Tennessee Aquarium Science Streams

Presented by

of Tennessee

TENNESSEE AMERICAN WATER

Eye Spy

Video Focus Question: How do scientists learn about animal behavior?	**Length of video:** 8 minutes 14 seconds

Science Standards

TN BIO.LS2.1	Plan and carry out an ethology investigation of a simple organism. Gather, analyze, and present data in tabular and graphical formats. Draw conclusions based on data and communicate findings.
TN ECO.LS4.3	Design and carry out an investigation examining the importance of animal behaviors and plant tropisms for survival.
NGSS MS-LS1-4	Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively. * ** This video contributes to the performance expectation by helping students practice collecting and analyzing empirical evidence.*

Main Learning Goal: Ethograms help scientists collect data to learn about animal behavior.

Science Content Storyline
Ethology is the study of animal behavior. Ethograms allow scientists to collect data, which then helps them learn more about animals' lives. Collecting data takes practice and as different scientists compare the data they collect, it can lead to different observations and information about the animals' life.

Ideal Student Response to Focus Question: Scientists observe and record behaviors to help them better understand the animals they are studying.

Preparation

In Advance
- Preview the video.
- Determine if students will create their own ethogram or receive copies of the Tennessee Aquarium's ethogram template (see page 7 of this document).
- Write scientific names of the two penguin species on the board.
  Pygoscelis papua Gentoo Penguin
  Eudyptes chrysolophus Macaroni Penguin
- Know how to identify a Gentoo versus a Macaroni Penguin. Figures 1 and 2 on page 6 can help distinguish the species.

Materials
Teacher
- Copies of the ethogram template, 1 per student (optional)
- Photos of a Gentoo and a Macaroni Penguin to help students identify which species they are observing (Figures 1 and 2 on page 6, optional)
- Board or butcher paper and markers

Student
- A copy of the ethogram template or paper to draw their own
- Pen or pencil

Key Activities and Reflection

Timestamp	Science Content Outline	Guidance to Support Students
0:21	Introduction	Play the introduction for students. Pause the video and ask students what they think the video will be about. For each answer, ask students if they can share what they heard that makes them think the video will include that idea. Accept all answers at this point. Once students have shared their ideas, resume the video.
0:47	Studying Animal Behavior	Have students watch the video, pausing at timestamp 1:27. Write the word "ethology" on the board for students to see. Ask students what kinds of questions scientists might want to the answers to as they study animals. You might prompt their thinking with ideas such as • What does the animal eat? How often do they eat? • Is the animal active during the day, night, or both? • How big or small is the animal's range during a given period of time?
1:27	Penguin Behavior	The video describes that students will be observing penguins. Pause the video at timestamp 1:42 to share the context of the video with students. This video was taken on a typical day in December in the Tennessee Aquarium's penguin exhibit. It was not during a feeding time or during nesting season. Ask students to consider the context as they list behaviors they think they might observe the penguins doing. Make a list on the board to capture their ideas. Next, ask students to predict how many different behaviors they think they might witness in a two-minute observation. Encourage students to think about other animals – pets or animals they have seen in nature – and whether they rush around doing 4 different things at once or not. That will help students make a more accurate prediction. Show students the pictures of the Gentoo Penguin and the Macaroni Penguin on page 6 of this guide. Tell them that the Tennessee Aquarium has two species of penguins, and they will have a chance to observe one of these two species as they complete their ethograms.

1:42	Development of Ethogram	Students should start their ethograms, following along with the way the video describes the process. If you are providing them with copies of the blank ethogram, distribute them before beginning this section of the video. Otherwise, students can write the information at the top of a clean piece of paper. Once the video starts, students can either choose to observe a Gentoo Penguin like in the ethogram example in the video or a Macaroni Penguin. Share with students how they would know which species they are looking at. Consider showing them Figures 1 and 2 on page 6 so they can see the characteristics of each species. One of the clearest differences is that Macaroni Penguins have yellow crest feathers on their head and are shorter than the Gentoo Penguins. It is important for students to make this decision and know how to properly identify the species so they can spend the full observation time gathering data. Write the common and scientific names of both species of penguins on the board so students may copy the correct names onto their ethogram. Tell them that once the video starts and they pick which penguin to observe, they should circle the correct name for their data. Share that ethologists will set-up their ethograms prior to starting any of their behavioral observations to make sure important information such as species, date/time, and observer are correctly recorded. Ask students why they think this type of information is important to ethologists. Ask probing questions to find out more about why students think this is important to animal behaviorists. Accept all ideas at this point.
2:20	Creating an ethogram	If students are creating their own ethogram, pause the video at timestamp 2:20 to allow them time to draw the needed columns. If using the ethogram template, do not pause the video here. Have students fill in the behaviors on their ethograms, following along with those listed in the video.

2:50	Questions Before Observing penguin behavior	The video will describe how students will make their observations. Briefly, they will observe penguins for two minutes, making an observation every 10 seconds. A bell will chime to let them know when to observe. At that sound, they should make an observation. Before starting the two-minute observation time, ask students if they have any questions. Remind students that they are only to watch one individual throughout the entire two-minute observation time. They will record their observation of what their individual animal they chose is doing at the exact moment the bell rings by marking a tally in the corresponding column. It might be helpful to pause the video at timestamp 3:29 as the observation time starts to allow students a chance to pick which individual penguin they will observe. Remind them how to distinguish between the two species of penguins and then have them circle the scientific name and common name for the species they chose.
5:37	Analyzing and sharing ethogram data	Play the video to timestamp 6:15 to allow students to hear the educator discuss her results. Give students a few minutes to compare the data they collected to their prediction and write a summary of their observation. Ask students to write any thoughts or questions that their data and summary has left them with. Ask students to share any of their observations, summaries, thoughts, and/or questions from their ethogram experience. Students may notice that their observations and summaries are different from another student's. Ask students why they think this could have happened. Guide them to remembering that everyone was asked to pick an individual penguin to observe, meaning that there is a possibility that everyone watched a different individual. Discuss with the class what they think some drawbacks and advantages to this might be for ethologists.
6:16	Investigating animal behavior	The next part of the video, to timestamp 7:38, will describe how students can do an independent ethology investigation. You can decide whether to assign students this project or just share it as something they might enjoy. They might choose a pet or animal they see in their yards to study. Alternately, you can share the Tennessee Aquarium live animal cameras with them by having them search for "tnaqua" and "live cams." These cameras will allow students to observe otters, lemurs, penguins, or different kinds of fish.
7:38	Conclusion	Play the conclusion of the video for students. Remind them that they have been doing some of the work that scientists do!

Extension Activities

- Each of the videos in the Science Streams series has an introduction by people in different departments at the Aquarium. This offers an opportunity to talk about the many different types of jobs it takes to run an aquarium.
- Have students observe different individuals of the same species and compare the information gathered on their ethograms. What can they learn about that species through analyzing the behavior of different individuals?
- Students could observe different species within the same class, for example, different bird species. From the data they collect, what observations can they make about the behavior of those animals? Students could construct a visual representation, such as a Venn diagram, to show some of the similarities and differences they observed.

Figure 1: A Macaroni Penguin

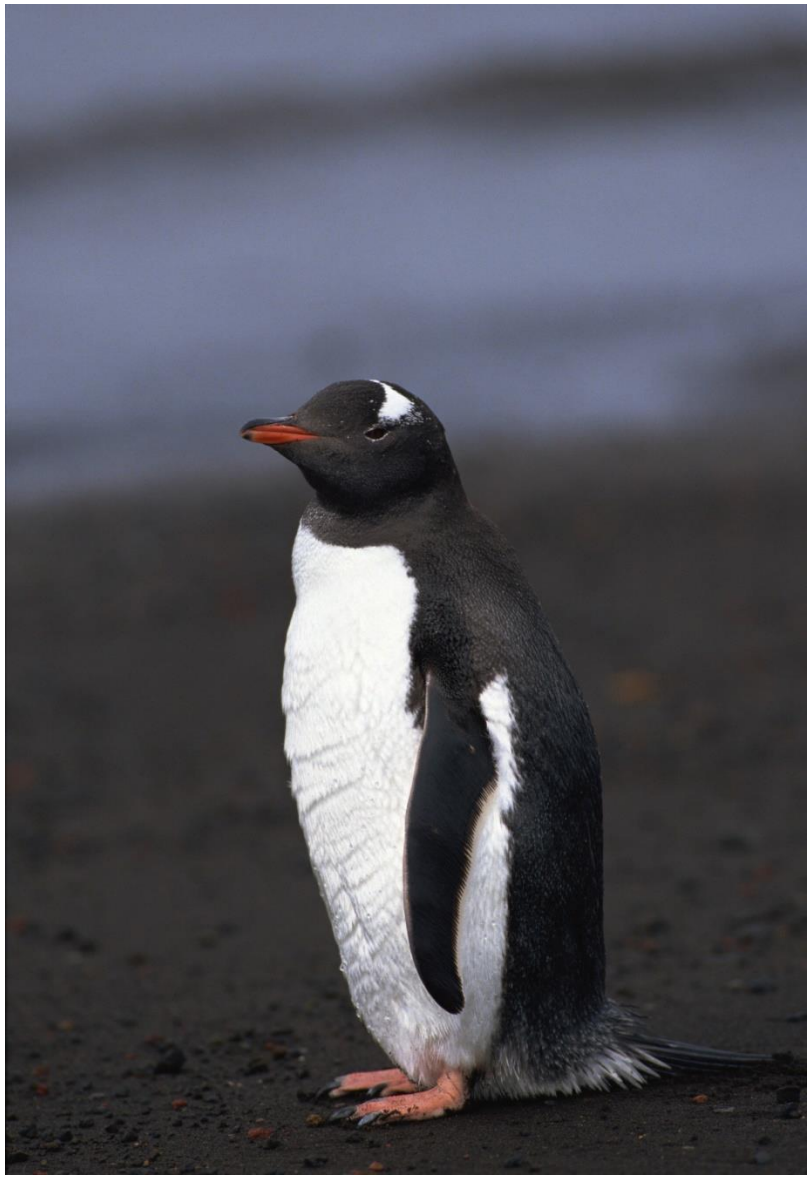

Figure 2: A Gentoo Penguin

Tennessee Aquarium
Ethogram

Common Name:
Scientific Name:
Observer Name:
Date:

Prediction:

Behavior	Tally Marks	Total