



# Enhanced Whale Watching Expedition



## Pre-Trip Lesson: Research Station Preparation

**Age of Learners:** K -6<sup>th</sup> grade

**Time:** 150 minutes total, with possible take-home elements.

### **BIG IDEA**

Davey's Locker invites your students to study our local marine ecosystem and search for wildlife during the Enhanced Whale Watch Expedition! During this 2 hour educational program, which was developed in partnership with local nonprofit, Crystal Cove Conservancy, your students will participate in five different monitoring projects. Each of these projects will focus on various species of wildlife found in the Crystal Cove State Marine Conservation Area.

This lesson plan, consisting of four short activities, will introduce your students to the on-board monitoring projects and prepare them for their sea-faring adventure!

### **PURPOSE OF ACTIVITY**

This lesson functions as an advanced organizer, introducing students to what they'll be doing during the Enhanced Whale Watch Expedition. By participating in one short introductory activity for each research station, students will develop an understanding of the marine ecosystem they'll be exploring during the boat program.


### **OVERVIEW OF ACTIVITY**

Students will participate in several short activities to familiarize themselves with the five research stations on board the boat. These activities can be broken up over multiple class periods, or can be assigned as take-home work.

The activities will focus on (1) adaptations and anatomical structures of gray whales, (2) the differences between seals and sea lions, (3) how to differentiate zooplankton from phytoplankton, and (4) training videos to practice identifying coastal birds and marine mammals.

### **NEXT GENERATION SCIENCE STANDARDS LINKS**

- **Disciplinary Core Ideas:** Populations of organisms live in a variety of habitats. Change in those habitats affects the organisms living there. (LS4.C, LS4.D)
- **Science & Engineering Practices:** 1) *Planning and Carrying Out Investigations.* Evaluate appropriate methods and/or tools for collecting data. 2) *Engaging in Argument from Evidence.* Students will construct and support an argument using models.

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- **Crosscutting Concepts:** 1) *Scale, Proportion, and Quantity*. Students recognize natural objects and observable phenomena exist from the very small to the immensely large. 2) *Patterns*. Students recognize that patterns can be observed and used as evidence.

### COMMON CORE STANDARDS LINKS

- ❑ W.K-5.7: Participate in research and writing projects (Check individual grade for specific requirements).
- ❑ W.1-5.8: Recall information from experiences or gather information from provided sources to answer a question (Check individual grade for specific requirements).
- ❑ W.3-5.9: Recall information from experiences or gather information; take brief notes on sources and sort evidence into provided categories (Check individual grade for specific requirements).
- ❑ SL.1.1: Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
- ❑ RI.1.10: With prompting and support, read informational texts appropriately complex for grade.
- ❑ SL.2.2: Recount or describe Key ideas or details from a text read aloud or information presented orally or through other media.
- ❑ RI.5.7: Draw on information from multiple print or media sources, demonstrating an ability to locate an answer to a question quickly or to solve a problem quickly.

### LEARNER PRIOR KNOWLEDGE

- Students should know the purpose of a Venn diagram and how to use one.
- Students should know what a species is and how the term “species” is defined.
  - **Species:** A group of closely related organisms that are very similar to each other and are usually capable of interbreeding and producing fertile offspring. A class of individuals having common attributes and designated by a common name.

### LEARNING OBJECTIVES


By the end of this lesson, students will achieve the ability to:

- 1) Use a field guide to identify common marine mammal and bird species.
- 2) Identify common differences between seals and sea lions and participate in an environmental debate.
- 3) Describe some key differences between zooplankton and phytoplankton, and identify common species of each.
- 4) Describe adaptations of gray whales and why they have developed these anatomical differences from other marine life.

### MATERIALS

- ❑ At least one computer with display capabilities
- ❑ (1) classset of Marine Mammal Identification Guides
- ❑ (1) classset of Bird Identification Guides



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- ❑ (1) class set of Marine Mammal/Bird Identification Answer Sheet
  - ❑ (1-2) Seal vs. Sea Lion Fact Sheet
  - ❑ (1) class set of Plankton Type Activity Sheet (with Teacher Guide)
  - ❑ (1) class set of Gray Whale Adaptations Activity Sheets (with Teacher Guide)
  - ❑ (1) class set of Gray Whale Adaptations reading

### **LINKS TO ONLINE RESOURCES**

- Venn Diagram Resource  
[http://www.readwritethink.org/files/resources/interactives/venn\\_diagrams/](http://www.readwritethink.org/files/resources/interactives/venn_diagrams/)
  
- Introduction to Plankton Video (Either watch until the demo portion ends or sign up for free trial to view the entire video.)  
<http://study.com/academy/lesson/what-is-plankton-definition-types-facts.html>  

**or**

<https://ed.ted.com/lessons/the-secret-life-of-plankton>
  
- Marine Mammal Identification Video  
<https://drive.google.com/file/d/10apRMGdcRSbkVv5lNaYj6ACy6FMbJGoA/view?usp=sharing>
  
- Bird Identification Video  
<https://drive.google.com/file/d/1FxWo6pudSO0RvHRcKgb0IIVTDKcTRdIF/view?usp=sharing>

### **TEACHING TIPS**

1. This lesson consists of five short mini-lessons. The five lessons will be in the **Explore** section of the overall lesson and follow a similar format to the lesson as a whole.
  
2. You can decide how you would like to teach the five mini-lessons and in what order. Portions of certain activities can be completed over different class periods, or assigned outside of the classroom for homework as needed. See procedure section for details.





# Enhanced Whale Watch Expedition


## Introduction

### **PROCEDURE**

#### **Engage (10 minutes)**

- 1) Start by telling the students that soon they will be embarking on an Enhanced Whale Watch Expedition with Newport Whales. You can ask the students if they've ever been whale watching before or on a boat. Maybe they have seen whales in the wild; what species of whale have you seen?
- 2) Explain that this trip might be a little bit different than what they've done in the past. Pull up the Enhanced Whale Watch Expedition PowerPoint slide.
- 3) Reading out loud is a great way to start getting students to understand the curriculum that will be on the boat. Have different students read each paragraph of the slide if appropriate. After you have read the slide as a class, explain to the students that over the next couple of days, you will be participating in five short lessons to help them prepare for their role as scientists on board a boat.
- 4) Advance to the second slide. Tell students that when they are on board during the Enhanced Whale Watch, they will participate in a variety of science stations: 3 research projects involving: identification of coastal birds, marine mammals, and plankton, and 2 other projects involving: a Gray Whale Scavenger Hunt and a Sea Lion vs. Fishermen Debate.
- 5) Some preliminary questions to ask students: "What do you think we will need to understand before we go on the Enhanced Whale Watch Expedition? What will we need to know in order to be prepared?"
- 6) Let students express what they wonder or might want to know. Keep track of their ideas on the white board.
- 7) At the end of the discussion, tell students that they will participate in four short training activities to prepare them for the Enhanced Whale Watch Expedition.

**Note:** The following four activities may be divided over multiple class periods, or assigned as a take-home work! Feel free to arrange them in a manner that works best for your class.





# Activity 1: Marine Mammal and Bird Identification Training

**Time:** 45 minutes

**Location:** In Class

## **MATERIALS**

- At least one computer with display capabilities
- (1) Bird Identification Guide per student or per pair
- (1) Marine Mammal Identification Guide per student or per pair
- (1) Identification Answer Sheet per student or per pair

## **ADVANCE PREPARATION**

- Make copies of the Bird Identification Guide, the Marine Mammal Identification Guide, and the Identification Answer Sheet. Students may either work individually, with one copy of each page per student, or in pairs, with one copy per pair.
  
- Pull up links to the bird identification and marine mammal videos from the internet, and prepare to display them to your class.

## **PROCEDURE**

### **Engage (2 minutes)**

- 1) Tell your students that part of their job as researchers during the Enhanced Whale Watch Expedition will be to keep an eye out for various species of marine wildlife.
  
- 2) Ask them for examples of marine wildlife that they might find.
  - *Possible Answers: whales, dolphins, birds, etc.*
  
- 3) Tell them that their first training assignment will be to use videos and identification guides to practice identifying the specific species they will be looking for during the expedition. On board the Enhanced Whale Watching cruise, each team will be assigned a different sea bird to identify and count, so this will help them practice!

### **Explore (15 minutes for Birds and 15 Minutes for Mammals)**


- 4) Pass out the Bird Identification Guide and the Identification Answer Sheet.
  
- 5) Then take a moment to go over activity instructions. Tell the students that you will be a short video training about bird identification. The first quiz will show your students photos of different marine birds. These five marine birds will be five of the most common bird species that they'll be looking for on the Enhanced Whale Watch Expedition. As they watch the video, the students should use the Bird Identification Guide to determine what species they are looking at. Once they identify the species, they should write their answer on their Identification Answer Sheet below.





- *Example: If the first image shows a Western Gull, students should write “Western Gull” in the answer space for #1, Quiz 1 on the Bird Identification Practice portion of the answer sheet.*
- 6) Tell the students that first, you will practice identifying marine birds. Ask them to find the marine bird section of the answer sheet.
  - 7) Before starting the video, give students a few minutes to review the Bird Identification Guide, so that they are familiar with the different species.
  - 8) Once students are ready, play the Bird Identification video. Have students use their Bird Identification Guide to identify each of the bird species. Make sure they are writing their answers in the space provided on the answer sheet.
  - 9) After the video is completed, review the correct answers with students. **Ask them how they correctly identified the different species – were there any unique markings or colorations?** Which species were the hardest to identify?
  - 10) The second Bird Identification Quiz will consist of multiple photos of birds which are numbered 1-4. This quiz is a bit harder, as the students will now have to use their skills to pick out the bird that we are asking them to find.
    - *Example: If the first image shows the following numbered photos: 1. Pelican photo, 2. Gull photo, 3. Cormorant photo, 4. Snowy Egret photo and the question is asking “Which picture is of a Snowy Egret?”, students should write “#4” in the answer space for ‘Question 1.’ under Quiz 2 on the Bird Identification Practice portion of the answer sheet.*
  - 11) Review the answers for the second quiz like first, asking how they correctly identified the different species, looking at the specific details for the species. On board the Enhanced Whale Watching cruise, each team will be assigned a different sea bird to identify and count.
  - 12) Repeat the above process for the Identifying Marine Mammals Video. Pass out the Marine Mammal Identification Guide and the Identification Answer Sheet.
  - 13) Take a moment to go over activity instructions. Tell the students that you will be a short video training about marine mammal identification. The quiz at the end of the video will show your students photos and video clips of different marine mammals. These seven marine mammals will be the most common species that they’ll be looking for on the Enhanced Whale Watch Expedition. As they watch the video, the students should use the Marine Mammal Identification Guide to determine what species they are looking at. Once they





identify the species, they should write their **observations and answers** on their Identification Answer Sheet below.

- *Example: If the first image shows a Common Dolphin, students should write something similar to “triangle dorsal fin; pointy beak; tan side – Common Dolphin.*


- 14) Tell the students that first, you will practice identifying marine mammals. Ask them to find the marine mammal section of the answer sheet.
- 15) Before starting the video, give students a few minutes to review the Marine Mammal Identification Guide, so that they are familiar with the different species.
- 16) Once students are ready, play the Marine Mammal Identification video. Have students use their Marine Mammal Identification Guide to identify each of the species. Make sure they are writing their answers in the space provided on the answer sheet.
- 17) After the video is completed, review the correct answers with students. **Ask them how they correctly identified the different species – were there any unique markings or colorations?** Which species were the hardest to identify?

#### ***Explain and Expand (5 minutes)***

- 18) If you have the time, use this as an opportunity to discuss with students how they identified the different species. Did they notice any field markings? What should they look for in order to identify these species, if they encounter them while at sea?
- 19) Ask the students: “How has this identification practice helped to prepare you for the Enhanced Whale Watch Expedition?”
  - *Possible Answer: It helped them to become familiar with the birds and mammals they are looking for; they may have learned new facts about the different species or learned what the different species look like.*

#### ***Evaluate (2 minutes)***

Ask the students: “Do you feel prepared to identify these different species? What else do you need to know in order to be successful?” Conclude by reminding students that making observations and recording data are all part of being a scientist. This is just one of many opportunities they will have to practice being scientists during this program.







# Enhanced Whale Watching Expedition



## Marine Mammal Identification Guide



**California Sea Lion**

**Size:** Up to 8 feet long.

**Color:** Brown.

**Fun Facts:** Have ear flaps and extended flippers. Often play in surf or sleep on floating buoys.

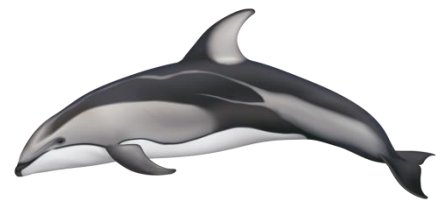


**Common Dolphin**

**Size:** 6 to 8 feet long.

**Color:** Dark grey, white underside, with a yellowish-white hourglass shape on each side.

**Fun Facts:** Often travel in large pods (family groups).



**Pacific White-Sided Dolphin**

**Size:** 6 to 7 feet long.

**Color:** Dark grey with a white underside and whitish side

**Fun Facts:** Usually seen November through March. They like cooler water.



**Humpback Whale**

**Size:** Up to 50 feet long.

**Color:** Dark Grey, with a lighter underside or white markings.

**Fun Facts:** In recent years they have stayed in the area year round. They are very active



**Blue Whale**

**Size:** Up to 100 feet long.

**Color:** Blue-grey.

**Fun Facts:** Has a small, pointed dorsal fin on its back. Commonly seen from May to October. Often travels alone.



**Gray Whale**

**Size:** Up to 50 feet long.

**Color:** Grey, often with visible barnacles on its face and back.

**Fun Facts:** Commonly seen during their migration from December to May. May travel in pairs.

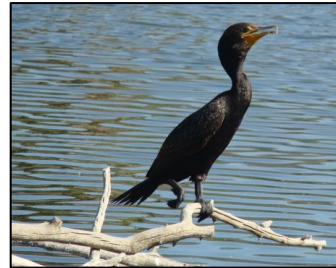




# Enhanced Whale Watching Expedition



## Bird Identification Guide



**Double Crested Cormorant**



**Heermann's Gull**



**Brown Pelican**



**Western Gull**



**Great Egret**



**Ring-billed Gull**



**Snowy Egret**



# Enhanced Whale Watching Expedition Identification Practice



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Bird Identification Practice

### QUIZ 1

#1: \_\_\_\_\_

#3: \_\_\_\_\_

#2: \_\_\_\_\_

#4: \_\_\_\_\_

#5: \_\_\_\_\_



### QUIZ 2

#1: \_\_\_\_\_

#3: \_\_\_\_\_

#2: \_\_\_\_\_

#4: \_\_\_\_\_





# Marine Mammal Identification Practice

Your Observations (Describe the Dorsal Fin, Rostrum, and Coloration)	Species Name
1	
2	
3	
4	
5	
6	
7	





## Activity 2: Plankton Classification

**Time:** 25 minutes

**Location:** In class or as a take-home assignment

### **MATERIALS**

- At least one computer with display capabilities
- (1) Plankton Type Activity Sheet per student (with Teacher Guide)

### **ADVANCE PREPARATION**

- Pull up link to plankton introduction video:  
<http://study.com/academy/lesson/what-is-plankton-definition-types-facts.html>

or

<https://ed.ted.com/lessons/the-secret-life-of-plankton>

- Make copies of the plankton classification worksheet to pass out to the students

### **PROCEDURE**

#### **Engage (1 minute)**

- 1) Inform the students that while on the boat, they will participate in a plankton tow and have the opportunity to look at plankton through a microscope. Ask them what they know about plankton.
  - *Possible Answers: The word plankton comes from the Greek root planktos, which means “drifter”. The most simple definition of Plankton is any living organism that cannot swim against the current, and drifts through the water.*
- 2) Tell students that during the Enhanced Whale Watch Expedition, they will need to be prepared to identify different types of plankton. Before going out on the boat, they will need to understand what plankton is, and be able to explain the differences between the two main types of plankton.

#### **Explore (20 minutes, or 10 minutes with a take-home assignment)**

- 3) Tell the students that you will begin by watching a short video to learn a little bit more about plankton.
- 4) Play the plankton introduction video until the demo portion ends. (If you choose, you may sign up for a free trial to watch the full video.)
- 5) After the video, ask the students: “What did you learn from this video?”
  - *Possible answers: There are different types of plankton. Some are plant-like (phytoplankton) and some are animal-like (zooplankton).*





- 6) Tell students that to prepare for your Enhanced Whale Watch Expedition, you will need to learn more about phytoplankton and zooplankton, and how scientists identify them. Pass out plankton classification worksheet to each student.
- 7) Tell the students to read the first question. Answer the first question together as a class.
  - *Answer: Phytoplankton is a plant-like plankton species, while zooplankton is animal-like.*
- 8) Use “think, pair, share” to brainstorm ways to determine whether a plankton is zooplankton or phytoplankton.
  - *Possible Answers: We can think about what a plankton looks like and how it moves. Animal-like plankton will resemble animals. Many animals that we know well, such as fish and crabs, spend part of their life as tiny plankton. Other zooplankton resemble shrimp or tiny crustaceans. Plant-like plankton will often have chlorophyll, making them green like plants. Phytoplankton will lack “eyespot” and are even smaller than zooplankton.*
- 9) Tell them that the bottom portion of the worksheet shows various species of plankton they will be looking for on the boat. Their job is to determine whether they are phytoplankton or zooplankton and write their answers in the boxes provided.
- 10) Students can complete the bottom portion of the worksheet as an in-class partner assignment, or as a take-home assignment.

#### ***Explain and Expand (5 minutes)***

- 11) Once students have completed the worksheet, go through it together as a class. Ask the students to identify each plankton species. Ask them to explain how they decided whether a species was phytoplankton or zooplankton.
- 12) Once you have gone through all of the answers, ask students to spend a moment discussing with a partner or as a table about how they reached the conclusions they did. What are some common traits of phytoplankton? What are some common traits of zooplankton?
- 13) Finally, discuss with the students how they can remember the difference between phytoplankton and zooplankton.
  - *Ex. Phytoplankton starts with “P”, as in **plant**; Animals live in the **zoo**, like zooplankton.*
- 14) Ask the students: “Most plankton are very small. Why do we want to study them? Why do scientists care about something that is so tiny?”
  - *Possible Answers: Plankton may be tiny, but they are important to the marine food chain. They are eaten by creatures as big as blue whales! As a result, it is important to know if their populations are healthy.*





***Evaluate (1 minutes)***

- 15) Ask the students: “Do you feel prepared to identify plankton on board the Enhanced Whale Watch Expedition? What else do you need to know in order to be successful?”
  
- 16) Conclude by reminding students that making observations and recording data are all part of being a scientist. This is just one of many opportunities they will have to practice being scientists during this program.







# Enhanced Whale Watching Expedition



## Plankton Introduction

Name: \_\_\_\_\_

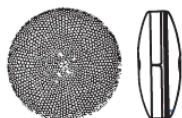
Date: \_\_\_\_\_

**What is the difference between phytoplankton and zooplankton?**

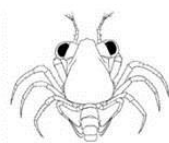
Phytoplankton are \_\_\_\_\_ plankton.

Zooplankton are \_\_\_\_\_ plankton.

**Directions:** Below are pictures of the plankton species that you may see during the Enhanced Whale Watching Expedition. Look at the picture, and decide if the plankton is phytoplankton or zooplankton. Then draw a line connecting the picture to the correct category.



Coscinodiscus



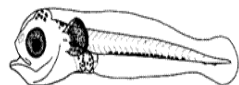
Crab Larva



Ceratium



Copepod



Fish Larva

phytoplankton

zooplankton



# Enhanced Whale Watching Expedition



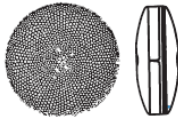
## Teacher Answer Key

What is the difference between phytoplankton and zooplankton?

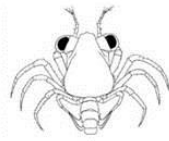
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**Directions:** Below are pictures of the plankton species that you may see during the Enhanced Whale Watching Expedition. Look at the picture, and decide if the plankton is phytoplankton or zooplankton. Then draw a line connecting the picture to the correct category.



Coscinodiscus



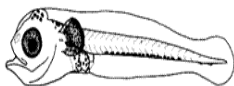
Crab Larva



Ceratium



Copepod



Fish Larva

phytoplankton

zooplankton





## Activity 3: Seal and Sea Lion Meet and Greet

**Time:** 40 minutes

**Location:** In class

### **MATERIALS**

- ❑ (1-2) Seal vs. Sea Lion Fact Sheet per class. There are 30 facts total. Depending on the size of your class, you may want to print out an additional set of facts.

### **ADVANCE PREPARATION**

- ❑ Print out the Harbor Seal Versus California Sea Lion Fact Sheet, and cut each page in half.
- ❑ Separate the facts into harbor seal and California sea lion piles.
- ❑ Pull up the link to Venn diagram website:  
[http://www.readwritethink.org/files/resources/interactives/venn\\_diagrams/](http://www.readwritethink.org/files/resources/interactives/venn_diagrams/)
- ❑ Familiarize yourself with the Venn diagram website, so that you are comfortable with showing the students how it works.
- ❑ If your school has a means of projecting a computer screen for the students, set up projection.


### **PROCEDURE**

#### **Engage (2 minutes)**

- 1) Tell the students that on the boat, they will likely encounter some California sea lions, and hear about the debate surrounding the California sea lion population and how it is affecting the environment and fish populations. After the trip, they will have an opportunity to participate in their own debate on the issue. In order to prepare for this, they will need to know how to identify a California sea lion and how it is different from a seal. They will also need to know that the sea lion population has risen over recent years and it has become an environmental issue for both the sea lions and local fisherman.
- 2) Ask the students: "Harbor seals and California sea lions are different, but they also have some things in common. How can we figure out how they are the same and how they are different?"
  - *Possible answers: Compare and contrast them; create a model of each animal; create a Venn diagram.*
- 3) Tell the students that in order to learn more about the differences between the two species, you will be having a Seal and Sea Lion Meet and Greet. Each student will play the part of either a seal or sea lion. As they mix and mingle, they will meet members of the other species to learn more about them.

#### **Explore (30 minutes)**




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- 4) Divide the class into two groups, seals and sea lions. Pass out one fact about their animal to each student.
  - 5) Tell the students that they will have five minutes to introduce themselves and read their fact to the other students. Seals should focus on meeting sea lions, and vice versa. Tell them they will be responsible for meeting at least three “animals” of the other species and writing down three new facts that they learn on their fact sheet.
  - 6) Give the students 5-10 minutes to meet and learn about each other. As they’re introducing themselves, circulate through the group to make sure that everyone is engaged and recording facts.
  - 7) After the meet and greet, ask each student to find a partner. Give the students a few minutes to share some new facts that they learned with their partner. When they’ve finished, ask two or three pairs to share with the class what they discussed.
  - 8) Then, ask the students to think back on the first question you asked: *“How can we figure out how seals and sea lions are similar, and how seals and sea lions are different?”*
  - 9) Tell students that in order to represent how these species are similar and how they are different, they will be creating a Venn diagram that compares and contrasts the two species.
  - 10) Depending on your school’s computer access and your personal preference, you can decide if the students complete the Venn diagram in small groups or all together as a class.

If you decide to complete the activity as a class:

- Pull up the link for the Venn diagram website. Take a moment to label the circles (with one as “Seal” and the other as “Sea Lion”), and ask students to share facts they learned about the different animals. As you call on students and they share what they learned, type their answers into the website and place the facts in the correct circles.
- Ask the students: “Are there any facts that apply to both species? Where should we put facts that apply to both species?”
  - *Answer: Both animals are pinnipeds and marine mammals. These facts should go in the middle area, between the two circles.*

If you decide to have the students complete the activity in small groups:

- If you’d like to use the website, students will need to work in small groups on computers. Alternatively, they can draw a Venn Diagram on paper.
- 



- Take some time demonstrate how to use the website by creating a sample Venn diagram for the students. (*Ex. apples v. oranges*).

11) Give the students time to complete the Venn diagram using the facts that they learned.

***Explain and Expand (5 minutes)***

12) Once the Venn diagram is completed, you can begin to wrap up the lesson by asking the students: “Do seals and sea lions have some things in common?” (*Yes, there are some traits that they share.*) Then follow up with, “Even so, are seals and sea lions identical, or are there some differences?” (*There are some differences between them.*)

13) Tell them that although the Venn diagram shows us the two species have a couple of things in common, they are different animals, and they behave differently in the wild. When we go on the Enhanced Whale Watch Expedition, students will learn how sea lion behavior has been causing issues up and down the coast of North America. They will also learn how human behavior has had an impact on sea lion populations and that this increase in population causes frustration for fishermen.

14) Ask them to chat with their partners about this question: “Why is it important that we know the differences between seals and sea lions before we go on the Enhanced Whale Watch Expedition?”

- *Possible Answers: It is easy to confuse seals and sea lions because they look so similar to each other. Although these species have similarities, their behaviors, biology, and lifestyles are very different. Being able to identify sea lions from seals will help us when we see them at sea.*

***Evaluate (2 minutes)***

17) Ask the students: “Do you feel prepared to identify sea lions on board the Enhanced Whale Watch Expedition? What else do you need to know in order to be successful?”

18) Conclude by reminding students that we will hear more about how sea lions have been effected by and are affecting humans when we go on the boat!





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion** and I am a member of the *pinniped* group, which means ‘feathered foot’.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am a marine mammal. This means when I was born, my mother gave live birth.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_







# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**. Although I like to swim in the ocean, I also like to haul myself out of the ocean to sleep.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am a marine mammal. This means I drink milk from my mother.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion** and I can live to be over 30 years old.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I can swim up to 25 miles per hour.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion** and I have ear flaps that you can see.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am very social. This means I like to spend time with other sea lions!”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am very loud. I communicate very loudly with other sea lions.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am a marine mammal. This means that I am warm-blooded.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion** and have large flippers that point out, which allow me to ‘walk’ on land.”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am very large. As an adult male, I can weigh up to 800 pounds and be up to 8 feet long!”

Write down three new **harbor seal facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion** and am a marine mammal. This means that I breathe air.”

Write down three new **harbor seal facts** that you learned:

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am a marine mammal. This means that I have a backbone!”

Write down three new **harbor seal facts** that you learned:

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_







# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion** and I am a marine mammal. This means I drink milk from my mother.”

Write down three new **harbor seal facts** that you learned:

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **California sea lion**, and I am a marine mammal. This means I have fur!”

Write down three new **harbor seal facts** that you learned:

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal** and I am a member of the *pinniped* group, which means ‘feathered foot’.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal**, and I am a marine mammal. This means I drink milk from my mother.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal** and my fins point backwards. This means that in order to move on land, I need to wiggle on my belly.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal**, and I spend more time in water than on land.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal** and I am a solitary creature. This means that I like to spend time alone.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal**, and I am smaller than a sea lion. As an adult, I will grow up to 6 feet long and weigh up to 300 pounds.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal** and you cannot see my ears because they are only tiny holes. I do not have ear flaps.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal**, and I am a marine mammal. This means I am warm-blooded.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal** and I am a marine mammal. This means that I have a backbone.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal**, and I am a marine mammal. This means I have fur.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal** and I can live to be up to 25-30 years old.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal**, and I can swim up to 12 miles per hour, although I usually swim much slower.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_





# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal** and I am not very loud. I don’t bark like a sea lion.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_



# Seal and Sea Lion

## Meet and Greet

When you meet someone new, introduce yourself by saying: “Hi, I am a **harbor seal**, and I am a marine mammal. This means that I breathe air.”

Write down three new **California sea lion facts** that you learned:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_







## Activity 4: Gray Whale Adaptations

**Time:** 40 minutes

**Location:** In class or as a take-home assignment

### **MATERIALS**

- (1) Gray Whales and Adaptations Activity Sheet per student (with Teacher Guide)
- (1) Gray Whales and Adaptations reading

### **ADVANCE PREPARATION**

- Make copies of *Gray Whale Adaptations* worksheet.
- Make copies of *Gray Whale Adaptations* reading.
- Decide on how you would like to approach the reading, and make any revisions to the article.

### **PROCEDURE**

#### **Engage (3 minutes)**

- 1) Ask students: “What is an adaptation?”
  - *Possible Answer: An adaptation is a trait or feature that helps an organism to survive. Populations of living things adapt, or change, slowly over time, evolve.*
- 2) Tell the students that in this lesson, they will be learning about some of the adaptations that gray whales use to survive. This will prepare them for the Gray Whale Scavenger Hunt on board the boat, when they’ll search for five items related to gray whales anatomy and physiology.


#### **Explore (25 minutes)**

- 3) If you choose to have the students complete this lesson in class, pass out the Gray Whales and Adaptations reading. Give the students time to read the passage. If necessary, you might start by reading it together as a group.
- 4) Once they have completed the reading, pass out the Gray Whales and Adaptations worksheet. Briefly go over the instructions with the students. Let them know that they are responsible for using the reading and word bank provided to fill in the blanks and complete the worksheet.
- 5) Give the students time to complete the worksheet. As they’re working, circulate between students to make sure they understand and are staying on task.

#### **Explain and Expand (10 minutes)**

- 6) Ask students: “Based on your reading, what are some gray whale adaptations?”
  - *Possible Answers: Gray whales have two small blowholes to help them breathe. They use baleen to eat amphipods. They have blubber to help them stay warm. They also migrate between Alaska and Mexico*



- 
- 7) Go over the worksheet with the students. Call on one student to read each sentence with their answer filled in.
  - 8) Ask the students why they think this assignment was important in preparing for the boat.
    - *Possible Answers: to learn background information on gray whales; to learn how marine mammals survive; to prepare for gray whale scavenger hunt; to know what to look for when observing marine wildlife.*

***Evaluate (2 minutes)***

- 9) Collect the worksheets from the students in order to give them credit for participating in the lesson.
- 19) Ask the students: “Do you feel like you know enough about gray whales to complete the Gray Whale Scavenger Hunt during the Enhanced Whale Watch Expedition? What else do you need to know in order to be successful?”
- 20) Conclude by reminding students that we will learn more about gray whales when we go on the boat!





## Gray Whale Adaptations

How do animals stay alive? Often, they rely on **adaptations**. These are behavioral and physical changes, to their bodies, that have developed over a very long time. Adaptations help animals survive in their natural habitat.


Although gray whales live their lives under the sea, they are marine mammals, not fish. This means they breathe air using their lungs at the surface of the water. Instead of breathing air through a nose, gray whales have two small **blowholes** on top of their head. When gray whales come to the oceans' surface, they breathe air out of their lungs forming a spout of mist. They then breathe air back in through these blowholes. Gray whales can hold their breath for up to fifteen minutes underwater!

Like all animals, gray whales must find and hunt their food to survive. Gray whales eat tiny, shrimp-like crustaceans called **amphipods**. They have a special type of adaptation called **baleen** to help them eat. Baleen is a comb-like set of "teeth", made of the same material as your fingernails, keratin. Gray whales have to dive down to the bottom of the sea floor and scoop up a mouth full of soft mud. The mud is filled with tubeworms and amphipods. They then push the watery mud out through their baleen plates. Amphipods get stuck in the small spaces of the broom shaped baleen, and then the whale swallows them. Yum!

Gray whales live in the Pacific Ocean. The ocean water can get very cold. Gray whales do not have a warm fur coat like a dog or cat might have to hold their body heat in. Instead, they stay warm thanks to **blubber**. This is a layer of thick fat under their skin. Blubber traps the whale's body heat and keeps them warm in cold Alaskan waters, just like wearing a sweater.

The behavior of gray whales is another type of adaptation. Gray whales **migrate**, or travel, between Mexico and Alaska. There is an abundance of gray whale food in Alaska, but it is also a very cold environment, especially in winter months. Therefore, in autumn, gray whales travel to warm waters near Mexico allowing females to have their babies in a safe, warm place. In the spring, when the babies are big enough, gray whales migrate back to Alaska.

If you're on board the Enhanced Whale Watch Expedition between November and April, you may be lucky enough to see a gray whale!





# Enhanced Whale Watching Expedition



## Gray Whale Adaptations

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Read the “Gray Whale Adaptations” article. Once you’re done, use the word bank to fill in the blanks in the following sentences.

adaptations	amphipods	baleen
blubber	blowholes	mammals
migrate	spout	

1. \_\_\_\_\_ are traits that help animals to stay alive.
2. Gray whales are marine \_\_\_\_\_, not fish.
3. Gray whales breathe through their two \_\_\_\_\_.
4. When gray whales breathe, they let out a \_\_\_\_\_.
5. Gray whales use \_\_\_\_\_, a comb-like structure, to eat.
6. Gray whales love to eat \_\_\_\_\_, a tiny shrimp-like crustacean.
7. Gray whales have \_\_\_\_\_ to keep them warm in cold water.
8. Mother gray whales \_\_\_\_\_ to warm waters in order to give birth in a safe, warm place.





# Enhanced Whale Watching Expedition

## Conclusion and getting ready to go!

### **PROCEDURE**

#### **Explain and Expand**

- 1) After students have completed all four mini lessons, tell them that you are now going to talk about how this helped them to prepare for the enhanced whale watch.
- 2) Ask the students to reflect on what they learned during these five lessons. Give them a moment to think, and then ask the following questions to the class:
  - What scientific research will we be participating in on board the boat?  
*Possible Answers: We will need to identify birds and marine mammals. We will participate in a plankton tow, and then try to identify zooplankton and phytoplankton. We will also be learning about California sea lions and preparing for a sea lion debate, and participating in a Gray Whale Scavenger Hunt.*
  - What tools/resources will we be able to use to conduct our research? How will they be helpful?  
*Possible Answers: Each of our research groups will receive an Expedition Backpack with the gear we need inside. We'll use field guides to identify birds and marine mammal species. We will use microscopes to observe and identify plankton.*
  - What animals you think we will see on the boat?  
*Possible Answers: Answers will vary; birds, dolphins, whales, sea lions, plankton, etc.*
- 3) The students will now continue this discussion with a partner, or table group. Ask each pair, or group, to discuss the following questions:
  - Why is it important for us to conduct research on bird populations and marine mammal populations? How can we benefit from learning about and observing plankton?
  - Why is it important to keep track of what marine mammals we see?
  - How will the data we collect be helpful to scientists?
- 4) Give students 5 minutes to discuss. When they are done, ask each group or pair to share something that they discussed.

#### **Evaluate**

- 5) Finally, wrap up the class discussion by asking the students: "Do you feel prepared to collect data on the boat? Is there anything else that you think you need to know?"





- 6) Ask each student to share one thing they are looking forward to doing on the trip. We look forward to seeing you on the water soon!

