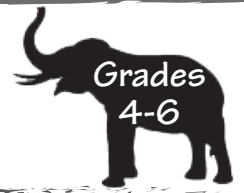




What do social elephants talk about?



This lesson will introduce students to the variety of vocalizations elephants use to communicate important information in a complex social environment. Through an online video, students will identify and explain the meaning of four different vocalizations between individuals in an elephant family.

Subject Area: Science

Background Information: Pages 7-8

Vocabulary: Bull, frequency, Hertz (Hz), infrasonic sound, matriarch, spectrogram, vocalization

Students will be able to:

- Understand elephants live in a complex social environment;
- Recognize elephant communication is crucial to social interactions;
- Define elephant infrasonic vocalizations;
- Describe how a spectrogram helps scientists study elephant communication;
- Identify multiple elephant vocalizations and their meanings.

Materials:

- Activity Sheet 11: Elephant Talk Questions
- Computers with internet access
- Activity Sheet 12: (Extension Only) Who Makes up an Elephant Family?
- Activity Sheet 13: (Extension Only) EleMessage Worksheet

Learning Activities

Preparation

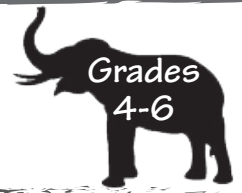
1. The students will work in pairs for this activity. Print off one copy of activity sheet 11 for every two pairs.
2. Prepare the introductory video “The Secret Language of Elephants”. The video can be found at <http://www.birds.cornell.edu/brp/elephant>. The video is at the bottom left of the screen and is just over 14 minutes long.

Activity

3. Introduce students to the intricate social structure of elephant families. In other lessons, the focus has been on savanna elephants, but this lesson will feature forest elephants. Forest elephants are found in the Democratic Republic of Congo, Central African Republic, Cameroon, Equatorial Guinea, Gabon, the Congo Republic. These populations of elephants live in the forest rather than the savanna grasslands. For more information on forest elephants refer to (<http://www.birds.cornell.edu/brp/elephant/cyclotis/cyclotis.html>) African forest elephants are typically smaller than savanna elephants with thin, straight tusks. Tell students they will be learning about elephant social life and communication. All elephants are highly intelligent animals that display complex social behaviors. What type of elephant behaviors can you name? *Some elephant behaviors are: feeding, walking, drinking, swimming, greetings, group defense, vocal communication, social play, courtship, parenting, teaching, and charging.* Who do you think makes up an elephant family? *An African forest elephant family group is about 7 individuals. These female-led herds usually consist of adult daughters, their calves, and a number of juvenile male and female offspring. The matriarch, typically an older female, leads the herd and makes decisions to ensure the survival of the family. Female herd members are usually related, but occasionally non-related individuals join to form families.*



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Adult males, called bulls, leave the herd upon maturity (12-13 years of age) and live a mostly solitary life except when they associate with other bulls or females ready to breed.

4. Continue the discussion introducing elephant communication. To be successful in such complex social environments, elephants have developed a sophisticated communication system. What types of vocalizations do elephants make? *Elephants communicate using many different vocalizations, e.g. rumble, trumpets, snorts and even sounds so low in pitch that we cannot hear them.*

5. Now, build on this information by showing the video “The Secret Language of Elephants.”

6. Lead a short discussion to review the video. What vocalizations do elephants use to communicate? *Elephants use many different vocalizations: roar, contact rumble, protest call, calf cry, bull musth rumbles, and even infrasonic sounds.* What do the contact rumble, calf cry or scream, bull roar, and elephant trumpet mean? *The contact rumble is given between elephants who are trying to find the location of each other. The calf cry/scream is given by a baby that is displeased, fears something, or has lost its mother. A bull roars to alert other elephants it is not happy. An elephant will trumpet when it is excited, positively or negatively, about a current situation.* What scientific techniques and tools do the researchers use to study elephants? *Scientist used binoculars, observation towers, cameras, headphones, acoustic recording devices, microphones, the internet, and spectrograms.*

7. Interpret spectrograms to the students to further explain their usefulness in studying infrasonic sounds. Display the spectrogram sheet and point out its key elements using the background information.

8. Divide students into pairs and give one Activity Sheet 11 to each pair.

9. Instruct the students to click on the link below that will take them to the Elephant Listening Project website. On the webpage (pictured above) they will find 4 videos of spectrograms, elephant behavior and a short description of each communication. After reviewing all four videos have students answer the three questions about each video on their Activity Sheet.

<http://www.birds.cornell.edu/brp/elephant/cyclotis/language/eletalk.html>

FOREST ELEPHANT TALK

Elephants are very vocal creatures and yet humans didn't really know this until Katy Payne discovered in 1984 that much of their talk can be below the threshold of our hearing (termed **INFRASOUND**). At the Dzanga Bai in the Central African Republic, ELP researchers made a rough estimate that we may hear only about 40% of all the calls produced. (How did we know how many calls there were? We used an 'acoustic array'.)

Below are some examples of the many types of calls that forest elephants use to communicate with one another. Notice that sometimes you can see an elephant open its mouth to vocalize, but often it is very difficult to tell who is calling and who is listening!

A mixture of rumbles, trumpets and yells

In this clip a sitatunga (an antelope) jumps out of a hollow tree off-camera and startles the Pia family and the Noor family. As they huddle together they rumble, trumpet, and scream. Pia is about 40 years old here and is with her fourth offspring, 2-year-old Pia V. Noor is about 38 and is with her fourth offspring, 2-year-old Noor V.

A lost infant - where's mom?

This unknown infant appears lost! He rumbles and screams as he searches. He also smells the air and listens for something.

A wayward infant is rescued

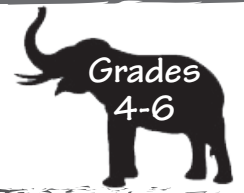
This video features the Penelope family and the Gonya family. Gonya II pushes Penny, who is only a few weeks old, and Penny's scream gets the attention of Penny's family. First a couple of Gonya's family arrive (Gonya II also has a young infant just behind her), then the Penelope's rush over and group around Penny. There are a variety of alarm calls, trumpets, and rumbling throughout the ordeal.

A mix of calls between two males

A young adult male advances towards Gabin, an older male (golden yellow). You will see the younger male flap his ears as he gives a soft rumble, then he runs at Gabin in challenge. The two males clash and probably it is the younger male who roars as he gets shoved away by Gabin. Then Gabin gives two rumbles, each time accompanied by flaps of his ears.



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Discussion

10. After every group has completed their activity sheet, lead a summary discussion on elephant social structure and communication to encourage the students to critically think about elephant vocalizations and their meanings.

Summary Discussion

11. Who are the members of a typical elephant family group?

The matriarch of the family, the oldest female, leads the family group in all major decisions. Older females, such as sisters and aunts, and the matriarch assist in raising younger members and comprise most of the group. Younger bulls, or males, are accepted until they start to reach maturity. Calves are the youngest members of the groups and rely on all family members, not just their mother, for survival.

12. How does communication play a role in elephant society?

Living in a complex, social group of intelligent animals requires a big vocabulary. There is a lot to learn and say. Multiple vocalizations are needed to convey the array of social interactions and complex emotions in elephant society.

13. What is the purpose of a spectrogram? Why is important to use in studying elephant communication?

A large majority of elephant communication occurs at the infrasonic level, which is sound below our hearing. Average human hearing does not go below 20 Hz.. Spectrograms however, allow us to see this communication; the visual representation allows scientists to look at the vocalization and match vocalizations to behaviors. Sound enables scientists to locate forest elephants in dense trees.

Extensions

People do not use infrasonic sound to communicate. Rather we use cell phones and text messaging for long distance communication. Students can develop elephant “text messages” based off of what they have learned elephants talk about. Encourage students to get creative and develop a text message conversation between members in the elephant family. What would they be saying to each other?

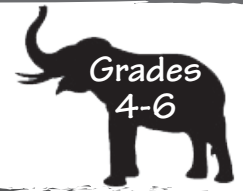
<http://www.birds.cornell.edu/brp/elephant/index.html>

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





What do social elephants talk about?



Activity Sheet 11

Visit <http://www.birds.cornell.edu/brp/elephant/cyclotis/language/eletalk.html> to watch four videos on elephant communication. Read, listen, and watch the four videos then answer the following questions for each.

Name the type(s) of vocalizations ? _____

1 What are these elephants saying? _____

Who responds and what was the response? _____

Name the type(s) of vocalizations ? _____

2 What are these elephants saying? _____

Who responds and what was the response? _____

Name the type(s) of vocalizations ? _____

3 What are these elephants saying? _____

Who responds and what was the response? _____

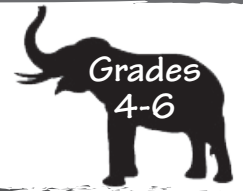
Name the type(s) of vocalizations ? _____

4 What are these elephants saying? _____

Who responds and what was the response? _____



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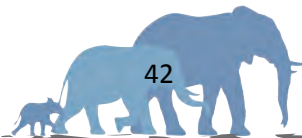
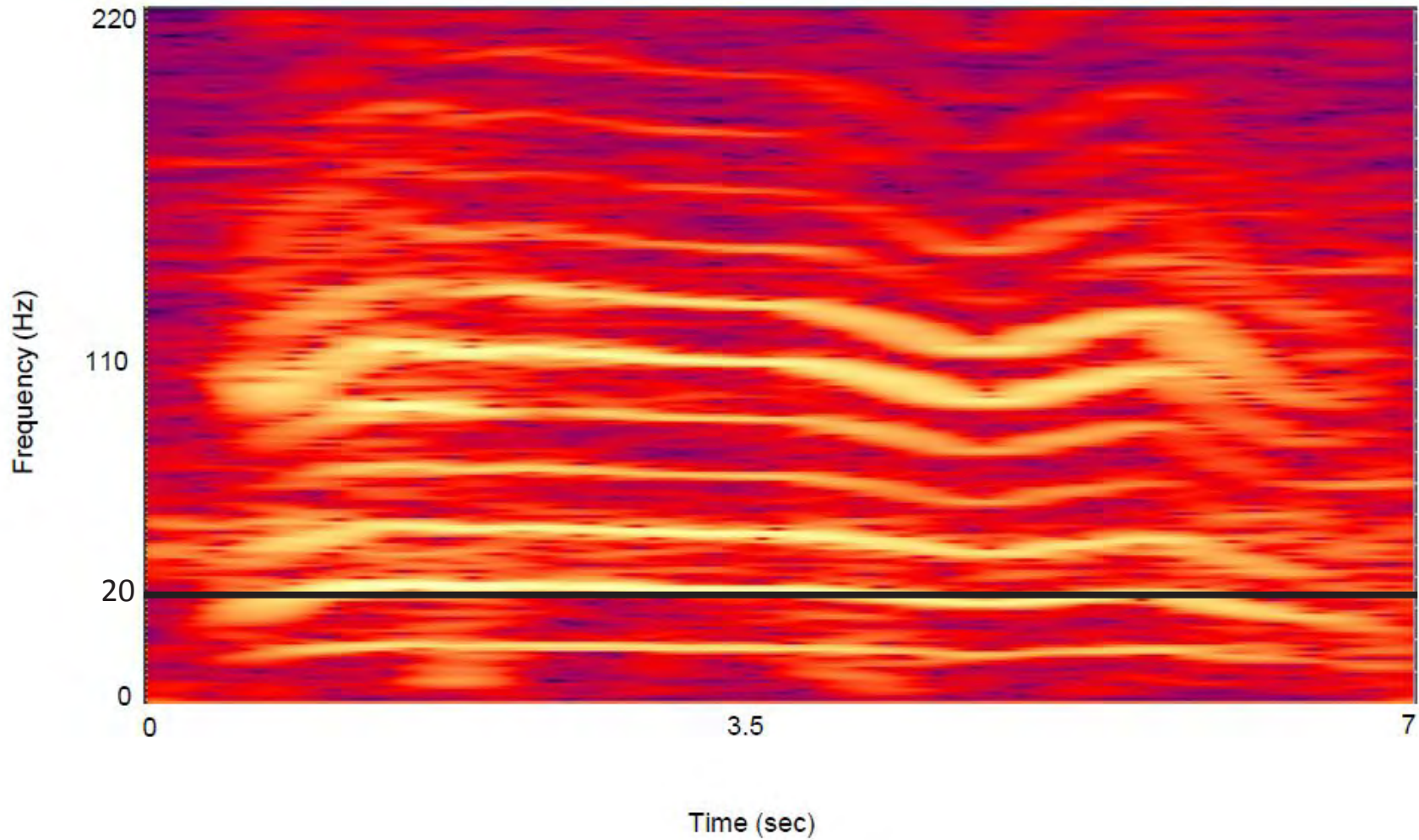
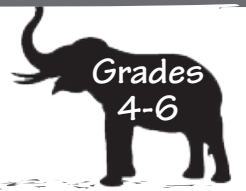
Name the type(s) of vocalizations ? _____

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Who responds and what was the response? _____

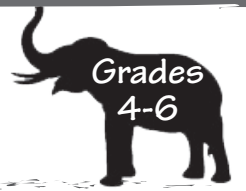


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Activity Sheet 12

Who makes up an elephant family?



Matriarch

In general, older, experienced females, called matriarchs, lead elephant families. She makes decisions to protect her entire family group. Female elephants maintain lifelong relationships with their immediate relatives, particularly their female offspring. Through her excellent social skills, she regularly and consistently builds, maintains and reinforces the close bonds within her family.



Adult sister

Becoming more independent in the family group. Younger females often assist their mothers with calf care and provide allomothering, or non-maternal care, for younger calves in the herd.



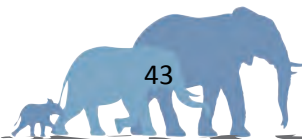
Younger brother

Male, or bull, elephants have very different social needs than do the females. Male elephants leave or are driven out of the family group as they approach adulthood. Males spend as much as 95% of their adult lives alone or in loose association with other bulls. In early years of adulthood, the bulls spend time learning the personalities and strength of other bulls in their area and establish a social hierarchy and status within the area.



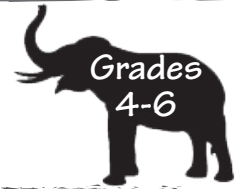
Baby

The baby, or calf, spends most of her day around mom. Older females will help the mother in raising the calf. Not only does this raise the likelihood of a calf surviving but it also strengthens the bond among the entire family.





What do social elephants talk about?



Activity Sheet 13

Messages Sister, Mom Details



[Grey message bubble]

[Blue message bubble]



[Grey message bubble]

[Blue message bubble]



[Grey message bubble]

[Blue message bubble]



[Grey message bubble]

EleMessage [camera icon] [microphone icon]

Share your passion for elephants by telling your family and friends how great they are!