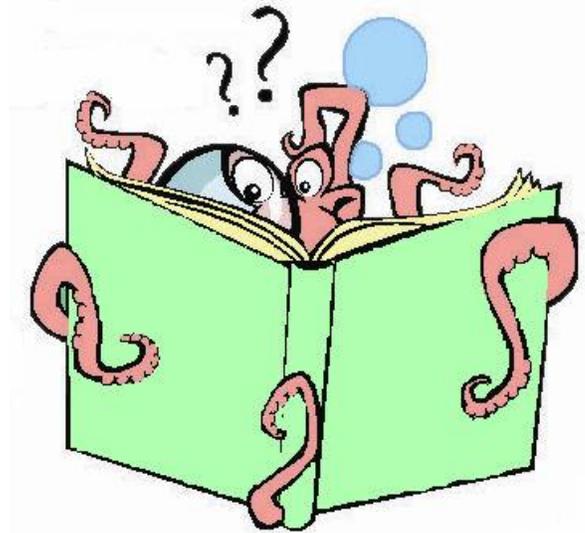
By Graeme Base – Ages 8 & up

What Do You See Under the Sea

By Bobby Kalman – 6 & up

All the Way to the Ocean

By Joel Harper and illustrated by Marq Spusta – Ages 7 & up



A New Frog: My First Look at the Life Cycle of an Amphibian

Hickman, Pamela. Toronto: Kids Can Press, 1999.

This book on frog development has two simultaneous texts. Each left-hand page has a flap. With the flap folded in, the text consists of a cumulative, sing-song rhyme in the style of "The House that Jack Built." When folded out, the enlarged page carries more detailed, scientific information about the life cycle of frogs. Gr. Preschool-3.

Videos

Blue Planet Series – 4 videos in series covering a wide range of topics.

<http://www.bbc.co.uk/programmes/b008044n>

References

The following resources were used in the development of these materials and or field trip presentations and were not among those cited in the text body.

Smithsonian Institution Press (1996) Sea Life – A Complete Guide to the Marine Environment

Duxbury and Duxbury (1994) An introduction to the World's Oceans, Wm. C. Brown Publishers, 4th edition: Dubuque: Iowa.

Pinet, Paul (1998) Invitation to Oceanography, Jones and Bartlett Publishers: Sudbury, Massachusetts.

<http://www.montereybayaquarium.org/cr/seafoodwatch.aspx>

Thank you for bringing your class,
and we look forward to serving you again!



We would like to gratefully acknowledge the contributions of Lori Layne and others from Rosecreek Elementary School in the development of these materials and beta testing of the presentations with their students.

Also, thank you to the many teachers and parents from other schools that have given and continue to give critical feedback and suggestions for improvement.

And to our sponsors

