COLLECTION OR FIELD GUIDE

Students make a field guide or "collection" of things within a focused category, such as leaf types, rocks in a stream, things that are red, or tracks.

Children are natural collectors. Kids (and adults) collect cards, stamps, coins, bird eggs, or any number of other objects. Focused observation of a category leads to a deeper understanding of it. A stamp collector scans every envelope that enters the house and notices unusual stamps and postmarks that most people would miss. Students can harness that type of focus to deepen nature observations by making a field guide. Any topic will lead students to explore a world that they might otherwise overlook and to develop understanding of a category of things. If a student makes a collection of fall fruit in their journal, they begin to see fruit on every bush and vine. If students make a field guide to "fuzziness," they will begin to see objects, relationships, and patterns among fuzzy things that would otherwise go undetected. Exploring with narrow focus will spark questions about similarities and differences among the objects, such as "What might be common functions of fuzziness?" paving the way for deeper learning about science concepts.

Time

Introduction: 5 minutes
Activity: 30–45 minutes
Discussion: 10–20 minutes

Materials

- ☐ Journals and pencils
- ☐ Examples of field guides, including small regional guides
- ☐ Examples of collections

optional

- ☐ Rulers
- ☐ Hand lenses

Teaching Notes

A broad topic can be overwhelming. In a diverse meadow, yellow flowers might be a more manageable topic than wildflowers. A narrow focus also makes it easier to notice patterns and generate relevant questions (e.g., "What pollinators are attracted to yellow flowers?")

If you would like to use students' field guide observations to deepen their understanding of specific concepts, make sure they create a field guide focused on a common subject.

NATURAL PHENOMENA

Students can make a collection in any outdoor space, even a seemingly bare schoolyard. Most published field guides are identification manuals: guides to birds, mammals, tracks, plants, or the biota of entire regions (e.g., the Sierra Nevada or Southwest deserts). These same topics make great subjects for your students' field guides. Or you can offer more creative topics, such as things caught in spider webs, patterns made by melting snow, icicle shapes, insects visiting a creosote bush, or things that are striped.

Field Guide Categories

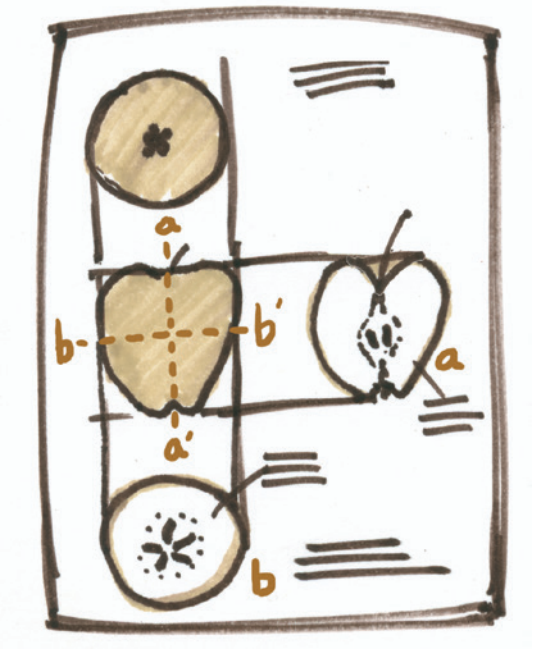
- Classic field guide categories: trees, leaves, rocks, landscape features, bird feathers, macroinvertebrates, or any other facet of the natural world
- Field guide of phenomena or evidence of an effect: things impacted or shaped by water, signs of fall, things affected by wind, things that snow does, shapes of icicles, evidence of drought, things that are broken, things that are soft, things with a strong odor, things attracted to porch lights at night, signs of the season
- Field guide to a pattern: 120˚ angles, spirals, branching patterns (not just in tree branches), things found under rocks
- Field guide to a system or a "tiny world": things on a lawn, under rocks or a log, on a rotting log, in puddles, or on windowsills

PROCEDURE SUMMARY

1. Make a field guide to (your chosen subject).
2. Include three to five things in this category in your field guide.
3. Arrange the page so that you show a drawing with words next to it.
4. Record observations with words, pictures, and numbers, paying attention to similarities and differences.

DEMONSTRATION

When the whiteboard icon appears in the procedure description: Choose a subject for your demonstration field guide. Create an informative title across the top of the page. Make a series of quick sketches of similar objects and indicate the addition of written notes with sets of lines. Give some verbal suggestions of different ways that students could structure their journal page.



PROCEDURE STEP-BY-STEP

Depending on your goals and your students, you can introduce this activity as making a field guide or making a collection.

Field Guide Introduction

1. **Show students examples of field guides and explain that they are tools useful for identifying and learning about plants, animals, and other parts of nature in a specific area.**
   a. "This is a field guide. It is a tool used to identify and learn about kinds of plants and animals that live in a specific area. For example, this book is a field guide to [wildflowers of the Sierra Nevada]; this pamphlet is a field guide to [trees along a nature trail in southern Florida]."
2. **Pass out a field guide to a group of four students, asking them to flip through the pages, noticing what kind of information is included and how it is arranged on the pages.**
   a. "Look through these books in small groups. What information is shown? How is it arranged to make it easy to understand?" (Typically, a field guide will have pictures showing different stages or forms for each subject, written information describing key points, and maps. Subjects are arranged in an order that helps compare similar species.)

Collection Introduction

1. **Discuss the kinds of objects that students have collected.**
   a. "Have any of you made a collection of some kind of object? What sorts of things do you collect?"
2. **Discuss the impact of making a collection on attention and discovery, highlighting how being a collector of something attunes you to details others might miss.**
   a. "What have you have noticed about the things you collect that other people might miss?"
   b. "How does making a collection impact your ability to notice and learn things about what you collect?"
   c. "When you collect something, you notice details about the types of things you collect that others don't."

Field Guide/Collection Procedure

Depending on your goals and your students, you can continue the introduction of the activity by giving students the same field guide subject or letting them choose their own topic. If all students will focus on the same subject, give them the "teacher-driven" instructions. If your students will be choosing their own subjects, give them the "student-driven" instructions.

1. **Teacher driven: Tell students that they will make a field guide to, or collection of (seed pods, fruits, animal tracks, holes in leaves, clouds, etc.), recording subjects in that category in their journal.**
   a. "You are going to make a field guide/collection to [seed pods/fruit, animal tracks, leaf buds, etc.]. You will find and record as many subjects as you can in this area."
2. **Student driven: Explain that students will make a field guide to, or collection of, any subject they want, encouraging them to narrow their focus to a specific topic and giving them a moment to brainstorm ideas with a partner.**
   a. "You're going to make a field guide/collection, and you will pick the area and the subject. This can be as scientific or as playful as you wish."
   b. "Generally it is easier to focus on a specific topic. So instead of doing a guide to all the plants and animals, you could narrow it to something like spider webs, insect damage on leaves, or tracks in the mud (if there are a lot of tracks in the mud)."
   c. "Take a moment, find two partners, and come up with a list of topics you could do in this area."
3. **Tell students to use words, pictures, and numbers to describe each subject of their field guide/collection, highlighting differences and similarities.**

a. "Try to include three to five subjects in your field guide/collection, and use words, pictures, and numbers to describe each subject."

b. "Show what makes each subject different from the others. Your goal is not to make pretty pictures. Your goal is to make accurate observations."

4. **Ask students to share ideas about how to structure their field guides or collections, based on their initial observations of field guides and their own ideas.**

a. "Describe the way the information was laid out on the pages of the field guides you looked at earlier."

b. "What kind of information was included? What did the pages look like?"

c. "Do you have any other creative ideas for how you could structure the pages of your field guide/collection?"

5. **(Optional) Give additional instructions that will focus students' observations to meet a learning goal, such as structure and function or interactions between organisms. For example:**

a. "As you make your field guide/collection of macroinvertebrates, pay specific attention to their structures or body shapes and how they are similar or different."

b. "As you make your field guide/collection of things found under this log, try to notice and record any evidence of how they're interacting with each other or their surroundings."

6. **Remind students of boundaries, ask if there are any questions, and tell them to begin, suggesting that they observe a few possible subjects first.**

a. "Please begin. You will have twenty-three minutes to make your field guide/collection."

b. "You may want to observe a few possible subjects first to help you think ahead about how to organize the information on your page."

7. **As students work, take time to circulate, check in, ask them about their observations, support students who are struggling, and give feedback on observations and strategies for recording information.**

a. (After about half the time has elapsed) "You have about ten minutes left to finish your field guide/collection. If you've only recorded one subject so far, you should move on so you can include at least three subjects in your field guide/collection."

DISCUSSION

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

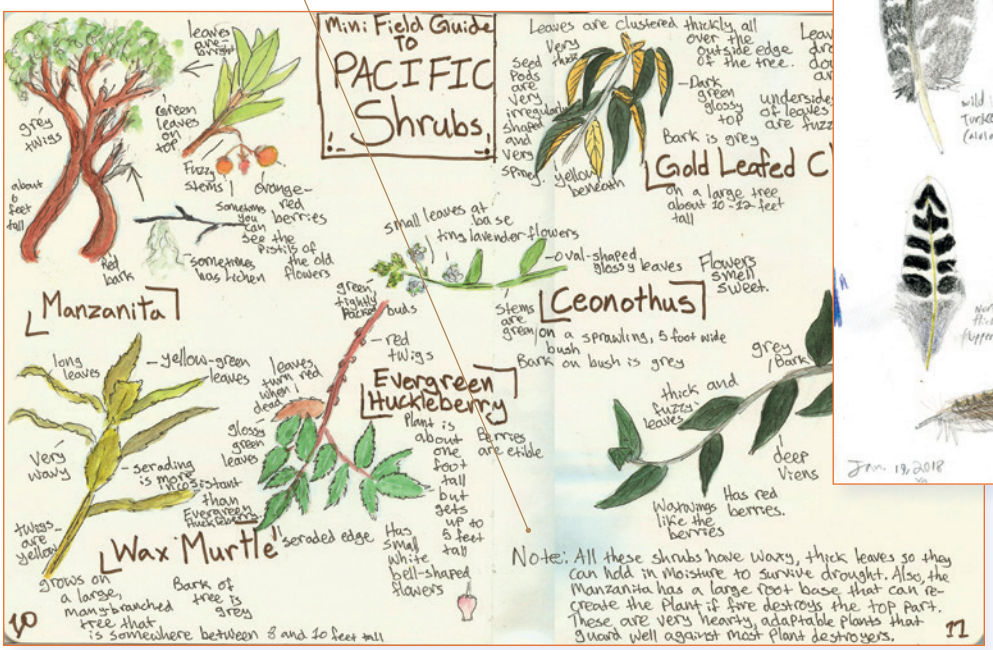
General Discussion

a. "Did you notice anything interesting as you made your field guide, or did any cool questions arise? Share some with a partner."

Drawing feathers life size and to scale makes them easy to compare.

Angelica, age 14

Thoughts about similarities and differences in the collection



Fiona, age 13

b. "What were some of the similarities and differences between the subjects you recorded in your field guide?"

c. "Check out some of the field guides that other students made. What are some differences and similarities between your subjects or how you chose to record information?"

Patterns

a. "Are there any features or structures that are shared by several or all of your field guide subjects? If so, describe them."

b. "What are some general statements we can make about icicles [or name the field guide category] based on what we observed?"

c. "What are some possible explanations for the similarities and differences we saw?"

Cause and Effect

a. "What are some features that all of the [water catchers, icicles, broken things, etc.] share? How might we describe this category of things in general? What were some of the differences between the subjects of your field guide?"

b. "This discussion might sound like: 'Well, all of the icicles weren't clear all the way through. They all were cylindrical in shape, but their outsides were rough. Some were very long and thin, while others were very thick at the base.'"

c. "What are some possible explanations for why these features occur?"

d. (If you made a field guide to evidence of an effect, such as evidence of drought) "What can we say about how drought is impacting this place?"

Systems and System Models

a. "What were the different things you found? Review a list with a partner."

b. "Did you see any interactions or evidence of interactions between different organisms, or between the organisms and the environment?"

c. "What are some other possible interactions you think might happen?"

d. "Take a moment to draw lines between the plants and animals that you think may interact with each other, and label the line with what you think the interaction might be."

e. "What are the nonliving factors that affect the organisms you saw?"

f. "How might the organisms or the interactions between them be impacted if some of these environmental conditions were to change?"

A SENSE OF PLACE: PHENOLOGY COLLECTION

Making a field guide to signs that represent a specific place at a specific time inspires rich observation and interesting discussions. This observation process gives students a sense of place. What objects would represent this habitat, historic location, stretch of coast, or natural area: characteristic trees, landscape views, rocks, animal behaviors, historical features? What would indicate this moment, this day, this season: morning dew, cloud shapes, seasonal plants (in bud, flower, or fruit), leaves turning color, or migratory birds? Encourage students also to think about sounds, smells, or feelings that could be described with words. Anything that catches a child's attention could be included as it is here now, but this prompt often helps students think more deeply about place. Make similar collections or field guides at different times of the year or different locations.

Structure and Function

a. "Are there any features or structures that are shared by several or all of your objects, such as leaves or bark? Pick one of these common structures and discuss how that structure is different or similar in each of your field guide subjects." "This kind of discussion might sound like: 'Well, the leaf on the oak tree in my field guide was very small and kind of tough, and a little curled. But the leaf on the maple tree was very wide, and way more flimsy."

b. "Now, discuss: How might those different structures function differently?"

c. "What other differences do you see from one object to another? How might they lead to different functions?"

FOLLOW-UP ACTIVITY

Make a Class Field Guide

Pick a local habitat or park and make a field guide as a class project. All the little decisions, from what area the guide should cover to what sorts of details should be included for each species (e.g., drawings, range map, description, seasonal changes or stages, behavior), make for interesting class discussions. Generally a more restricted guide, with a smaller area and narrower scope of contents, is easier to make. A guide to the water birds found in a neighboring marsh is more manageable than the plants, animals, and fungi of Great Smoky Mountain National Park. Divide the work so that all students are involved in development and production of the guide. Make copies for every student and extras for parents or a school fundraiser.