Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour \_\_\_\_\_\_\_\_

Purple **Sound Vibration Station 5: Elephant Seals Rhythm and Pitch Article**

(20 point formative assessment)

**Part I Comprehension Questions Directions:** Use the article to answer the questions below; write the letter of the answer on the line provided.

Read the list of sentences from the article:

1. Vocalizations, including animal sounds and human speech, have rhythm, too.

2. The rhythm in our speech is part of how we recognize the voices of people we know.

3. Casey had previously shown that elephant seals can identify the calls of their rivals.

4. However, when the beta males heard the call with a considerably modified rhythm, they took no notice.

\_\_\_\_\_1. Which two sentences taken together provide the BEST evidence to support the idea that seals use rhythm to differentiate each other’s voices?

 (A) 1 and 2 (C) 2 and 4

 (B) 2 and 3 (D) 1 and 4

According to the article, the careful design of the study enabled a better understanding of the elephant seal's communication patterns.

\_\_\_\_\_2. Which paragraph BEST supports the idea outlined above?

 (A) Just as a musician divides a beat into long and short tones, a seal also subdivides the pulses of its calls. This study modified the tempo, or number of beats per minute, but Mathevon thinks the seals may even decipher rhythms at a finer level involving complex subdivisions of the beat.

 (B) “This research was beautifully designed,” said Andrea Ravignani, a researcher at the Seal Rehabilitation and Research Center in Pieterburen, Netherlands. His work focuses on the evolutionary basis of rhythm and the origins of music.

 (C) Unlike most projects, which use musical recordings to understand how animals make sense of rhythm, this study uses the animal's own calls, which Ravignani said “is more ecologically relevant.”

 (D) The next step in Mathevon’s research will be to look at the seal rhythms on a finer scale, by modifying more aspects of their calls. He plans to also examine female-to-female conversations, as well as communication between adults and their young.

\_\_\_\_\_3. Which of these statements would be MOST important to include in an objective summary of the article?

 (A) Mathevon likely observed the elephant seals for longer than was necessary in order to become more accustomed to recognizing individual animals by their voice rhythms.

 (B) The findings of the current study on the importance of rhythm to elephant seal communication provide important insight to human appreciation for rhythm.

 (C) The researchers quickly jumped to the conclusion that the rhythm of seals' calls is vital to their ability to recognize each other’s' voices.

 (D) Mathevon's research must continue to investigate seal rhythms in order to make the findings of this study truly significant.

\_\_\_\_\_4. The CENTRAL idea of the article is developed by:

 (A) describing the design and findings of a new study and outlining the implications of its discovery

 (B) incorporating quotes from leaders in the field on the importance of well-designed animal studies

 (C) highlighting how social mammals react to variations in rhythm in music

 (D) illustrating the importance of communication in seal interactions over mating

**Part II ABC Vocabulary Directions:** Use the article to list any vocabulary words that you think might be important in the ‘how do sound waves behave?” unit in the spaces below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | E |
| F | G | H | I | J |
| K | L | M | N | O |
| P | Q | R | S | T |
| U | V | W | X | y |

**Part 1V:** Write a summary using four of the above words (circle the vocab words in your paragraph) and two pieces of textual evidence (underline the textual evidence). (5 sentences min)

 **Science**

**Elephant seals recognize rhythm and pitch to avoid bullies, study says**

By PBS NewsHour, adapted by Newsela staff

Text Level **8**

07/26/2017

Word Count **727**

We recognize friends on the phone by just their voice. We can figure out who is on the other end of the line because of our ability to recognize tone, pitch, and rhythm.

In music or dance, rhythm is a repeated pattern of movement or sound. Vocalizations, including animal sounds and human speech, have rhythm, too. When we speak, we arrange every sound into stressed and unstressed sounds. The rhythm in our speech is part of how we recognize the voices of people we know.

Humans are not the only mammals with this ability, it turns out. New research shows that elephant seals can pick up on differences in rhythm, too.

**First Mammal Other Than Humans To Show Behavior**

Male elephant seals can recognize their rivals by rhythmic patterns in the seals' calls, according to a new study recently published in the journal Current Biology. Elephant seals are the first mammal other than humans to show this behavior. The discovery may help explain why humans enjoy rhythmic things like music and dance.

To uncover this behavior, scientist Nicolas Mathevon headed out before sunrise to the Ano Nuevo State Park in California. There, more than 4,000 elephant seals gather on the beach from December to March to mate and give birth. At the start of the season, male seals battle to establish a pecking order, sometimes fighting to the death. The strongest ones are then in charge.

“It is a high-stakes environment,” Caroline Casey, a scientist and co-author of the new study said. “We wanted to know what these animals are saying to each other – what information is embedded in these calls that the seals use to avoid a fight, and which components of the calls are important.”

Casey had previously shown that elephant seals can identify the calls of their rivals. Dominant “alpha” males sing out to warn low-ranking seals to stay away or fight.

**Animals Studied For Five Years**

Mathevon, Casey and their team observed these animals up close for five years. Eventually, they became accustomed to recognizing individual animals by the rhythms of their voices. They wondered if the seals could do the same.

To find out, the team recorded the vocalizations of a dominant male elephant seal. Back in the lab, they used a computer program to create two variations of the song, modifying only the rhythm and leaving all other natural qualities of the vocalization.

Armed with the original and modified recordings, they sounded first one and then the other version of the alpha male calls to 10 "beta," or less dominant males. Upon hearing the original call, the lowly beta males retreated, as they would do when avoiding a fight. However, when the beta males heard the call with a considerably modified rhythm, they took no notice. That led the researchers to conclude that the rhythm of a call is key to its recognition.

**"Recognize Members Of Their Network"**

“All social mammals have to recognize members of their network,” said Mathevon. “To navigate in the social network, you have to know who is who. What is special about this study is it’s the first time that we found a mammal that uses a rhythm to support an individual’s unique [vocalization] signature.”

Just as a musician divides a beat into long and short tones, a seal also subdivides the pulses of its calls. This study modified the tempo, or number of beats per minute, but Mathevon thinks the seals may even decipher rhythms at a finer level involving complex subdivisions of the beat.

“This research was beautifully designed,” said Andrea Ravignani, a researcher at the Seal Rehabilitation and Research Center in Pieterburen, Netherlands. His work focuses on the evolutionary basis of rhythm and the origins of music.

**Music To Their Ears**

Unlike most projects, which use musical recordings to understand how animals make sense of rhythm, this study uses the animal's own calls, which Ravignani said “is more ecologically relevant.”

“Everybody loves music — but we don’t understand why,” Ravignani said. Mathevon's study, he added, brings us closer to understanding why humans like language and music, simply by having another species for comparison.

The next step in Mathevon’s research will be to look at the seal rhythms on a finer scale, by modifying more aspects of their calls. He plans to also examine female-to-female conversations, as well as communication between adults and their young.