







Practice


Use this unit and other references to find the **favorite food(s)** and **habitat(s)** of these **marine mammals**. Write **all** letters that apply on the line provided.


_____ 1. 
polar bear

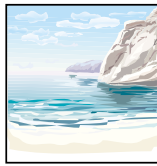
_____ 2. 
manatee


_____ 3. 
walrus

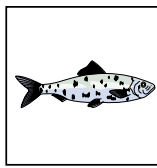
_____ 4. 
sea otter

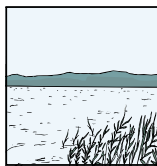
_____ 5. 
dolphin


_____ 6. 
killer whale

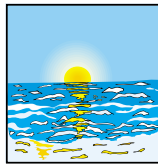
A. 
coastal cliffs

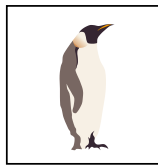
B. 
deep sea water


C. 
fish


D. 
grassbeds


E. 
ice packs, icebergs

F. 
open water

G. 
penguins

H. 
shallow, warm

I. 
shellfish, oysters

J. 
seals



Practice

Use this unit and reference books to answer the following using short answers.

1. What is *echolocation*? _____

2. What is *bradycardia*? _____

3. Why were seals and sea lions nearly hunted to extinction? _____

4. Into what two groups are whales divided? _____

5. Why and how are manatees protected? _____

6. How does the layer of blubber under the skin of seals help them?

7. How will the playful behavior of sea lion and seal pups be used as adults? _____



Practice

*In this activity, you will use your math skills to **calculate feeding rates of whales and compare this to the feeding rates of humans.** Show all work. Place a **box** around your final answer.*

Conversion Information:

- A typical human weighs 150 pounds and takes in 3,000 calories a day.
- A typical whale weighs 50 tons and needs 395,000 calories a day.
- A whale may spend 15 hours a day feeding during the summer season.
- A whale can swim at speeds of 1.5 meters per second while feeding.
- A whale can open its mouth 1.5 square meters wide.
- Right whales feed where plankton densities (thickness) are 4,000 to 15,000 per cubic meters.

Problems:

1. How many **cubic meters** of water enter the **open** mouth of the whale each **minute** as it moves through the water at 1.5 meters per second? _____
2. How many plankton can a whale ingest **per second** if the density is 4,000 per cubic meter? _____
3. How many plankton can a whale ingest **per second** if the density is 15,000 per cubic meter? _____



4. How many plankton can a whale ingest **per minute** if the density is 4,000 per cubic meter? _____
5. If a whale ingests 500,000 calories **per day**, how many calories is it ingesting **per hour**? _____
6. If a whale ingest 500,000 calories **per day**, how many calories is it ingesting **per minute**? _____
7. Complete the following investigation. Tomorrow, keep track of your own food consumption. Complete the chart below with your results.

number of minutes you spent feeding	number of calories ingested	number of calories ingested per minute
_____	_____	_____

8. Compare your caloric intake per minute with that of a whale. Who has the higher caloric rate? _____
9. What factors account for the difference in caloric intake? _____



Practice

Use this unit and other reference books to complete the chart below. List the **characteristics** of each of the **marine mammals** in a few words or phrases.

Comparison of Marine Mammals						
Mammal	Mammal Characteristics					
	nostrils	special features	appendages	diet	enemies	habitat
baleen whales						
sperm whales						
dolphins						
seals						
sea lions						
manatees						
walruses						
polar bears						
sea otters						



Lab Activity 1: Observing Dolphins



Investigate:

- Observe dolphins and record data on eating, swimming, and breathing habits.

Materials:

- pencil
- paper
- video or laser disc

Procedure:

Observe a dolphin in an aquarium, in the wild, or on a video or laser disc.

Analysis:

1. Where did you observe the dolphin? _____

2. What kind of dolphin was it? _____
3. Describe its shape and color. _____

4. When is the blowhole open? _____
5. When is the blowhole closed? _____
6. Count the number of times the blowhole opens and closes. How many times does the dolphin breathe per minute? _____



7. Watch the dolphin swim. How does its streamlined shape affect its speed? _____

8. Is the movement of the dolphin's fluke vertical or horizontal? How does this direction of movement help the dolphin? _____

9. Watch the front flipper's movement as the dolphin swims. What is the function of the front flippers? _____



Lab Activity 2: Marine Mammal Population



Investigate:

- Investigate how hunting has affected the populations of marine mammals and study specific laws that protect marine mammals.

Materials:

- reference books
- paper
- pencil
- video programs

Procedure:

1. Research a marine mammal of your choice.
2. Present your research in a poster presentation or a video presentation.

Analysis:

1. How has hunting affected the species' population? _____

2. Is the selected species considered endangered? _____
3. Which laws protect this species? _____



Lab Activity 3: Bradycardia



Investigate:

- See if humans show the same diving responses as marine animals.

Materials:

- dish pan
- cold tap water
- towels
- stopwatch or watch with a second hand

Procedure:

1. Work in pairs. Record all data as you collect it on the data chart. Sit quietly for two minutes. During this time, your partner can practice taking your pulse. After the two-minute rest, have your partner count the pulse for 15 seconds. Multiply this number by four to find the number of heart beats per minute and record this figure on your chart. Repeat the above twice more, and determine the average for the three trials.
2. Rest for two minutes.
3. After the rest, practice holding your breath for 35-second periods without activity. Rest for one minute between trials.
4. While holding your breath for 35 seconds, have your partner count your pulse the *last 15 seconds of the 35-second period*. Rest and repeat twice more, and determine the average of the three trials.
5. *Practice* holding your breath with your face in the pan of cold water for 35 seconds. Submerge your face up to your ears. Have towels ready. When you have your self-confidence established and can do it without excitement, you are ready for the next test.



6. With your face in the water up to your ears, have your pulse measured the *last 15 seconds of the 35-second period*. Repeat twice more and determine an average for the three trials, as before. Rest briefly and catch your breath before proceeding to the next procedure.
7. Exercise strenuously for two minutes (run in place, do push-ups, sit-ups, jumping jacks). Have your partner determine your pulse *immediately*. Record the beats per minute on the data chart. Repeat step 2 twice more and determine the average rate for the three trials.
8. Empty and rinse the pan when finished. Assist your partner; repeat the experiment and collect the data.
9. Clean up the counters, floor, sinks, and spread the towels out to dry.

Bradycardia Experiment					
Activity	Pulse Measurements in Beats per Minute				
	resting	1st trial	2nd trial	3rd trial	average
1. Hold breath for 35 seconds; check the last 15 seconds.					
2. Hold face in cold water for 35 seconds; check pulse the last 15 seconds.					
3. Immediately after two minutes of strenuous exercise, check the pulse again.					



Lab Activity 4: Whale Migrations



Investigate:

- Use mapping skills to plot the migration patterns of four unknown whales. After studying the plotted migrations, determine the sex and age of the whales.

Materials:

- map with coordinates of the east coast of the United States
- whale migration data
- colored pencils

Procedure:

1. Read the background information to obtain working knowledge about whale migration.
2. Using the *latitude* and *longitude* coordinates from the data chart, plot the migrations of each of the four whales. Plot each whale's migration in a different color. Be sure to include a map legend explaining the color key for each whale.
3. Mark each coordinate on the map with a solid triangle pointed downward for the trip south. Use an open triangle pointed upward for the trip back north.

Background information:

Some whales spend the spring off the coast of New England, where they eat plenty of plankton. In the early summer, they head north to breeding and nursery area in the Bay of Fundy and in areas south of Nova Scotia. In the winter, some of the adult females migrate to the coastal waters off the southeastern United States. They particularly like the shallow waters from Savannah, Georgia southward to Cape Canaveral, Florida. Very few juveniles or males migrate to this region. Often, females are alone early in the season. They give birth to their calves and then move back north. Scientist believe that most births occur between December and March. This is the only known calving area for some whales, and it is unknown where the nonpregnant females go.

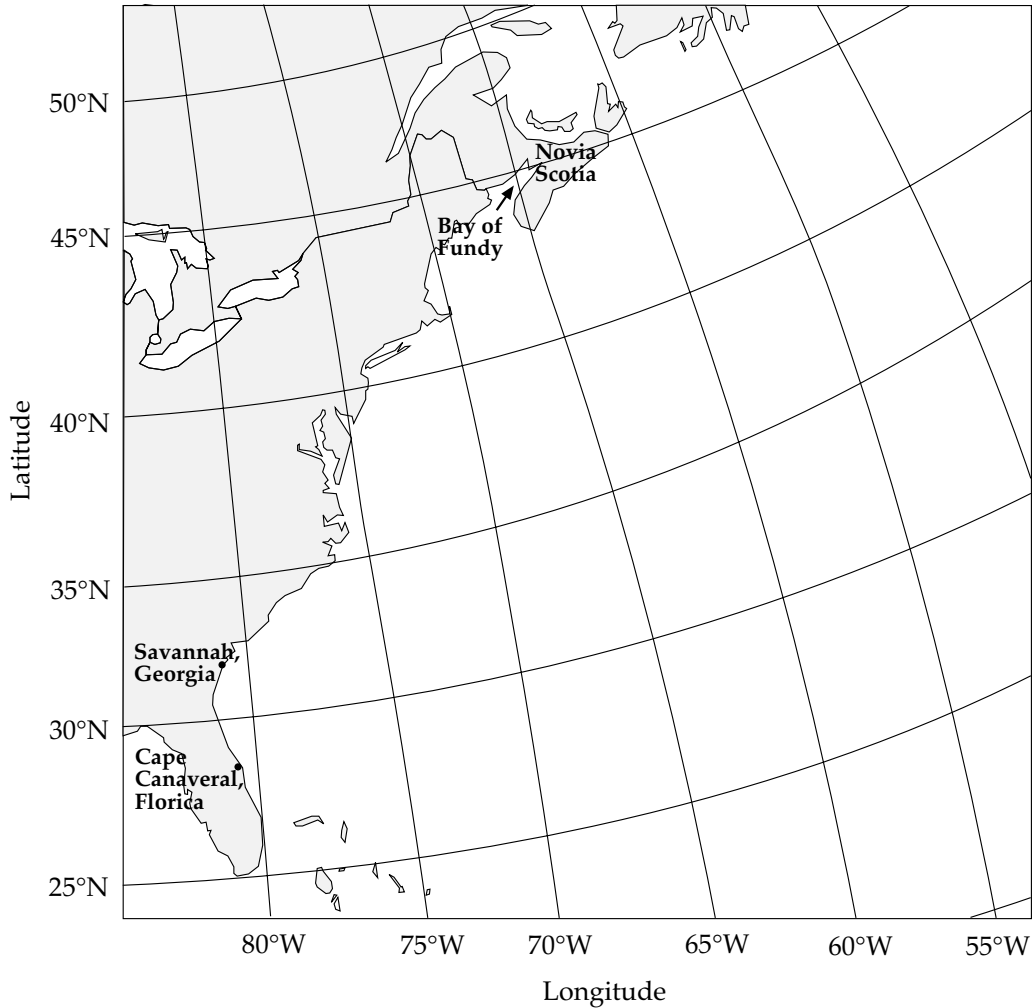


Data

Whale #1		Whale #2		Whale #3		Whale #4	
Date	Lat/Long	Date	Lat/Long	Date	Lat/Long	Date	Lat/Long
6 - 01	45/66	6 - 02	45/66	6 - 03	45/66	12 - 02	31/80
6 - 21	44/66	6 - 21	44/66	6 - 21	44/66	12 - 24	30/80
7 - 04	43/69	7 - 03	45/67	7 - 25	43/69	1 - 05	30/81
7 - 25	40/72	7 - 27	44/67	8 - 28	42/70	2 - 28	32/80
8 - 19	39/73	8 - 06	43/67	9 - 07	40/72	3 - 07	34/77
9 - 25	38/74	8 - 31	42/67	9 - 12	37/43	3 - 17	36/75
10 - 25	34/76	9 - 05	42/64	9 - 14	37/47	4 - 01	39/74
11 - 03	33/79	5 - 02	43/67	10 - 05	34/76	4 - 04	41/70
11 - 07	32/80	5 - 18	44/66	1 - 31	31/80	5 - 01	42/69
11 - 19	31/80	5 - 20	45/67	2 - 12	32/78	5 - 20	44/68
12 - 23	1/81	2 - 19	34/75	5 - 25	45/67		
12 - 24	30/80	3 - 17	36/73				
1 - 05	30/81	4 - 02	40/72				
2 - 28	32/80	5 - 15	43/69				
3 - 07	34/77	5 - 18	42/68				
3 - 17	36/75	5 - 21	44/69				
4 - 01	39/74	5 - 25	45/66				
4 - 04	41/70						
5 - 01	42/69						
5 - 20	44/68						
5 - 25	45/67						



Sighting Map



Analysis:

1. State if each whale was male or female.

whale 1: _____ ; whale 2: _____ ;

whale 3: _____ ; whale 4: _____

2. State a logical reason as to how you determined the sex of each whale.

whale 1: _____



whale 2: _____

whale 3: _____

whale 4: _____

3. State if each whale is less than one year old, a juvenile, or an adult. whale 1: _____ ; whale 2: _____ ; whale 3: _____ ; whale 4: _____

4. State a logical reason as to how you determined the age of each whale.

whale 1: _____

whale 2: _____

whale 3: _____

whale 4: _____

5. What benefit does this journey provide for each whale?

whale 1: _____

whale 2: _____



whale 3: _____

whale 4: _____

6. What are some of the hazards the whales may encounter during their migrations? _____

7. List the areas within the routes that cause greater risks to the whales. _____

8. Determine the average distance traveled between sightings for each whale. Round to nearest hundredth.

whale 1: _____

whale 2: _____

whale 3: _____

whale 4: _____

9. Determine the average traveling speed for each whale. Round to nearest hundredth.

whale 1: _____ ; whale 2: _____ ;

whale 3: _____ ; whale 4: _____



Practice

Use the list below to write the correct term for each definition on the line provided.

baleen whales	endangered	melon
blowhole	flippers	moratorium
blubber	fluke	toothed whales
echolocation		

- _____ 1. whales which have teeth
Examples: sperm whale, dolphin
- _____ 2. opening located on the top of the head of whales and dolphins, used for obtaining oxygen
- _____ 3. whales without teeth but with rows of whalebone plates that act as a sieve for feeding
Example: blue whale
- _____ 4. a legal ban; a legally authorized period of delay
- _____ 5. front limbs of dolphins, other whales, and seals; used for balancing and steering
- _____ 6. fatty areas on the forehead of whales, including dolphins, that controls the reception of pulses and echolocation
- _____ 7. the fat of marine animals, which is used to keep the animal warm
- _____ 8. tail fin of whales, including dolphins
- _____ 9. use of sounds to locate objects
- _____ 10. in danger of extinction due to natural or manmade factors