

Oxley Nature Center - Elementary

Title: Discovering Pond Life at Tulsa's Oxley Nature Center

Video Title on SDE Website: Discovering Pond Life E

Length: 0:02:43

Teacher Tool: Primary Focus: Grades 1 through 5

Description of the Bellringer:

Led by Donna Horton, senior staff naturalist at Oxley Nature Center, 4th grade students of Jackson Elementary School, of Tulsa Public Schools, learn how to use dip nets and cups in capturing macroinvertebrates for study. This bellringer might serve as an introduction on how to study macroinvertebrates. Ms. Horton introduces students to a wetland habitat (BJ's Pond at Oxley Nature Center) and the importance of carefully handling the specimen that are to be studied.

Curriculum Application

PASS for Science Process Standards, Grades 1 through 5

Science Process Standards

Grades 1, 2 and 3: Standard 3.1 and 3.2: Ask questions about organisms in the environment and use tools (dip nets and cups) to gather data (macroinvertebrates).

Grades 4 and 5: Standard 1.1 Use tools to gather data (macroinvertebrates)

Possible Outside Activity

City parks, Oklahoma State Parks, national wildlife refuges and national parks, Quartz Mountain Nature Park, educational facilities of the Okla. Dept. of Wildlife Conservation and nature preserves like Tulsa's Oxley Nature Center, the Rogers County Conservation Education Reserve in Claremore and Oklahoma City's Martin Park are all great places for student field trips. If your school isn't able to travel to such places, you might see if there is a creek or pond near to your school. If so, a short trip to such an aquatic habitat might be a good way to introduce your students to examples of the aquatic life that can be found in even the smallest water body. Use this bellringer as an orientation before the student's field trip. If a student field trip isn't possible, before class the educator might collect a small amount of water from one of these aquatic habitats for classroom use. The best time to collect macroinvertebrates is during the springtime, late summer or early fall when the water is warm.

Even if you don't have a dip net, you can also capture macroinvertebrates using other techniques. One way is to simply dip a small Tupperware container into the creek and pour the water into a larger, clear, container that has a lid. If macroinvertebrates are in the water sample, you will be able to see them moving around. Macroinvertebrates are often found near aquatic vegetation which provides them with food and cover. You may be astounded at how many examples of aquatic life you capture in just a small amount of creek water. In the classroom use such inexpensive magnification tools as acrylic bug boxes or hand lenses for students to observe these fascinating creatures. Be sure to return these organisms back into their aquatic habitat at the end of the day.

Oxley Nature Center – Elementary School

Title: Exploring the Outdoors at Oxley Nature Center and How Can I Become a Naturalist?

Video Title on SDE Website: Exploring Outdoors E

Length: 0:04:21

Teacher Tool – Primary Focus: Grades 1 through 5

Description of the Bellringer:

This bellringer provides examples of some of the things that a naturalist does in their daily job duties (Process and Inquiry Standards). Ms. Donna Horton, senior staff naturalist at Tulsa’s Oxley Nature Center, explains to 4th grade students of Jackson Elementary School of Tulsa Public Schools what things they might study in college to become a naturalist. As well, Ms. Horton points out that being a naturalist means that a person is a life-long student of nature.

This bellringer also contains a testimonial by Ms. Ava Hamilton, Elementary Science Specialist of Tulsa Public Schools, on the benefits of providing students with the opportunity to explore nature in the outdoors.

Curriculum Application

Science Process Standards

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|---------------------------|--|
| Grades 1 through 5 | Standard 1 Observe Nature |
| | Standard 2 Classify Organisms |
| | Standard 3 Experiment and Inquiry |
| | Standard 4 Interpret and Communicate Findings |
| | Standard 5 Skills for Inquiry (4 th and 5 th Grades) |

Life Science – Inquiry Standards

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|---------------------------|---|
| Grades 1 through 3 | Standard 2 Characteristics and Basic Needs of Organisms |
| Grade 4 | Standard 3 Characteristics of Organisms |
| Grade 5 | Standard 2 Organisms and Environments |

Oxley Nature Center - Elementary

Title: Pond Life is an Indicator of Water Quality

Video Title on SDE Website: Pond Life E

Length: 0:03:43

Teacher Tool – Primary Focus: Grades 4 and 5

Description of the Bellringer:

Students learn that the kinds of organisms that live in a pond or other body of water are an indicator of the water's quality. Water that is clear, but doesn't have any creatures living in it, is most likely polluted. This was one of the clues of acid rain and its harmful effect on aquatic environments. While water pollution is harmful to all aquatic organisms, some species are more tolerant of pollution than others. When sampling water, it is best if many kinds of organisms are found to be living in the pond, lake or stream. The more kinds of animals that live in a wetland, the better is the water quality of the wetland.

This bellringer might also be used to introduce the topic of how air pollution and the dumping of chemicals and other pollutants in a watershed can harm the animals that live in our lakes, rivers and streams. As well, such pollution is harmful to our drinking water. This lesson might include a discussion about the important job that is performed by city water departments, rural water districts and such government agencies as the Oklahoma Department of Environmental Quality, in making sure that our drinking water is safe to drink.

Integration into the Curriculum

Life Science – Inquiry Standards

Grade 4 Standard 3.1 Organisms can only survive in those environments that meet their needs.

Grade 5 Standard 2.2 Changes in environmental conditions due to human interactions or natural phenomena can affect the survival of individual organisms and/or an entire species.

Supplemental Material

With regard to **non-point source pollution** (surface water pollution that comes from a number of sources), students might be given the assignment of researching this subject on the internet (**Grade 5, Language Arts, Standard 5.1.a.**).

Possible website references include:

www.epa.gov/nps/whatis.html; oceanservice.noaa.gov/education/tutorial_pollution/welcome.html;

The Oklahoma Conservation Commission's **Project WET (WOW! The Wonders of Wetlands)** provides many classroom activities that address the topic of wetland pollution,

http://www.ok.gov/conservation/Agency_Divisions/Conservation_Programs_Division/Conservation_Education/Project_WET.html

Oxley Nature Center – Elementary

Title: Use of Controlled Fire to Help a Prairie Habitat

Video Title on SDE Website: Use of Fire E

Length: 0:04:06

Teacher Tool – Primary Focus: Grades 3 through 5

Description of the Bellringer:

Ms. Donna Horton, senior staff naturalist at Tulsa’s Oxley Nature Center, explains to 4th grade students of Jackson Elementary School of Tulsa Public Schools, that a controlled fire is a good thing for the plants and animals that live in a prairie habitat. By keeping grasses from getting too tall, controlled fires reduce the amount of fuel that is on the ground. In this way if the prairie did catch fire from lightning or a tossed cigarette, the chances for a dangerous wildfire are reduced if the prairie doesn’t contain too much dry grass (fuel).

Another benefit of controlled fires is that they burn, and kill, tree seedlings/saplings. Through adaptation, prairie plants have deep roots, and thus are able to survive such fires. Without occasional controlled fires, trees and shrubs will eventually crowd-out prairie plants. When the prairie plants are gone, prairie animals must either find a new home, or die.

The bellringer concludes by making the point that controlled fires are only set by people who are specially trained for starting and managing such fires. The rest of us must never, ever, start a fire.

Curriculum Application

Life Science – Inquiry Standards

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|----------------|--|
| Grade 3 | Standard 2.1 Plants (prairie) have deep roots that help them to survive prairie fires. |
| Grade 4 | Standard 3.1 Organisms (prairie plants and animals) can only survive in environments that meet their needs. |
| Grade 5 | Standard 2.1 Organisms in a community (prairie) depend upon each other for survival.
Standard 2.2 Changes in environmental conditions (lack of fire) can affect the survival of organisms (prairie plants and animals). |

Attachment

Illustration of some of the native grasses that grow in Oklahoma.

Additional Information on the Use of Controlled Fire to Maintain the Prairie Habitat:

Oklahoma State Forestry Services: www.forestry.ok.gov

Common Native Grasses of Oklahoma

Big Bluestem

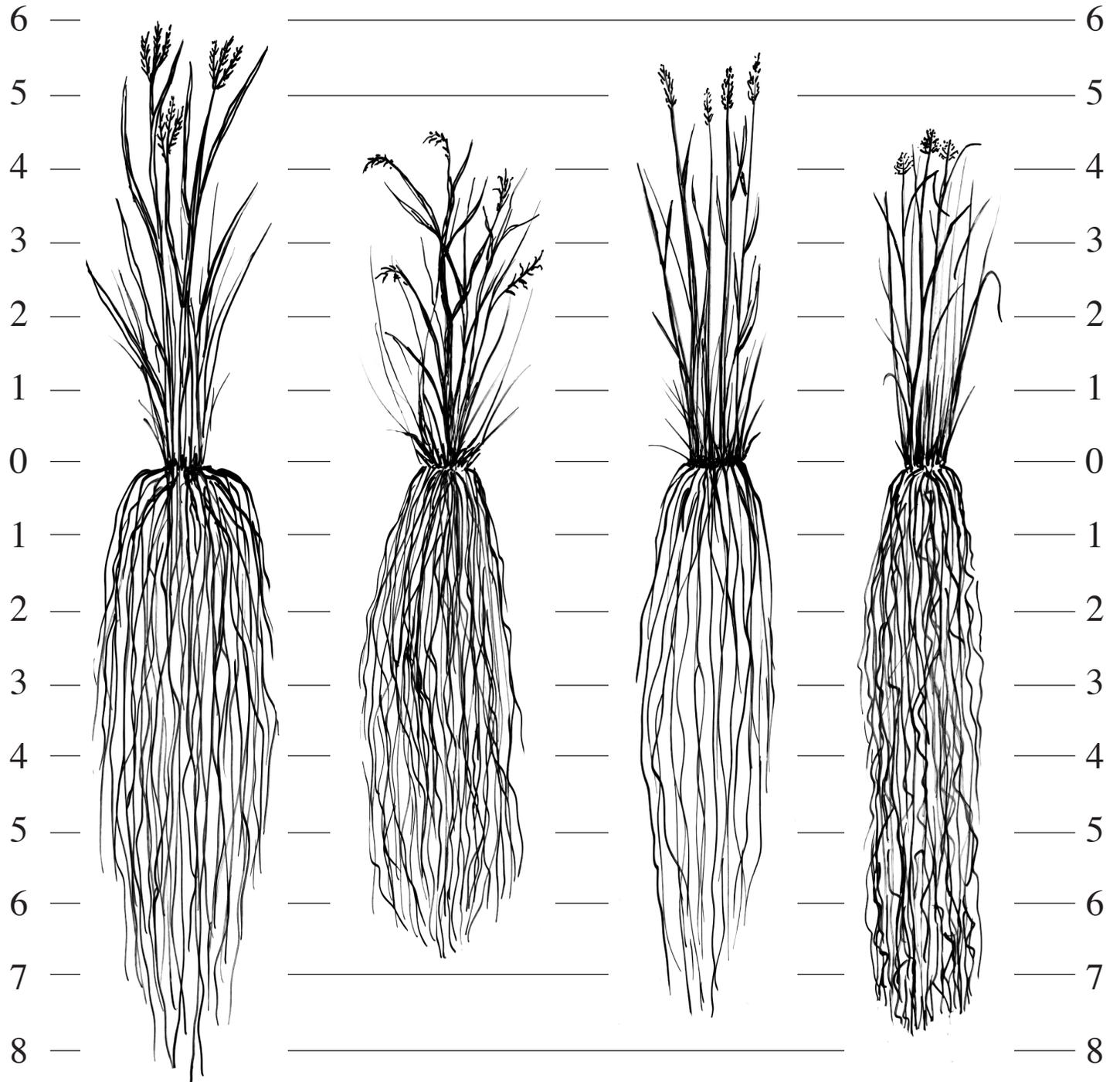
Little Bluestem

Indiangrass

Switchgrass

Feet

Feet



Oxley Nature Center – Elementary

Title: Using a Dichotomous Key to Identify Macroinvertebrates at Tulsa’s Oxley Nature Center

Video Title on SDE Website: Using Dichotomous Key E

Length: 0:06:50

Teacher Tool- Primary Focus: Grades 1 through 5

Description of the Bellringer:

Ms. Donna Horton, senior naturalist at Tulsa’s Oxley Nature Center, shows 4th grade students from Jackson Elementary School of Tulsa Public Schools, how to use dichotomous keys to identify macroinvertebrates and other aquatic animals that they have found in a pond.

Curriculum Application

***PASS* for Science Process and Inquiry Standards, Grades 2 through 5**

Science Process Standards

Grades 1, 2 and 3: Standard 1.2 Compare and contrast organisms
Standard 2.1 Classify a set of organisms by observable properties.

Grades 4 and 5: Standard 1.2 Compare and contrast organisms
Standard 2.1 Classify organisms using simple dichotomous keys.

Life Science - Inquiry Standards

Grade 2: Standard 2.1 Discussion of the life cycle as demonstrated by nymphs and larvae of selected aquatic insects.

Grade 3: Standard 2.1 Macroinvertebrates have specialized features (gills) that enable them to live in water.
Standard 2.2 Macroinvertebrates have legs for moving in water and wings for flight as an adult insect.

Additional Resources:

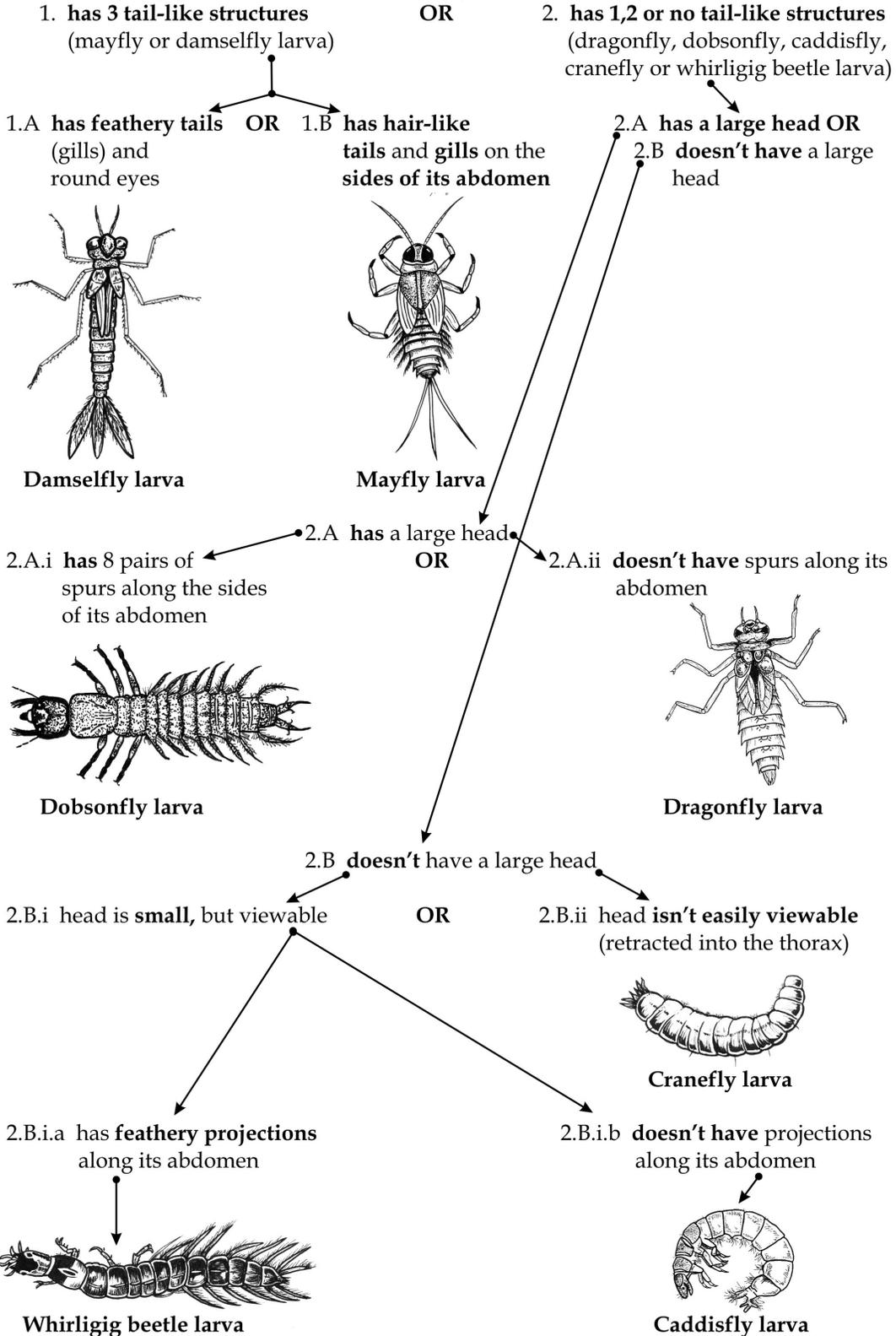
Attached is the dichotomous key that was used by the Jackson Elementary students during their field trip. These materials may be reproduced for classroom use. A website that contains photo images of macroinvertebrates is: www.bgsd.k12.wa.us/hml/jr_cam/macros/amc/index.html

Dichotomous Key

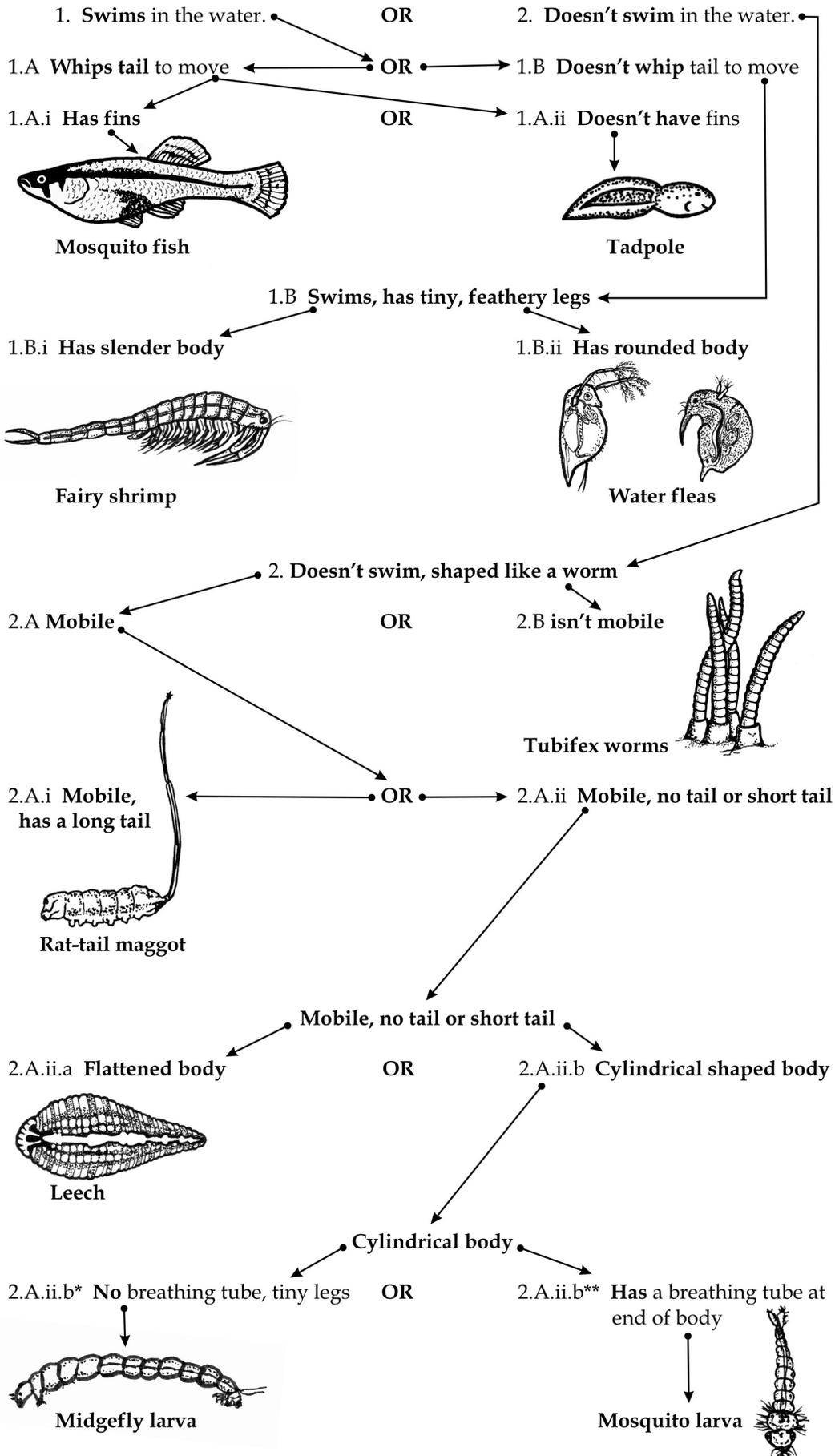
Thorax (body part that is behind the head) has easily observable segmented legs; (the insect has 3 pairs of legs) and no shell.

Possibilities: larva of mayfly, damselfly, dragonfly, dobsonfly, caddisfly, cranefly, or whirligig beetle

Abdomen (body part that is behind the thorax)



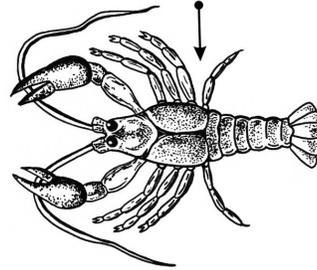
**Aquatic Animals that don't have easily observable segmented legs.
None of them have a shell.**



Animals That Have Shells or Carapace

1. Shell covers entire body

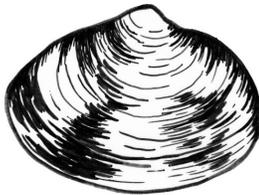
2. Shell doesn't cover entire body



Crayfish

1.A Shell is oval-shaped

1.B Shell is peanut-shaped.



Fingernail clam



Lung snail

Oxley Nature Center – Elementary

Title: Using Measurement and Data Recording in Studying Macroinvertebrates at Oxley Nature Center

Video Title on SDE Website: Using Measurement E

Length: 0:05:46

Teacher Tool – Primary Focus: Grades 1 through 5

Description of the Bellringer:

Students learn how to use hand lenses and other magnification tools to observe aquatic animals. Ms. Donna Horton, senior staff naturalist at Oxley Nature Center, also helps students use rulers and the metric system to measure these macroinvertebrates and data sheets to record this information.

This bellringer might serve as an introduction to a lesson on performing an experiment to discover information (Process Standard 3).

Curriculum Application

Science Process Standards

Grades 1, 2 and 3: Standard 1.1 Use the metric system to measure organisms.
Standard 3.3 Use equipment and tools to gather data.

Grades 4 and 5: Standard 1.1 Use the metric system to measure organisms.
Standard 5.2 Use tools for observation and measurement

Life Science – Inquiry Standards

Grade 1 Standard 2.2 Scientists use tools to gather information.
Grade 3 Standard 2.1 Macroinvertebrates have distinctive features.

Classroom Activity Using Science and Mathematics Correlations

Attached is a data sheet with a listing of benthic macroinvertebrates that one might expect to find at Oxley Nature Center’s BJ’s Pond. Using this hypothetical data, students could be asked to organize this information into tables and/or graphs, comparing the total number of each species that is recorded.

Another classroom activity might consist of the use of fractions and/or percentages to describe the individual species of macroinvertebrates as a part of the total number of animals that are recorded.

**Data Sheet for Macroinvertebrates Collected
At The Oxley Nature Center**

Location of the Collection: BJ's Pond at Oxley Nature Center

<u>Macroinvertebrates That Were Collected</u>	<u>Number</u>
Mosquito Larva	15
Midgefly Larva	12
Cranefly Larva	8
Dragonfly Nymph	9
Damselfly Nymph	6
Whirligig Beetle Larva	5
Mayfly Nymph	2
Dobsonfly Nymph	2
Caddisfly Larva	1

Oxley Nature Center – Elementary

Title: Using Random Samples to Collect Data at Oxley Nature Center

Video Title on SDE Website: Using Random Samples E

Length: 0:05:46

Teacher Tool – Primary Focus: Process Standards for all Elementary Grades

Description of the Bellringer:

Led by Ms. Donna Horton, senior staff naturalist at Tulsa’s Oxley Nature Center, 4th grade students of Jackson Elementary School of Tulsa Public Schools, use hula hoops to randomly select patches of a prairie to examine. Each tossed hoop constitutes a random sample. As each hoop is tossed, the students and adult leaders run to the hoop to identify any creature that tries to move out of the hoop’s circle. Plant species that are found within each hoop are also described and if possible, identified. Students used tally sheets to record their findings.

This bellringer might be used to introduce the process standard that employs an experiment as a way to obtain information and record data. Classroom students observe the Jackson Elementary students as they conducted random samples of a prairie habitat. The bellringer concludes by posing this question: can random samples be taken of other types of habitats, like forests and wetlands? Students are asked to think about how they might conduct such samples. While a hula hoop might not be the appropriate tool to sample a forest or wetland, other tools and techniques are available for such samples. The following are a couple of additional examples of how sampling is used to obtain information about plants and animals that live in a particular ecosystem.

Because they can’t count every tree in a forest, foresters use various methods for estimating the number and types of trees that are growing in a particular forest. For example, foresters may use a compass to walk along imaginary lines (transects) as they identify, count and measure selected kinds of trees within the forest. They may use plots (circles of a certain diameter size) that are selected at specified distances along these transect lines. Wildlife biologists also use transects for estimating the populations of certain wildlife species. **(see Bellringer Video titled: Salt Plains NWR-High School, Using Transects to Perform Wildlife Surveys)**. Wildlife biologists also use airplanes to fly over wetlands of national wildlife refuges as they inventory waterfowl populations. These biologists use sampling techniques to count these birds from the air. **(see Bellringer Video titled: Salt Plains NWR-High School, Estimating Wildlife Populations)**.

Curriculum Application

Science Process Standard

Grades 1 through 5 Standard 3 Experiment and Inquiry

Attachment:

Attached is a copy of the data sheet that is similar to the one used by the Jackson Elementary students during their field trip to Oxley Nature Center. This sheet might be useful for your students’ field study.

**Data Sheet
For Random Sampling Activity**

Date _____

Description of Sample Location (Prairie, Wetland, Forest) _____

Sample Conducted By (Name of School/Class) _____

Sample #1

Plant Species	Name	Number
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Animal Species	Name	Number
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Sample #2

Plant Species	Name	Number
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Animal Species	Name	Number
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Random Sampling Cont'd.

Possible Outside Activity

City parks, Oklahoma state parks, Quartz Mountain Nature Park, national wildlife refuges and national parks, educational facilities of the Oklahoma Department of Wildlife Conservation, nature preserves, like Tulsa's Oxley Nature Center, and the Rogers County Conservation Education Reserve in Claremore are just a few of the many great places for student field trips. Contact information for these facilities is listed in the preface of this Teacher Tools document.

If your school isn't able to travel to such places, your school grounds or a nearby community park might offer useful opportunities for conducting plant and animal data collection.

To obtain random samples, you can either use thrown hula hoops, as shown in this bellringer, or devise another method for field study. One method is to determine the length of your pace/stride. Walk two steps and use a tape to measure this distance (ex. 5 feet). By pacing the dimensions of the study tract, the teacher might, for example, determine that it is 150 feet across and 200 feet long. Using the 150 foot dimension, mark (using rocks or small stakes) three imaginary transect lines that are 50 feet apart. Sample plots will be located along these transect lines. The size of each sample should be determined (ex. radius of 4 feet). Each sample must be the same size.

Using a compass to stay on-course, students will walk along each of the three transect lines. The random samples may be taken at a set distance along each transect (ex. every 50 feet). After walking 50 feet along the transect line, the students should stop and mark the center of the sample (plot). From this center point, the students use a tape measure to obtain the radius (ex. 4 feet) dimension for each sample plot. The students then observe, identify and record the plants and animals that they find within each sample (as was done in the bellringer).

This data can then be the basis for several classroom activities. For example, students might be asked to display their results in tables, graphs and/or charts. They might also perform mathematics calculations (i.e. fractions and percentages) similar to those described in **Teacher Tool** titled: **Oxley Nature Center –Elementary, Using Measurement and Data Recording in Studying Macroinvertebrates**. For the purpose of mathematics' summations, students might use the attached data sheet which separates the observed organisms into plant and animal species.