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| **Learning about Trees using**  **The Michigan Trees Coloring Book** |  |

## Objectives

Students completing this module will be able to do the following:

* Identify and describe variation in leaf morphology
* Use a key to identify tree species based on leaf morphology
* Identify and communicate key features of tree species’ biology, including: native distribution, economic significance, biological significance, and threats
* Explain the importance of specimen collection and preservation
* List the critical steps in preparing real herbarium specimens for a collection

**Introduction**

Plant identification is one of the primary skills a botanist has in their toolkit and it is important for many reasons. Scientists studying ecosystems may need to identify all of the plant species present in an ecological community in order to determine and monitor the plant diversity. Changes in the diversity of the plant community can be a signal of environmental change. Researchers will want to know which plants are native to the community and which are nonnative and may be disrupting the ecosystem. It may also be useful to know what rare or endangered species are present in the community so that their populations can be monitored.

Citizens may need to accurately identify a plant to determine if it is safe to eat or touch.

Accurate plant identification is also critical when plant specimens are being collected and preserved in herbaria. **Herbaria** are libraries of preserved plants, fungi, and algae specimens, rich with biodiversity and history of earth’s flora over time. While the main function of herbaria is to document biodiversity, they also do many other things, acting as a valuable resource for scientific research, education, and community outreach. To prepare a plant specimen for entry into an herbarium collection, the following steps are completed:

1. The plants or plant parts are dried, flattened, and glued to heavy archival paper.
2. The plant is identified to species.
3. A label is added to the paper. This label includes the species name, collection information, and other information (e.g., accession number and herbarium code). If the collection is digitized, a barcode is included.

In this set of activities, you will use the Michigan Trees Coloring book to learn and practice plant identification. You will also simulate some of the steps of specimen preparation by labeling your plant “specimens”.

**Activity 1: Review Leaf Morphology**

In order to identify tree species, you will need to be familiar with some of the variations in leaf morphology that are present in trees. Review the terms and images on the “Michigan Trees Coloring Book Specimen Key” and answer the following question.

*Question:*

1. Which of the following terms correctly apply to the leaf pictured below? Circle the terms that apply.

|  |  |
| --- | --- |
|  | Simple or Compound  Toothed or Smooth  Lobed or Unlobed  Palmate or Pinnate |

**Activity 2: Identify Your Specimens**

The specimen key that is provided consists of a series of either/or decisions you will need to make (e.g., does the specimen have needle-like leaves or broad-leafed leaves). By following this flow chart, you will be able to identify the tree species included in the key. As you practice identification, try to recognize and remember key identifying features of the plants so you can identify them from other pictures or if you were to see these species in-person!

*Procedure:*

1. Use the Michigan Trees Coloring Book Specimen Key to identify each “specimen” included in the Michigan Trees Coloring Book.
2. Scan the QR codes on the label for the species you have identified. Compare the specimens found in the **Midwest Herbaria database** to the corresponding coloring pages. Use this information to confirm your identifications.
3. Using the images on the website as a reference, color in your specimens.

*Question:*

1. Now that you have completed some plant identifications, what qualities and skills do you think it takes to become good at plant identification?

**Activity 3: Label Your Specimens**

The labels on preserved plant specimens are critical to their value as records of the history of biodiversity. The labels are important because they: (1) confirm the plant’s identity, (2) provide information about the collection event, and (3) help organize specimens for efficient retrieval. You will now be labeling your specimens.

*Procedure:*

1. Cut out the species labels provided in the Michigan Trees Coloring Book.
2. Paste the correct label on each specimen page.
3. Write your name in the “Collector” spot and today’s date in the “Date” spot.
4. The diagram below shows the step involved in preparing real herbarium specimens for a collection. In the space below, explain how what you are doing with the coloring pages corresponds to how real specimens are prepared.

Diagram

Description automatically generated

Preparing Specimens display created by Alaina Brenner

**Activity 4: Research Your Specimens**

Understanding of the biology of different plant species is essential for scientists who study the plants and the ecosystems that they are part of. You will be learning some details about each species by researching each species on the MSU Herbarium website. This resource provides information about each species’ native distribution, economic significance, biological significance, or threats.

*Procedure*

1. Scan the QR codes below. These codes will take you to the corresponding species page on the MSU Herbarium website.

|  |  |  |  |
| --- | --- | --- | --- |
| *Fraxinus Americana*  White ash |  | *Pinus strobus*  Eastern white pine |  |
| *Acer saccharum*  Sugar maple |  | *Quercus rubra*  Red oak |  |
| *Asimina triloba*  Pawpaw |  | *Malus pumila*  Paradise apple |  |
| *Crataegus coleae*  Cole’s hawthorn |  | *Liriodendron tulipifera*  Tulip tree |  |
| *Cornus florida*  Flowering dogwood |  | *Sassafras albidum*  Sassafras |  |

1. Read the information provided and select one interesting fact about each species to enter on the specimen label on your coloring page. The sample below shows an example of what the different categories mean.

Graphical user interface, text, application, email

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1. As you read about the species, pick the information that you find the most interesting for each category (native distribution, economic significance, biological significance, threats) and record these in the appropriate space below. These facts can all be from different species, so be sure to include the name of the species for each fact.
   1. Native Distribution
   2. Economic Significance
   3. Biological Significance
   4. Threats