

SPECIES ACCOUNT

Students choose one species that they can readily observe, and document as many details as they can about it through direct observation.

Time

Introduction: 5 minutes
Activity: 10–45 minutes
Discussion: 10–15 minutes



Materials

Journals and pencils



optional

- Binoculars
- Example species account field notes from local scientists

Teaching Notes

Scientists in many disciplines of life science make focused species accounts. These thorough records describe species, including markings of individual organisms, where they were found, what was nearby, and interesting behaviors. This is a simple and powerful approach to learning in nature, one that students can continue to use in their journaling. This is also a great jumping-off point for studying the species in more depth, giving students the background to dive into relevant research or to think about the species' interactions with its environment.



Much of what we know about nature started with direct observation and experimentation. There are many species that have been deeply studied, but there is always more to learn and discover. Each observation, if recorded and shared, becomes part of a growing understanding of the world. Species accounts are a common approach to cataloguing organisms and building a database of information. In a species account, the observer attempts to learn as much as they can about the type of organism, using words, pictures, and numbers to record details about structures, behaviors, and location in and interaction with the surrounding environment. Once students learn and develop an approach for doing a focused species study, they can apply the skills anywhere they go.

NATURAL PHENOMENA

Any plant or animal that can be observed for a sustained period can be used for a species account. If you think an animal might scamper away, use the *Animal Encounters* protocol instead. Students don't necessarily need to focus on the same organism, unless you want the whole group to build a base of observations to use to reach specific learning goals. Find an area with enough plants, animals, or fungi that individual students could choose their own subject to observe. Plants are very cooperative and will not walk away. Animals are fun because they exhibit behavior that can also be recorded. Encourage students to choose animals that will not crawl or fly away halfway through the observation period. Catching small insects, macroinvertebrates, or other critters in clear plastic cups is a way to deal with this issue. Captive animals are often easy to observe, but may exhibit behavioral and structural differences compared to wild animals.

PROCEDURE SUMMARY

1. Record as many observations and questions about this species as you can, using words, pictures, and numbers.
2. Include information about how the organism looks, its behaviors and feeding habits, where it was found, and the like.
3. Focus on specific observations, not explanations.

DEMONSTRATION

When the whiteboard icon appears in the procedure description:



As you suggest things to include in a species account, create a sample page that reflects those suggestions. Do not worry about making a pretty picture. Your bunny can be a circle with two lines for ears. Demonstrate making more than one sketch, to show different



views; changing scale; using words, pictures, and numbers; and including metadata.

PROCEDURE STEP-BY-STEP

1. Tell students that they will get the chance to learn as much as they can about a specific species by studying it.

- a. "We are about to practice our observation skills by using them to learn as much about [ants, this type of tree, these worms, a species of students' choosing, etc.] as possible."
- b. "This is your chance to do an in-depth study and become more familiar with this part of nature. We can learn a lot when we focus in on one species and give it directed attention."

2. Explain that the goal is to describe the species in as much detail as possible using words, pictures, and numbers; and students can use "I notice, I wonder, It reminds me of" to help them focus on specific observations.



- a. "You don't need to make a pretty picture of this species, but you do need to record as many observations as you can."
- b. "Use words, pictures, and numbers together to describe what you see, relying more on whichever approach is most comfortable."
- c. "You can use the frame 'I notice, I wonder, It reminds me of' to help guide your observations and what to write down."

3. Encourage students to be specific with their observations and language.

- a. "When you make observations, be as specific as possible. Don't just say 'The leaf is green'; rather, say 'It is deep blue-green at the base, shading to yellow-green within two millimeters of the edges.' It's important to come up with as accurate a description of this organism as possible."

4. Tell students to focus on making observations (e.g., "There are yellow leaves at the ends of the branches"), not assumptions or explanations ("The leaves at the ends of the branches are dead").

- a. "Sometimes when I record observations, I make assumptions or explanations for what I see. I might say, 'Older leaves on the tree are yellow,'

but I don't really know that those leaves are older. I saw the yellow leaves and without realizing it assumed that they were older. This is an explanation for why the leaves are yellow. My assumption that the yellow leaves are older may be wrong."

- b. "When you record your observations, try to avoid assumptions or explanations. Just describe what you see, not what you think is going on."
- c. "I could say instead, 'Larger leaves that are farther from the branch tips are yellow.'"

5. Ask students for suggestions of observations they could include that go beyond just describing how the organism looks.

- a. "We can do more than just record observations to show what the organism looks like. What are some examples of the types of observations we can make?"
- b. If students don't mention any of the following, bring them up: notes about its location, notes about other nearby organisms, behavior if it is an animal, similarities or differences compared to nearby individuals of the same species, evidence of where else the organism has been, feeding behavior, contextual information such as nearby soil, the weather conditions, associated species, or a small map showing the area of study.

Writing a title and adding metadata (date and location) help establish the big picture.

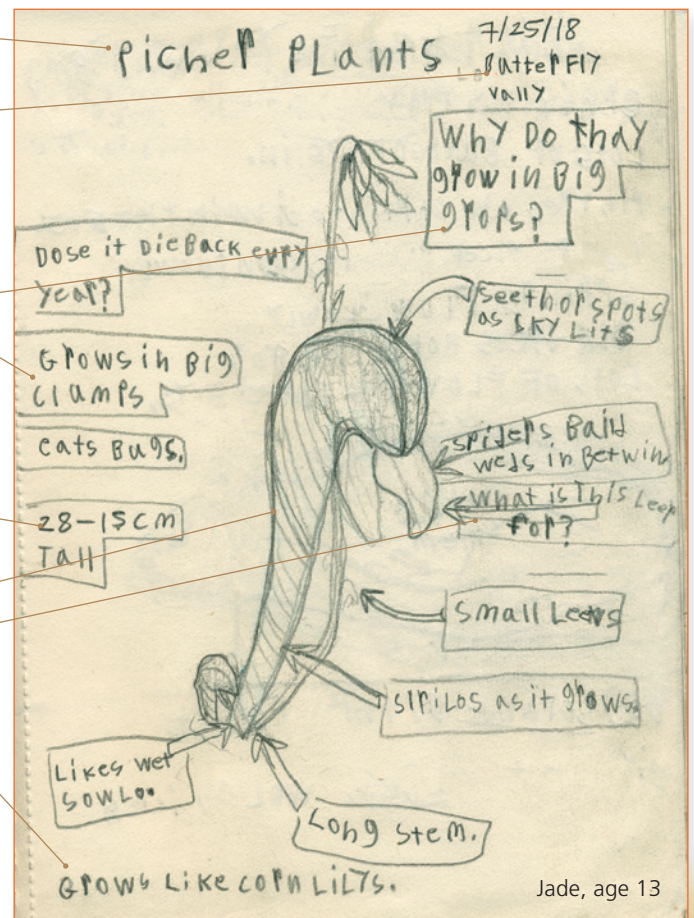
Direct observations inspire related questions.

Writing, drawing, and numbers are used together.

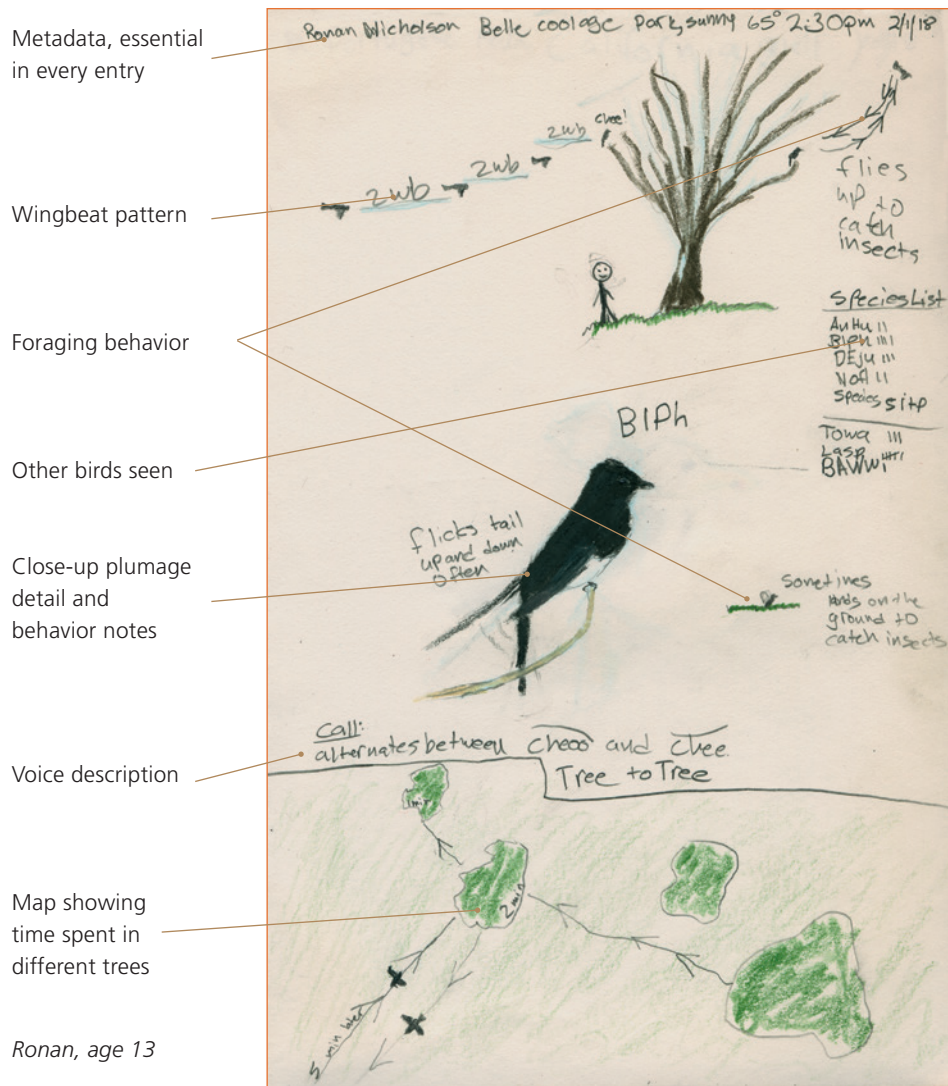
"I notice."

"I wonder."

"It reminds me of."



Jade, age 13



Ronan, age 13

6. Encourage students to record questions that occur to them as they work.

- a. "Put a question mark somewhere on the page, and record any questions that come to you as you work."

7. Offer specific strategies for drawing the subject students will focus on, as appropriate.

8. Send students out to observe.

- a. "You have nineteen minutes. Are there any questions? Begin."

- b. "How did recording observations in a journal help you learn? Why do you think using journals might be a useful practice in science?"

- c. "What are some of the limitations of gaining knowledge by journaling? Are there other observation tools that would help you learn even more?"

- d. "What were some observations that were more easily shown with a drawing? What observations were easier to record with writing?"

- e. "Were you able to focus on observation and avoid going into explanations in your journal?"

- f. "What could you do next to discover more about this individual organism, or type of organism?"

- g. "Let's go around the circle and each complete this sentence: 'From my direct observation, I now know that...'"

DISCUSSION

Lead a discussion using the general discussion questions and questions from one of the Crosscutting Concept categories. Interperse pair talk with group discussion.

General Discussion

- a. "Let's share some of our observations. Look at your notes and find an example where you provided rich and specific details. Let's share some of these with the group."

Patterns

- a. "What patterns did you observe? These might be patterns in shapes, colors, growth, behavior, or the location of species."

- b. "What does that pattern remind you of? Where else have you seen similar patterns?"
- c. "What are some possible explanations for one of the patterns you observed?"
- d. "Do you expect that the patterns you saw might be different during a different season or in a different location? Why or why not?"

Cause and Effect

- a. "Were there any interesting or unique markings you noticed while doing your species account? What are some possible explanations for them?"
- b. "When we study an organism, we can notice where it is located, what it is doing, its shape or growth pattern, or any evidence of interactions with other species or the environment. This is all valuable information, and each category can be thought of as a mystery to explain. Look back at your notes and discuss these questions:"
 - "Where is the organism located? What are some possible causes of this?"
 - "Did you find any evidence that the [observed organism] may be affected by living or nonliving things in the environment?"
 - "How do you think the [observed organism] might affect the living or nonliving things in the environment?"
 - "How might the interactions we observed be affected by the time of day, year, weather, or location?"
 - "Did you see any interactions between the [observed organism] and the environment? What effect might they have had on each other?"

Structure and Function

- a. "What were some of the structures you noticed while studying this species? Describe them in detail."
- b. "Pick a structure and think about how it might function or work to help this organism survive in this environment. Connect your explanation with a specific description of the structure and how it works in this environment. For example, don't just say 'Its fur helps it hide.' Say, 'The brown spots on the fur look like they might help it blend in to the dead grass or the hillside.'"

Systems and System Models

- a. "How do the [observed organism] and the [other thing or organism in area] affect each other?"
- b. "What connections between the [observed organism] and other parts of the ecosystem did we observe? How many others can you think of?"

Energy and Matter

Note: These questions are appropriate for students fifth grade and above.

- a. "Let's construct a partial food chain based on your observations. What did you see eating what? Now expand your food chain to a web based on what you have seen in this area, your prior knowledge, and your best guesses about other relationships between animals."
- b. "Now trace the cycling of matter through the parts of the food chain you just described. Use arrows to show how matter cycles through different parts of this ecosystem."

FOLLOW-UP ACTIVITIES

Conducting Further Research

Encourage students to supplement their personal observations with research. Have other scientists seen the same patterns or behaviors that your students observed? Offer resources such as field guides, research papers, or contact information for local scientists so that students can answer their questions and extend their studies. The chapter Teaching Science and Inquiry: A Deeper Dive, following the activities, includes ideas for how students can engage in future research.

Looking at Others' Field Notes

Grinnell and his colleagues at the Museum of Vertebrate Zoology in Berkeley, California, made detailed species accounts across the western United States to gather distribution and natural history data. The types of information they collected for each species can provide a framework for what students pay attention to whenever they encounter a new species. Students could study these examples of species accounts and use them to guide the observations they make the next time they take notes.