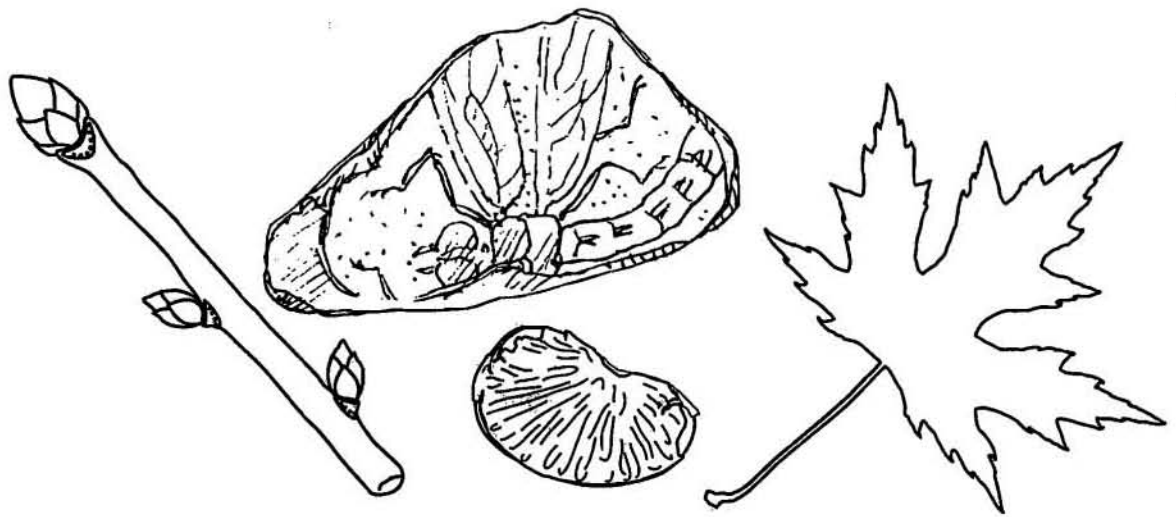


Collections from Nature



Overview

The natural world holds great fascination for young children. Leaves, shells, stones, and twigs, as well as other objects from nature, are treasures that always seem to find their way into the welcoming kindergarten classroom.

This study channels and deepens children's natural impulses to explore and collect as they learn how scientists approach the study of objects in nature. We suggest that you and your class decide upon a single type of natural object to study. You might choose shells, rocks, seeds, leaves, or any other object of interest that can be readily found by the children. Together, you will build a class collection of the selected items and conduct an in-depth investigation of them.

The children will explore many ways to examine and compare the properties of objects in their collection. They weigh and measure objects, closely observe form and texture, and make simple classifications through sorting activities. The children also learn various ways of acquiring information about their collection, including observation, experimentation, research, and communication with an "expert." Over the course of the study, the children will become "experts" themselves about the items in their collection. You can revisit this study over and over again in slightly different ways with a variety of collections.

Standards and Benchmarks

The activities in the Collections from Nature Study begin to address several aspects of national standards and benchmarks for science education. The following discussion highlights the standard and benchmark topics that are important in this study and briefly explains how the activities in the study address each featured topic. This study also touches upon several other components of the national standards set by the National Research Council and the benchmarks developed by the American Association for the Advancement of Science (Project 2061), but with less prominent focus.

All standards cited below refer to the K-4 components of the *National Science Education Standards*.¹ All benchmarks, chapter names and numbers, and section names and numbers cited below refer to the K-2 components of the Project 2061 *Benchmarks for Scientific Literacy*.²

Standards: Science as Inquiry Standard A: Abilities necessary to do scientific inquiry, and Understandings about scientific inquiry

Benchmarks: Chapter 1 (The Nature of Science), Section 1B: Scientific Inquiry and Section 1C: The Scientific Enterprise

The Collections from Nature Study helps children learn how to find out more about a particular type of natural object. It begins with children's observations and questions about the objects that they collect and suggests various ways, including using tools—such as magnifiers, different types of measuring tools, and balances—to pursue more information about the collection. Describing the objects in the collection in accurate detail is emphasized throughout the study. The Collections from Nature Study is a very collaborative endeavor, with children working together in their explorations and sharing discoveries with one another and the class.

Standards: Physical Science Standard B: Properties of objects and materials, and Science and Technology Standard E: Abilities to distinguish between natural objects and objects made by humans

Benchmarks: Chapter 4 (The Physical Setting), Section 4D: The Structure of Matter

Children do extensive observation and description of the properties of the objects in the class nature collection throughout this study. In looking for and studying natural objects, children's understanding of the distinction between natural objects and those that are made by humans is developed.

Standards: Life Science Standard C or Physical Science Standard D: Properties of Earth Materials

Benchmarks: Chapter 5 (The Living Environment) or Chapter 4 (The Physical Setting), Section 4C: Processes that Shape the Earth

If the objects collected were once part of a living organism, as in the case of shells, leaves, flowers, and bones, the activities in this study will also address components of Life Science Standard C and multiple benchmarks in Chapter 5. If the class collects rocks, the activities in this study will address components of Physical Science Standard D: Properties of Earth Materials and some of the benchmarks in Chapter 4, Section 4C.

Benchmarks: Chapter 2 (The Nature of Mathematics) and Chapter 9 (The Mathematical World)

Regardless of what type of natural object the class collects, the children will apply many mathematical concepts and skills, such as measuring, weighing, counting, sorting, and looking for shapes and patterns, as they study their collection and communicate their findings. These activities address many of the benchmarks in Chapter 2 and, especially, Chapter 9 in *Benchmarks for Science Literacy*.

Benchmarks: Chapter 12 (Habits of Mind)

As with all of the Kindergarten Science Companion studies, the content and pedagogy embedded in the collections from nature activities are intended to develop and reinforce many of the “Habits of Mind” described in Chapter 12 of *Benchmarks for Science Literacy*.

¹ National Research Council. *National Science Education Standards*. Washington, D.C.: National Academy Press, 1996.

² American Association for the Advancement of Science (Project 2061). *Benchmarks for Science Literacy*. New York: Oxford University Press, 1993.

Preparing for the Collections from Nature Study

Choosing a Collection

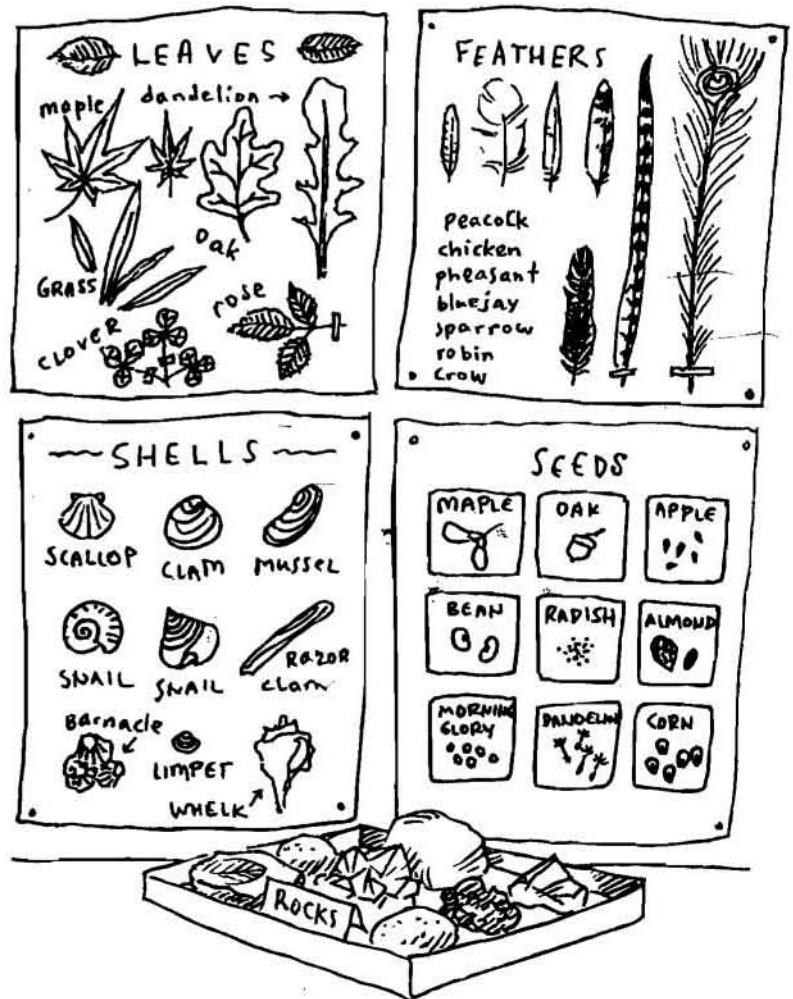
Before embarking on this study, you and your class need to decide what you want to collect and study. Rocks, shells, leaves, seeds, flowers, and twigs are just a few of the most obvious examples, based on their availability and their appeal to kindergarten scientists. Other ideas for collections may emerge from the children's interests or other studies. For example, a study of birds may prompt an interesting collection of feathers or nests to investigate.

The contents of the collection are less important than the investigations that follow, so the best and most natural way to begin this study is to let the children's enthusiasm be your guide. After a vacation at the beach, a child may bring in a few shells that seem to captivate the class. Or you might notice autumn leaves or rocks from the playground regularly finding their way onto your desk or into your class sharing sessions. Use these opportunities to discuss starting a collection. If you already have the beginnings of an interesting collection or a desire to study certain objects from nature, generate interest by enthusiastically sharing a few objects with the class and putting them on display for looking and touching. (Some schools and museums have collections that teachers can borrow. You might want to build from these resources if they are available.)

Setting Up the Science Center

During this study, the Science Center will be home to your growing collection, as well as the various experiments and displays that emerge from it. It is also the place to keep materials needed for exploring objects in the collection, including sorting trays, scales or balances, rulers, tape measures, magnifiers, and colored and graphite pencils. If these tools are readily available, children will use them for self-directed explorations as well as the activities in this study. Also try to keep a supply of paper accessible to encourage children to draw and record their observations, activities, and experiments. Finally, keep field guides and other books or resources about the objects in your collection in the Science Center for perusal, research, and reference. Arrange reference resources so they are easy to see and use, thereby inviting children to consult them frequently. See the Science Library section on page 70 for book suggestions.

It's important to arrange the class collection attractively. To start, create a neutral background by covering the surface of the Science Center with butcher paper or poster board. Other suggestions include putting the collection in several baskets or other



easy-to-use containers so children can see and access the objects. Select a sampling of items and display them in interesting clusters or patterns. For example, a series of mussel shells arranged from smallest to largest, or a cluster of maple leaves of varying sizes and colors, will draw children in and invite them to look for other similarities and differences in the collection. Change the display setups frequently, and let volunteers help you create new ones. Try to involve children in the maintenance and arrangement of the Science Center and the class collection. The care you take with this task will likely inspire them to do the same.

Collaborating with Families

Review the sample family letter on page 69. You can use this letter, or your own adaptation of it, to acquaint family members with some of the content and goals of the Collections from Nature Study, and explain how they can participate or help. Copy and distribute the letter "as is" or customize the letter by downloading the online version from our website at www.sciencecompanion.com. You may want to enlist the help of the class to personalize the letter with information about the particular nature collection the class will study.

Activities at a Glance

Charting a Path Through the Activities

Once you have decided on a type of collection, the best activity to start this study with is "Seek, Find, and Share." This activity will help you accumulate a large and diverse sample of objects for your collection, which the children can use for the various activities that follow. "Think and Wonder" is also an important activity to do early in the study; it will help you assess and work from children's interests and knowledge. Most of the remaining activities can be done in any order, although there are some natural connections between activities. (Connections are listed at the end of each activity.) "Make a Museum" is a meaningful culminating activity because it allows children to organize, synthesize, and communicate what they learned.

Many of the activities, such as "Sort and Classify," "Weigh and Measure," "Research and Identify," and some of the subactivities in "Explore Form and Texture," should be available throughout the study. As you know, it is a good idea to repeat kindergarten science activities either for several days in a row or spaced intermittently. Repetition allows all interested children a chance to participate and, if they choose, to revisit activities, thereby enhancing kindergartners' engagement and learning.

Activity Summaries

The following list summarizes the activities in the Collections from Nature Study. Add, delete, or modify the activities for your particular class collection. Remember to preview the activities before you begin and to plan each activity accordingly.

Seek, Find, and

Share. Children become aware of the science possibilities in their surroundings as they look for objects to add to the class collection.

Think and Wonder. ... Children participate in determining the direction of the study by discussing what they wonder about the class collection, and how they can investigate their questions. They are exposed to the idea that curiosity is a vital part of science and learn that there are many valid ways to pursue information.

Explore Form

and Texture Children explore the shapes and textures of objects in the collection by representing them in different media. Through observing and depicting various objects, they learn about diversity in nature.

Molds and Casts Children sharpen their observational skills by making a clay mold and a plaster cast of an object from the class nature collection.

Sort and Classify Children sort objects in various ways. They focus on attributes of objects in the collection as well as similarities and differences between objects.

Weigh and

Measure Children practice measuring skills as they investigate the size and weight of objects in the collection and make comparisons between objects.

- Twenty Questions** Children practice making distinctions between objects by carefully observing them. They gain experience with describing objects in accurate detail.
- Identify and Research** Children use field guides and other books to try to identify and learn about objects in the class collection.
- Explore Form and Function** Children use books and other resources to investigate what the objects in the class collection do in nature. They consider connections between form and function.
- Guess and Count** Children practice their estimation and counting skills using samples from the class collection.
- Visits and Visitors** Children expand their search for information about objects in the class collection by asking an expert.
- Make a Museum** Children synthesize, organize, and communicate information they have learned about the class collection by making a museum about it.

Dear Families,

As part of our science curriculum, our class is preparing to build a class collection and conduct an in-depth study of _____.

The natural world holds great fascination for young children. Objects from nature are treasures that always seem to find their way into the classroom. This study will channel and deepen children's natural impulses to explore and collect as they learn how scientists approach the study of objects in nature.

The children will explore many ways to examine and compare the properties of objects in our class collection. They will weigh and measure objects, closely observe form and texture, and make simple classifications through sorting activities. The children will also learn various ways of acquiring information about the collection, including observation, experimentation, research, and communication with an "expert." Over the course of the study, the children will become "experts" themselves about the items in the class collection.

Throughout the study there will be time for children to share items they add to the class collection. They can present information they have about the item, including where they got it, what kind it is (if they know), and any other pertinent details. Children can keep special objects that they do not want to lose separate from the class collection. For very special objects, children can share them during a class meeting, put them out for observation at choice time, and take them home at the end of the day.

We welcome visits from you or anyone you know with a special interest in or knowledge about _____. Books on this subject, including field guides, are also appreciated if you are able to loan any to the class.

Thank you for your interest and support.

Sincerely,

Science Library

The following list offers just a sampling of fiction and non-fiction books related to various types of nature collections. Ask your school or local librarian to help you find informational books and stories that are specific to your collection. For the most current recommendations or to recommend a book, visit our web site at www.sciencecompanion.com/recommendedreading/

General Recommendations

Backyard (One Small Square)

By Donald M. Silver; illustrated by Patricia Wynne. (1993, W H Freeman and Co.)

An interesting approach to depicting the wealth of science and life in children's own backyards. Shows children how to study their surroundings as a scientist would.

Backyard Pets: Activities for Exploring Wildlife Close to Home

By Carol A. Amoto; illustrated by Cheryl Kirk Noll. (2002, John Wiley & Sons)

Lots of information about animals and insects that live in your backyard. What do toads eat? Why do crickets sing? How do you attract birds? Written by a nature science educator and language-learning specialist.

Let's Go Rock Collecting (Let's Read and Find Out)

By Roma Gans; illustrated by Holly Keller. (1997, Harper Collins)

Describes the formation and characteristics of rocks, and how to collect and identify them, as it follows two child rock collectors around the globe.

Natural Objects (Cool Collections)

By Mir Tamim Ansary. (1997, Rigby Education)

This is a beautiful book with photographs of a variety of nature collections, including rocks, shells, bones, feathers, leaves, flowers, and seed cones. It offers tips for collecting, organizing, and displaying various collections of natural objects. A good reference and source of ideas for the study.

Seashells by the Seashore (Sharing Nature with Children)

By Marianne Collins Berkes; illustrated by Robert Noreiken. (2002, Dawn Publications)

A rhyming book about a young girl's search along the beach to collect seashells for her grandmother. An enjoyable book for children with clear information about the shells the girl collects.

Why Do Leaves Change Color? (Let's-Read-and-Find-Out)

By Betsy Maestro; illustrated by Loretta Krupinski. (1994, Harper Trophy)

An informative book with detailed pictures of leaves and simple instructions for making leaf rubbings and pressings.

Field Guides and Reference Books

There are a number of series for children that might have a reference book or field guide about your class's collection. You might want to investigate the following series:

DK Handbooks (Dorling Kindersley)

Eyewitness Books (Dorling Kindersley)

Eyewitness Explorers (Dorling Kindersley)

National Audubon Society First Field Guides (Scholastic Trade)

Peterson First Guides (Houghton Mifflin)

Activity **Seek, Find, and Share**

Focus: Children become aware of the science possibilities in their surroundings as they look for objects to add to the class collection.

Materials: Containers to collect objects in, such as baskets, buckets, or plastic bags.

Setting: Children look outdoors, at home, and elsewhere for objects to add to the collection, and share them periodically at class meetings.

Once you and your class have determined the type of objects you want to collect and study (e.g., rocks, shells, seeds, leaves, feathers, flowers, twigs, etc.), enlist the children's help in building your class collection. This will heighten children's awareness of science in their everyday lives and help them become invested in the study. (See "Preparing for the Collections from Nature Study" on page 65 for suggestions about deciding on a collection and initiating this study.)

If appropriate, take the children for a walk outdoors to search for objects to add to the class collection. In addition, provide collecting containers for them to use regularly during outdoor time. Tell them to keep an eye out for interesting additions whenever they are outside. For some collections, such as rocks or shells, family members might have interesting samples they are willing to share with the class temporarily.

TEACHER NOTE: Some schools and museums have collections of rocks, seeds, shells, feathers, or other such items that teachers can borrow. If you save your class collections from year to year, you will also begin to accumulate interesting collections that you can draw on for future studies.

Throughout the study, make time for children to share objects they add to the class collection. Ask them to share information they have about the object, including where they got it, what kind of object it is (if they know), and any other pertinent details.

TEACHER NOTE: Arrange for children to keep special objects they don't want to lose separate from the class collection. They can place these objects in the Science Center in small boxes or on index cards with their name. For very special objects, children can share them during a class meeting, put them out for observation at choice time, and take them home at the end of the day.

Language Arts Extension

Enlist the children's help in writing a letter to families explaining the study and asking them to loan relevant objects to the class for a short time. You might use this letter in place of, or to supplement, the Family Letter on page 69.

Math Extension

Put a tally sheet in the Science Center to keep a running count of the collection as it accumulates.

Connections

Begin the study with this activity. It would work well to follow this activity with "Think and Wonder."

Activity Think and Wonder

Focus: Children participate in determining the direction of the study by discussing what they wonder about the class collection, and how they can investigate their questions. They are exposed to the idea that curiosity is a vital part of science and learn that there are many valid ways to pursue information.

Materials: Class nature collection, chart paper, and a marker.

Setting: Class meeting.

Once the class has begun to accumulate objects for their collection, hold an “I wonder” meeting during which children can share what they are interested in learning about the objects in the collection. Record their questions on chart paper and post it in the Science Center for the duration of the study. Some questions will be general. (How are rocks made? Why are different leaves different colors, shapes, or sizes? How many different kinds of shells are there?) Others will be specific. (Why does this leaf have bumps on it? Why are strawberry seeds on the outside of the strawberry?) Respect and encourage all queries.

TEACHER NOTE: Some children could be inhibited about sharing their questions. Encourage them by showing interest in the questions that are asked and adding genuine questions of your own. Emphasize that an important part of being a scientist is being curious and asking questions. Place yourself in the role of wonderer along with the children.

After children have had a chance to share their questions, ask them to think about how the class could find out more information. Again, invite a range of responses. Probe for direct methods of inquiry (observation and experimentation) and indirect methods (for example, book research or asking an expert).

The activities in this study will likely provide answers to many of the children’s questions about objects in the class collection. You may need to help children find additional ways to investigate some of their remaining questions. Whenever possible, follow up on the children’s suggestions for how to pursue more information. (This can be done with individuals or small groups.) Periodically revisit the list of questions with the class and discuss what they have learned and how they learned it.

Language Arts Extension

Begin a class book about your collection. You might want to use a question and answer format, with one side of each page devoted to a question, and the other side devoted to the answer. Children can create the “question” sides as an extension of this activity, then work on the “answer” sides as they learn more information. Add pages, as desired, throughout the study. In addition to taking dictation and helping children with writing, focus on drawing as an important way for the children to convey what they have learned.

Connections

This activity follows “Seek, Find and Share.” Conduct this discussion early in the study to help you assess the children’s interests and knowledge about the objects in the collection.