



VA SEA

LEARNING ABOUT NATURE THROUGH MUSEUM COLLECTIONS

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Grade Level

1st Grade

Subject Area

General Science / Ecology

The Virginia Scientists & Educators Alliance (VA SEA) is a project of William & Mary's Batten School & VIMS Office of Outreach and Engagement. The VA SEA project is made possible through funding from VIMS, Virginia Sea Grant, the National Science Foundation, and the MacWhorter Family.



Title: Learning about nature through museum collections

Focus: Collect specimens (depending on availability: plants, shells, or rocks) while recording data about them to understand the importance of scientific collections.

Share and document specimens by doing basic drawings of them.

Grade Level: 1

Virginia Standards of Learning:

1.4 The student will investigate and understand that plants have basic life needs and functional parts that allow them to survive. Key ideas include

c) plants can be classified based on a variety of characteristics.

1.5 The student will investigate and understand that animals, including humans, have basic life needs that allow them to survive. Key ideas include

c) animals can be classified based on a variety of characteristics.

Learning Objectives:

- Students will explore their environment and collect a specimen of their choice.
- Students record field information including locality, time of day, weather conditions, and a description of their surroundings.
- Students will curate their collected specimen.
- Students will collaborate by examining specimens brought by their peers.
- Students will document by illustrating one of the specimens brought by their peers.

Total length of time required for the lesson:

- **Total length:** 50 minutes
 - **Introduction:** 5 minutes
 - **Field trip to collect specimens and record field data:** 15 minutes (but may be variable depending on availability)
 - **Curating specimens:** 10 minutes
 - **Accessioning specimens:** 5 minutes
 - **Selecting a peer's specimen to document:** 5 minutes
 - **Documenting by drawing the selected specimen:** 15 minutes

Vocabulary:

- **Accession:** Add a new item to an existing collection.
- **Arthropods:** A group of animals made up of invertebrates with an external skeleton – an exoskeleton. They include insects, spiders, millipedes, crabs, and lobsters, among others.
- **Biodiversity:** A measure of the diversity of life. The more species of living things, the higher the biodiversity. For instance, deserts have low biodiversity, and rainforests high biodiversity.
- **Curate:** To properly organize an object so that it can be displayed or preserved.
- **Entomology:** The study of insects.
- **Fishes:** Normally fish is the plural of fish, but in the study of animals when there is a group of many fish of different kinds, we call them fishes. For example, Nemo and Marlin are fish because they both are clownfish, but Nemo and Dory are fishes, because one is a clownfish, and the other is a blue tang.
- **Herbaria:** The plural of herbarium. A collection made up of pressed plants stored within paper sheets.
- **Ichthyology:** The study of fishes. The prefix “ichthyo” comes from the Greek “ikhthus”, meaning fish.
- **Pelt:** The skin and fur of a mammal.
- **Specimen:** An item used for study that is representative of a category.

Background Information:

Museums are places where people can see objects on public display. People go to museums to explore and learn more about those objects. Public displays are usually a small fraction of the specimens and items that museums care for. For example, the Smithsonian Institution’s public display makes up less than 1% of its entire collection of more than 145 objects. Museum collections are **curated**, cared for, and preserved for future use, even if they are not all on display.

Natural history museums specialize in keeping a record of the natural world. Their collections are usually made up of **specimens** of plants, animals, and microorganisms. Rocks, minerals, and even meteorites are also usual components of these collections. Collections are often used for reference, like you would a library. For example, if you are trying to compare one mineral to another to make sure that you are naming it properly. Collections of living things are often used to look back at the **biodiversity** of the past. This allows researchers to understand how we can better conserve current species. These collections are important because they help us understand the natural world and our place in it.

There are many different types of natural history collections, which usually require different types of care. For example, collections of insects and other land **arthropods** are usually stored as dry specimens and referred to as **entomological** collections. **Fishes** are usually stored under liquid substances that preserve them – normally in alcohol – in collections known as **ichthyological** collections. Mammals tend to be rather large and often you will find that collections of these animals are separated into their **pelts** and bones, and only smaller specimens are stored under preserving liquids. Plant collections are usually stored as dry

specimens, but in this case, the plant specimen is pressed among sheets of paper – these collections are known as **herbaria**.

One of the duties of museum staff is to make sure that their objects have as much data about them as possible. A good museum specimen should at least have information about the location and date where it was collected. These data are important because they give researchers clues about a specimen's environment. For example, data about a plant's location could show that a plant was growing in a place where it doesn't anymore.

Museum collections give specimens and objects unique numbers. These numbers allow a specimen to be traced and located. This step is called **accessioning**. Museum staff recheck that the collectors have followed all the rules of collecting before accessioning an object. This is particularly important because after this step the specimen is in full care of the museum.

As you might have guessed by now, the plants, animals, and other living things stored in museums are not alive. Although it is a sad reality that we cannot preserve specimens in their living condition, the importance of having them for research makes up for this unfortunate cost. Scientists and collection staff, however, make great efforts to collect only necessary and important specimens.

Materials & Supplies:

- Printable materials:
 - *Field Data Sheet* (one per student)
 - *Accession List* (one per class)
 - *Drawing Sheet* (one per student)
- For taking notes:
 - Pencils
 - Clipboard or notebook for support
- For drawing:
 - Pencils
 - Colors
- For staging specimens:
 - Tape
 - Printer paper
 - Recycled containers

Teacher Preparation:

1. Define location of field trip and possible collection specimens:

For this activity students will collect specimens of some kind to build up a collection. Because every place is different, the instructor may choose to target different specimens for collection. These are some ideas: If you are close to a beach, shells might be a good choice. If there are prairies, meadows, parks, or yards with plants, collecting vegetation might be appropriate. Collecting rocks could also be a good fit for more arid

environments. If the season is right, collecting fall foliage or flowers in the spring might work.

2. Safety at the field site:

To ensure safety it is important that instructors look for hazards in field trip locations. In the Eastern US, plants such as poison ivy or poison oak could be dangerous especially if the objective is to collect vegetation. Especial considerations should be taken to address those and other hazards.

3. Projector for video on short introduction about collections:

A short, 5-minute video will introduce museum collections to the students.

4. Prepare printable materials:

- a. Every student should have a *Field Data Sheet* to fill out the collector's name, location, date and time of collection, weather, and any other observations that may be important. The layout provided is of two *Field Data Sheets* per letter-sized page.
- b. One *Accession List* is required per class. This list will have all the specimens that students brought with them and each of them will have a number assigned to them. The provided list does not have collection numbers filled in, as more than one sheet may be needed. Instructors should fill in those numbers according to the number of students in their class. Although museums normally use a combination of letters and numbers (e.g. VIMS 1456), for this exercise only numbers would be enough (i.e. consecutives from 1 to 30 if there are 30 students).
- c. Each student will get a *Drawing Sheet* where they will illustrate a specimen that another student brought into class. The layout provided is of two *Drawing Sheets* per letter-sized page.

5. Writing and crafting supplies:

- a. **During the field trip:** Students will need pencils to write down information on their *Field Data Sheet*. As recording those data will take place in the field, students will probably need either clipboards, or a notebook or book for supporting the sheet.
- b. **While curating specimens:** Depending on what students collected they will need supplies to store or display their specimens. If plants were collected students could affix them to a sheet of paper using tape. In the case of more three-dimensional objects like rocks, shells, or flowers, small containers, boxes, or even paper plates could do. The instructor could bring an array of suitable containers and have their students look through them to find an appropriate one to display their specimen.
- c. **While accessioning objects in the classroom:** Students will need to stand up and come to a central place where they can add their specimen's information to the *Accession List*. This list could also be circulated throughout the classroom, if preferred. Students will need pencils to write their information.
- d. **During the documenting step:** Students will need drawing and sketching supplies, and one *Drawing Sheet* per person.

Procedure:

1. Introduction

Instructor plays *Introduction Video* or *Power Point presentation*, which gives insight into scientific collections, and a brief explanation of the activity to come.

2. Field trip

Instructor takes class outside to collect specimens

a. Instructions to be given before heading out:

- i. Which site will be visited
- ii. What specimens are to be collected: shells, rocks, plants (leaves, seeds, flowers, etc.). *I would suggest all students collect the same type of material so that you don't get a jumble which may be harder to curate later. Also, I would highly discourage anyone doing this activity from choosing insects as the collection object for the class, even if they are dead.
- iii. Point out the potential hazards of the field site (e.g., poison ivy, fire ants, other insects, etc.).
- iv. Make sure that students know that they are supposed to collect a single specimen.
- v. Provide each student with a *Field Data Sheet* and give a brief explanation of how this should be filled out.
- vi. Make sure that students have pencils and a clipboard or notebook for support – as they will be writing while on the field.

b. While at the field:

- i. Keep an eye on potential hazards.
- ii. There will be some students that don't know where to start, so provide them with ideas of what specimen to collect.
- iii. Announce interesting observations while outside.
- iv. Remind students to fill out their *Field Data Sheets*.

3. Curating specimens

When students return to the classroom, the instructor will have the students set their specimens on top of their table. Students should:

- i. Pick foreign objects from their specimens (e.g., remove dirt from a rock).
- ii. They will now look for an appropriate container (or in the case of a plant, a piece of paper) to set or affix their specimens to. Keep in mind that the containers that students choose should be to display their specimens, not to store them long-term.
- iii. With the container at hand, the students should position their object in or on it and should make it look ready to display. In the case of plant specimens, a little glue, or tape may be used to affix the specimen to a piece of paper.

4. Accessioning specimens

Students will add their specimen's information to the *Accession List* to create a list of all the specimens in the class.

- a. The students will either move to a central place in the classroom where the *Accession List* is placed, or the list will be circulated through the class. There are only two fields that the students should fill out Collector and Specimen. The collector field should have the student's name, and the specimen, just a short title of the specimen that they collected (e.g., plant with blue flowers).
 - b. Students will remember that number and write it down on the container that holds their specimen. If it can't be written down because of the container's shape, they can get a small piece of paper and place the number inside the container.
5. Sharing specimens
Students will go around the room and they will select a specimen that they find interesting. They will move this specimen to their table being very careful not to damage or alter it. All students should have a specimen that is not the one they collected originally.
6. Documenting specimens
Students then will get a *Drawing Sheet* and drawing supplies. They will draw the specimen that they borrowed from someone else. They should make a note of the collector's name and the specimen number that was assigned on step 4.
7. End
Depending on the instructor's interest in keeping the specimens long term to showcase the class project, they may be discarded, or the students may choose to take them home. *Field Data Sheets* and *Drawing Sheets* may be used as assessments of the student's performance of the activity.
Student's should clean up their workspace and wash their hands.

Assessment:

Students can be assessed based on the materials they turn, for instance their *Field Data Sheets* and *Drawing Sheets*. The depth of work of either of these may represent the interest of the student.

References:

Handouts/Worksheets:

- Accession sheet
- Drawing sheet
- Field data sheet

Answer Keys:

Appendices:

Your name: _____

Collector: _____

Specimen number _____

Draw a specimen that someone else collected

Use the space above to draw a specimen that caught your eye. Make sure, however, that it was one that someone else collected!

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Collector: _____

Specimen number _____

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Field data sheet

Record some information about your collected specimen

Name of collector (your name): _____

Year: _____ Month: _____ Day: _____ Time of day: _____

What did you collect? (a plant, a rock, a shell?): _____

Location (for example, by the sports shed): _____

Weather (is the day hot, sunny, cold, damp, windy?): _____

Give a short description of the specimen (what color, shape, size is it?): _____

Other observations (describe other things that caught your eye while at the field trip): _____

Field data sheet

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