ACTIVITY FORMAT

The activities in this book have a consistent style that makes them easy to scan and present to your students. Each journaling activity includes the following sections and information.

Summary

The summary at the beginning of each activity includes information about the kind of learning the activity will support and a brief synopsis of what the students will do during the activity. This is a good place to scan when you are deciding which activity to use.

Procedure Step-by-Step

The procedure is directions to give to students to do each activity. The numbered steps summarize the instructions. Lettered steps are directions to give students as you might say them.

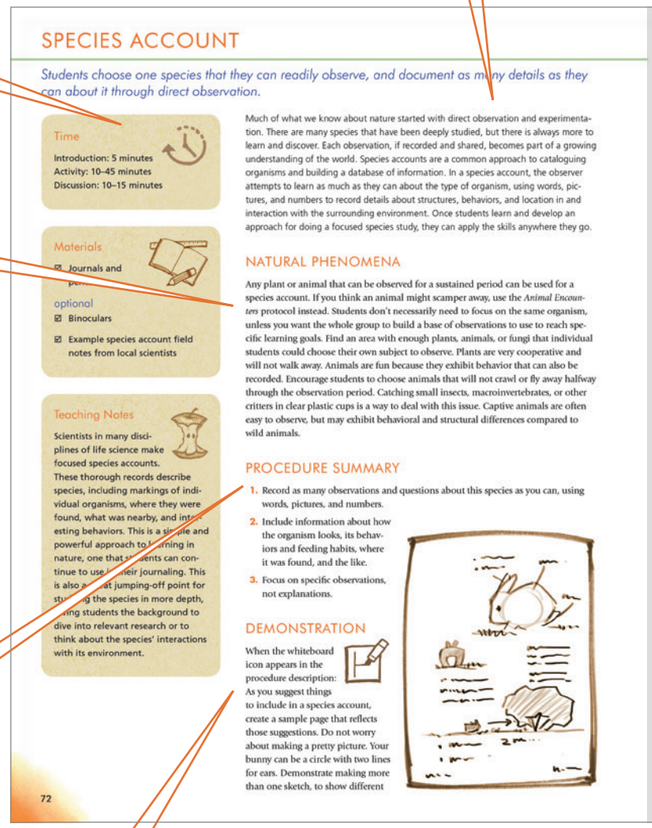
Sidebars (Time, Materials, Teaching Notes)

The sidebar provides an "at a glance" summary of the timing, setting, and materials for the activity as well as notes about leading the activity, management, or context specific to the activity.

Natural Phenomena

This section offers suggestions for possible phenomena. Check here for ideas about the parts of nature that students could focus on during the activity.

For many activities, there are nearly infinite possibilities for phenomena to focus on. For example, students could engage in *Comparison* using almost anything, from seed types to bird beaks, or could do *Mapping* focused on a creek bed, plants on a schoolyard, or location of gopher holes. Activities such as *Species Account* and *Timed Observations* focus on observing one kind of organism.



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

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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.

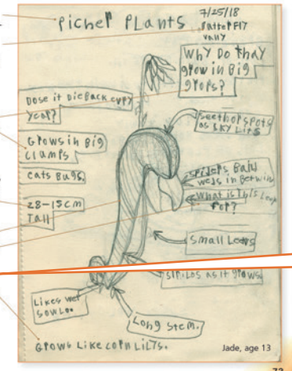
DISCUSSION

Lead a discussion using the general discussion questions and questions from one of the Crosscutting Concept categories. Intersperse 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."

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

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Discussion

Sets of questions help you facilitate a discussion with your students after they do an activity. It is in these discussions that they will draw greater meaning from the activities. General discussion questions wrap up a specific activity. Crosscutting Concept questions and Science and Engineering Practice questions help students see a bigger picture, build toward conceptual understanding, and see greater application for their newly developing skills.

As you look through the question categories to decide which ones will help students reach your learning goals, imagine how your students might respond. We recommend discussing the general questions, and questions from one of the other categories. It is better to have a deeper discussion about fewer ideas than try to cover everything and not allow students to build on their thinking and questions. Give students time to talk about each question in pairs before discussing it with the whole group.

Procedure Summary

This is a summary of what students will do during their independent journaling time. After you've given the directions for each activity to students, write these bullet points out on your whiteboard (or write them on a piece of paper ahead of time) and set it out somewhere so that students can be reminded of what they are to do.

Demonstration

As you give the step-by-step instructions, use a small, portable whiteboard to demonstrate what you want students to do. Your example need not look exactly like ours or be a pretty picture. Just give an overall structure to the page, use simple line diagrams to represent drawings, and draw horizontal lines to simulate writing. The whiteboard icon in the procedure indicates when to do the demonstration.

Student Work

For many activities, we have included an inset journal page from a student. The callouts around the illustration point to aspects of the page that demonstrate some of the targeted journaling skills. Pointing out these kinds of details in your own students' journals motivates them to continue to use these strategies throughout the journal.