Lesson 2: Building an ethogram

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Grade level(s): 5–8
Time: One 50–60 minute lesson or two 45 minute lessons
Materials/preparation:

- Interactive google slides with links to animal videos and optional Jamboard slides (make copies for your class)
- Students need notebook/computer to record observations/questions

Learning Outcomes

1. Explain what an ethogram is and what information it provides
2. Construct an ethogram
3. Graph data from an ethogram
    a. Calculate the proportion of time spent doing different behaviors and create a bar graph to show those results
4. Use an ethogram to answer a scientific question about animal behavior
    a. *Optional extension:* examine relationships such as seasonal changes in behavior, or age/sex and behavior

Vocabulary

- Ethogram - a list of typical behaviors performed by an animal, including how often and how long the animal does them

See additional online resources at the end of this lesson.

Lesson Sequence

- **Learning outcomes** for lesson 2 (see above)
- **Review** what we learned in lesson 1 and **introduce** lesson 2 topic: *One of the ways we can study and answer questions about animal behavior is by observing how they spend time and constructing ethograms*.
- **Hook:** Ask students what behaviors (activities) humans do and have them estimate how much time humans spend doing each behavior per day - fill in the chart of human behaviors
    - First, define ethogram
    - Ask students to list activities/behaviors they do on a typical week day. Guide them toward the "behavior" names for these categories . . . . e.g., eating, grooming/self-care, social behavior, excretion, obtaining or preparing food/foraging (e.g., students might say something like “shower” which would be grooming or self care, or “hanging out with friends” which would be social behavior). Group similar activities like showering and brushing hair into the major category of “grooming” or “self care”

    - As a class, ask students to estimate the time they spend on various behaviors and add their numbers to the fill-in-the blank google sheet (the sheet will automatically create a pie chart showing amount of time spent on each type of behavior)
    - ***Optional:*** Ask students to discuss and compare their results (could do this as a class or in small groups). Which category did they spend the most time on? The least amount of time? Are there any activities they do regularly that did not fit on the chart, or any behaviors that need to be added to this ethogram?
    - ***Optional:*** Show a couple of graphics from the "fun by year site" (see link in Additional Resources below) → have students guess how many years are spent doing each activity before revealing the answers
    - ***Optional extension:*** Ask students: How did the COVID-19 pandemic cause you to change your behavior? (e.g., school from home, less time driving to different places, less time socializing in large groups?) → you can relate this to major climatic events (e.g., large storm or drought) that might cause animals in the wild to behave differently
- **Students create an ethogram**
    - Play a short video clip (~1 min) of an animal and have students write down all the different behaviors they see.
    - **Recommended video clip** of an elephant at the Melbourne Zoo: https://www.youtube.com/watch?v=jWLRigQ4oYw (1:08:45 - 1:14:30 → 1:10:00 - 1:11:00 is the best portion)
    - Ask students what behaviors they observed and combine these into a **master list** of behaviors. You may need to group certain behaviors together or rename them so that everyone is using consistent names for the same behaviors.
    - Play the video again and have students record how many times the animal does each behavior, using the Elephant Ethogram Template (make a copy of the google sheet for your class or print out paper copies; see additional instructions in the google sheet).
    - Fill data into a class chart and calculate the proportions of time for each category; then graph the results.
    - *Interpretation:* Ask students basic questions about the data: what behaviors did the animal do the most/least? Did they notice any patterns, such as the animal doing behaviors in a specific order or only doing certain behaviors when alone vs. around other animals?
- [OPTIONAL EXTENSION] **Example ethogram and research questions:** How are ethograms used to explore patterns and answer questions about animal behavior? The remaining slides provide an example of a real ethogram and related questions about behavior (link to lesson 1).
    - Ethograms can reveal patterns in behavior, like the difference between males and females or juvenile/adult animals, or patterns of seasonal change in behavior. Recognizing these relationships can help researchers connect patterns in behavior with the *function* or *development* of the behavior.

    - The example provided in the slides is about Western fence lizards, which are very common in California. The example provides an ethogram and real data from a scientific paper, including separate data for adult and juvenile male and females. We ask the students to focus on one behavior, head bobbing, and see if there are differences between males and females. Then, we link this to a question about the function of the behavior of head bobbing.
- Wrap up: **review learning outcomes**
- ***Optional:*** Assign students to create another ethogram and collect data on the frequency of different behaviors for homework. You can make a copy of the Elephant Ethogram Template and modify it. Students could do this for a live animal they see around their house, like a bird or a squirrel, or a pet. Students could also observe animals on a zoo webcam or use the USF Wild Discoveries horse video (link below).

Additional Resources

- USF Wild Discoveries (horse ethogram activity and training):
    - https://programs.ifas.ufl.edu/wild-discoveries/research-practice-materials/
    - https://programs.ifas.ufl.edu/wild-discoveries/#:~:text=Wild%20Discoveries%20Mission&text=The%20Wild%20Discoveries%20team%20major,for%20tomorrow's%20leaders%20and%20scientists.
- Website with already-made video resources on why we study animal behavior, using ethograms, etc: https://programs.ifas.ufl.edu/wild-discoveries/research-training/
- Templates for different types of ethograms:
    - https://nc3rs.org.uk/macaques/wp-content/uploads/2014/09/Ethogram-for-general-behavioural-monitoring-Caralyn-Kemp.pdf
    - https://www.reed.edu/biology/professors/srenn/pages/teaching/2008_syllabus/2008_labs/week2_stuff/zoo_20080820.pdf
    - https://programs.ifas.ufl.edu/media/programsifasufledu/wild-discoveries/docs/word/Ethogram-Assignment-(blank).pdf
    - https://www.zsl.org/sites/default/files/media/2015-09/Ethogram%20template%20and%20follow-up%20questions.pdf
- Human ethogram/time budget data:
    - US Bureau of Labor Stats Time Use (hard numbers start on pg. 9): https://www.bls.gov/news.release/pdf/atus.pdf
    - Fun “By Year” breakdown with cool graphics (sources not necessarily validated, but might be a cool starting point for discussion): https://www.huffingtonpost.com.au/2017/10/18/weve-broken-down-your-entire-life-into-years-spent-doing-tasks_a_23248153/
    - Time Management Calculator: https://docs.google.com/spreadsheets/d/1YKvyNwJdC6wxNWrodIKDH8ANCuR3PP9E_p4-vO2zbnQ/edit?usp=sharing