

This Plant Key Is All Wet!

Adapted from: "This Plant Key Is All Wet" in WOW!: The Wonders of Wetlands. The Environmental Concern Inc. and The Watercourse, 1995.

Grade Level: All

Duration: 25 minutes + field trip time (optional)

Setting: Classroom and field

Summary: Students use a dichotomous key to identify pictures of wetland plants in the classroom, then use their skills to identify wetland plants in the field.

Objectives: Students will learn to use dichotomous keys while studying emergent plants.

Related Module Resources:

- "Treatment Plants" module activity

Vocabulary: hydrology, hydric, hydrophytic, macrophytes, emergent plants, submerged plants, floating-leaved plants, dichotomous key, opposite, alternate, whorled and simple leaves, petiole, compound, palmate, pinnate, entire

Materials (Included in Module):

- Emergent Plant Mystery Plant photo sheets (This Plant Key is All Wet! Module Activity Envelope)
-1 copy each Plant A, C-K
-10 copies Plant B
- Key to Emergent Plants original and overhead transparency
- This Plant Key is All Wet worksheet
- The Book of Swamp and Bog [Book Box]
- Plants in Wetlands [Book Box]
- Through the Looking Glass: A Field Guide to Aquatic Plants [Book Box]
- Common Marsh, Underwater & Floating-leaved Plants [Book Box]
- 15 magnifying glasses for field work [Book Box]

Additional Materials (NOT Included in Module):

- real plant specimens
- overhead projector

ACADEMIC STANDARDS (ENVIRONMENT AND ECOLOGY)

7th Grade

- 4.1.7.D Explain and describe characteristics of a wetland.
- Identify specific characteristics of wetland plants and soils.
 - Recognize the common types of plants and animals.
- 4.1.7.A Describe diversity of plants and animals in ecosystems.
- Select an ecosystem and describe different plants and animals that live there

10th Grade

4.1.7.C Describe the physical characteristics of a stream and determine the types of organisms found in aquatic environments.

- Identify terrestrial and aquatic organisms that live in a watershed.

ACADEMIC STANDARDS (SCIENCE AND TECHNOLOGY)

Grade 7

3.3.7.A Describe the similarities and differences that characterize diverse living things.

- Explain how to use a dichotomous key to identify plants and animals.
- Account for adaptations among organisms that live in a particular environment.

Grade 10

3.3.10.A Explain the structural and functional similarities and differences found among living things.

- Identify and characterize major life forms according to their placement in existing classification groups.
- Describe organizing schemes of classification keys.

BACKGROUND:

A defining characteristic of wetlands, in addition to their **hydrology** (presence of water) and **hydric** (saturated) soils, is the presence of **hydrophytic** (adapted to saturated soil conditions) vegetation. Hydrophytic plants that are large enough to be seen with the naked eye are called **macrophytes**. (The prefix "macro" indicates that they can be seen with the naked eye and "phyte" means plant). There are three main types of wetland or hydrophytic macrophytes: emergent, submerged, and floating-leaved. As you might guess, **emergent plants** are those that are rooted in water but also have sections that protrude out of the water. An example of an emergent plant is a cattail. **Submerged plants** are entirely underwater, while **floating-leaved plants** are underwater except for leaves (and sometimes other parts, like flowers) that float on the surface of the water.

Each species of wetland plant is adapted to its particular needs as well as to the specific hydrologic and soil conditions in which it lives. These wetland

plant adaptations can be used to identify the plants.

Organisms, hydrophytic macrophytes included, are often identified with the use of a **dichotomous key**. This device has a number of different steps each with two choices. The option that best describes the plant in question is selected and the reader is directed to a new pair of options to choose from. Eventually, the choice made is so specific that it leads to only one answer, and the plant is identified!!

For plant keys, there are some basic concepts that must be learned in order to identify the plant in question. First, you must remember that plants do not always look the same. They undergo different stages; they will appear different if they are young, or if they are dying back for the winter. Also, they might be flowering. Just because you don't associate a plant with flowers doesn't mean that it doesn't produce them. For instance, even grasses have flowers if allowed to develop properly.

Second, it is important to know the basic identifying feature of plants: the arrangement of their leaves and branches on the stem. (See the lower right hand corner of the Key to Emergent Plants at the end of this activity write-up for line drawings of the various leaf arrangements.) **Opposite** arrangement means that pairs of leaves or branches grow from the same position on the stem (on opposite sides), though other pairs can be present on the stem at different positions. The leaves and stems of **alternate** plants grow from different positions on the stem. That is, leaves are not directly across from each other on a branch. **Whorled** leaves all come out from the same place on the stem, creating an effect that is like the spokes of a wheel.

Leaf shape is also important. **Simple** leaves are those that have one leaflet per leaf stem (**petiole**). **Compound** leaves have two or more leaflets per leaf stem. These leaflets can be arranged in a palmate or a pinnate fashion. **Palmate** leaves have leaflets that all have their base at the same point, giving them a shape like a hand. Leaves that are **pinnate** have leaflets with their bases at different points on the leaf. These look like feathers. Be careful, though, because simple leaves can also have palmate or pinnate patterns. In addition to these features, leaves can be round, oval, long and slender, pointed, lobed, or a variety of other shapes.

Leaf edges can also aid in identification. Leaves with smooth edges are called **entire**. Other types of edges are hairy, toothed (jagged), and wavy.

OVERVIEW: Students learn to use a plant key to identify pictures of mystery wetland emergent plants in the classroom. They then use their new skill to identify wetland plants in the field.

PROCEDURE:

Teacher Preparation:

1. Locate the Key to Emergent Plants, the Mystery Plant photo sheets for plants A through K (there are single copies of A and C-K and 10 copies of B), and the This Plant Key is All Wet worksheet at the end of this activity write-up.

2. Make photocopies of the Keys and worksheets for your students.
3. Locate the numerous wetland plant resources in the module and have them accessible during the activity.
4. You may also want to use the overhead transparency version of the Key to Emergent Plants to review plant features and the use of a dichotomous key with your students. If you elect to do so, procure and set up an overhead projector.

Student Activity:

1. Distribute the Key to Emergent Plants copies to your students and quickly review the features of plants and their leaves as described in the lower right hand corner of the Key. (You may also use the overhead transparency at this juncture).
2. Group students into ten groups and distribute a copy of the Mystery Plant B photo sheet to each group and a worksheet to each student.
3. Have students describe Mystery Plant B's features and jot down their observations in the "Observations" column on the worksheet that corresponds to Mystery Plant B. What does the plant look like? What is its shape? Its height? Its color? What kind of leaves does it have? Does it have flowers? Have students describe as much as possible about their mystery plant.
4. Students may recognize Mystery Plant B as a cattail immediately. This is fine. Encourage them to still make close observations of the plant. Explain to students that if they didn't know what the plant was, they could use the Key to Emergent Plants to determine what it was. Practice using the Key as a class to identify the cattail.
5. Explain to students that they will go through a similar process to identify other Mystery Plants. Distribute one of the remaining 10 mystery plants to each team. Give them about 3-5 minutes to identify the plant using the dichotomous key. Make sure students write down observations on the worksheet. Then have groups switch Mystery Plants (e.g., A→C, C→D, E→F, K→A, etc.).
6. Once all groups have had a chance to identify all 10 plants, go over the answers with students using the key below.

Mystery Plant	Plant Name
A	Arrowhead / Duck Potato
B	Cattail
C	Bulrush
D	Soft Rush
E	Iris
F	Tearthumb
G	Hibiscus
H	Wild Rice
I	Jewelweed
J	Phragmites
K	Skunk cabbage

7. Once students feel comfortable using a dichotomous key, take a field trip to a wetland and use the Key to Emergent Plants as well as the field guides included in the module to identify wetland hydrophytic macrophytes in the field. It may be best to determine some of the plants there in advance so that students do not get frustrated trying to identify plants that are not in your guide. (NOTE: The attached Key to Emergent Plants is not complete. Therefore, other plants may fit the descriptions in the key.)

DISCUSSION:

Talk to the students about what they learned. Do they look at plants differently now? What might they notice now that they did not before? *Answers will vary.*

What were the most useful characteristics when identifying the emergent plants?
Answers will vary.

What do all the Mystery Plants have in common? *They are all hydrophytic and emergent.*

EVALUATION:

- Identify a plant using a dichotomous key.
- Describe some characteristics of a given plant specimen.
- List some plants that might be encountered in a wetland.

EXTENSIONS AND MODIFICATIONS:

- Identify aquatic plants that grow under the water. Compare the characteristics of these plants with those that are emergent. Brainstorm why these differences might be helpful for the plants in their environment.
- Use various other types of keys and/or field guides to identify plants (or other organisms!).
- Have students create their own reference collection or field guide after identifying their plants.

**NOTES (TEACHERS, PLEASE WRITE ANY SUGGESTIONS YOU HAVE FOR
TEACHERS USING THIS ACTIVITY IN THE FUTURE):**

Activity Version: June 2003



WORKSHEET : THIS PLANT KEY IS ALL WET!

Name _____ Date _____

Mystery Plant	Observations	Plant Name
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		
K		

