

Salt Plains National Wildlife Refuge – Middle School

Title: Identification of Macroinvertebrate Species at the Salt Plains NWR

Video Title on SDE Website: Identification of Macros MS

Length: 0:04:28

Teacher Tool – Primary Focus: Process Standards

Description of the Bellringer:

Ms. Becky Wolff, of the Salt Plains National Wildlife Refuge, assists students of Timberlake Middle School as they use hand lenses and a microscope to observe benthic macroinvertebrates. Ms. Wolff helps the students use a dichotomous key in classifying the species that they collected.

Curriculum Application

***PASS* Process Standards**

Standard 1.2 Use tools to observe an organism.

Standard 2.1 Use a dichotomous key to classify an organism.

Additional Resources

Attached is an example of a dichotomous key for classifying a few species of benthic macroinvertebrates and other aquatic animals.

For images of Benthic Macroinvertebrates: 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)

1. **has 3 tail-like structures**
(mayfly or damselfly larva)

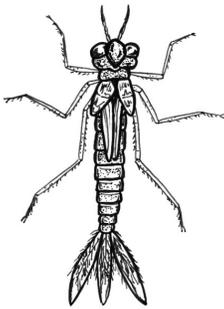
OR

2. **has 1,2 or no tail-like structures**
(dragonfly, dobsonfly, caddisfly,
cranefly or whirligig beetle larva)

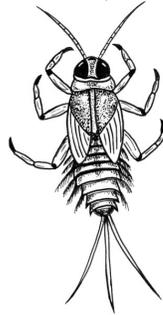
1.A **has feathery tails**
(gills) and
round eyes

OR

1.B **has hair-like
tails and gills on the
sides of its abdomen**



Damselfly larva



Mayfly larva

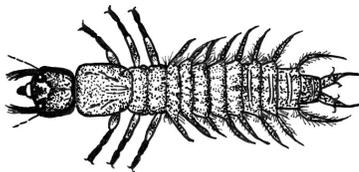
2.A **has a large head OR**

2.B **doesn't have a large
head**

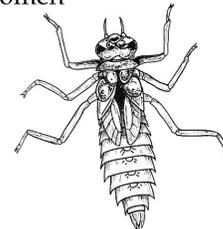
2.A.i **has 8 pairs of
spurs along the sides
of its abdomen**

OR

2.A.ii **doesn't have spurs along its
abdomen**



Dobsonfly larva



Dragonfly larva

2.B **doesn't have a large head**

OR

2.B.i **head is small, but viewable**

2.B.ii **head isn't easily viewable
(retracted into the thorax)**



Cranefly larva

2.B.i.a **has feathery projections
along its abdomen**

2.B.i.b **doesn't have projections
along its abdomen**

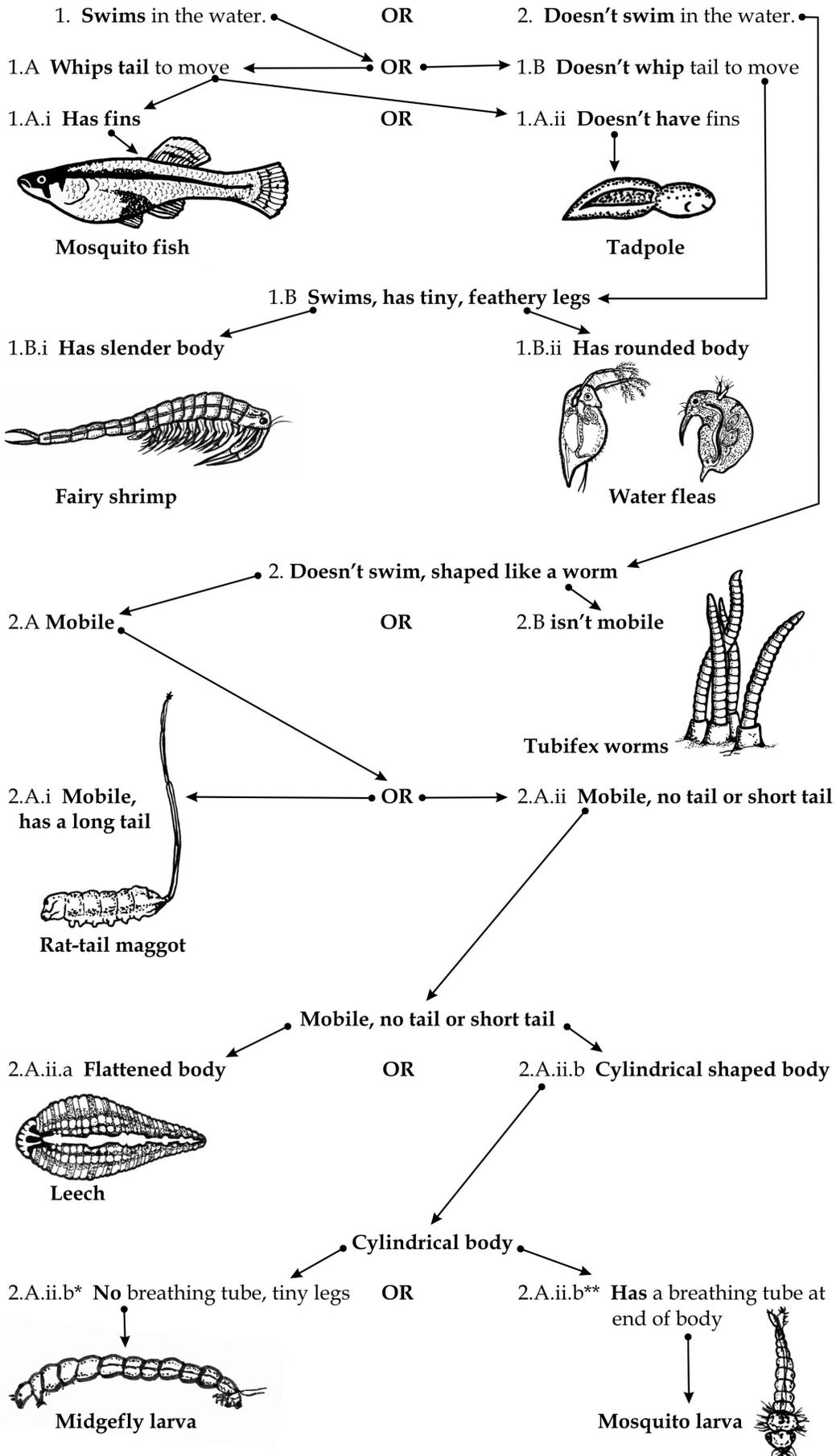


Whirligig beetle larva



Caddisfly larva

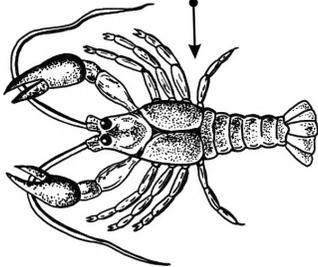
**Aquatic Animals that don't have easily observable segmented legs.
None of them have a shell.**



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

Salt Plains National Wildlife Refuge – Middle School

Title: Importance of Macroinvertebrates to Habitat at the Salt Plains NWR

Video Title on SDE Website: Importance of Habitat MS

Length: 0:02:44

Teacher Tool – Primary Focus: 6th Grade

Description of the Bellringer:

Ms. Becky Wolff, of the Salt Plains National Wildlife Refuge, and students of Timberlake Middle School, discuss some of the ways that macroinvertebrates are important members of a wetland. Ms. Wolff mentions that some of these aquatic organisms, as adult insects, become pollinators. Pollinators are essential for the survival of many aquatic plants. In turn, these plants filter harmful pollutants from the water of a wetland. Some macroinvertebrates, like the dragonfly, are excellent predators for they feed on such pests as mosquitoes. A concluding point is made that many of these aquatic insects serve as environmental indicators. When certain of these species are present in water it is a sign that the water is of good quality. Conversely, their absence may mean that the wetland contains some form of pollutant.

Curriculum Application

***PASS* Life Science**

Grade 6 Standard 4.1 Organisms within an ecosystem are dependent upon one another and on nonliving components of the environment.

Additional Resources

Oklahoma Conservation Commission's **WOW! The Wonders of Wetlands and Blue Thumb** programs,

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

http://www.ok.gov/conservation/Agency_Divisions/Water_Quality_Division/Blue_Thumb/

Salt Plains National Wildlife Refuge – Elementary and Middle School

Title: Let's Go Bird Watching at the Salt Plains NWR

Video Title on SDE Website: Let's Go Bird Watching S. Plains E & MS

Length: 0:08:36

Teacher Tool – Primary Focus: Process Standards for Elementary and Middle School Grades

Description of the Bellringer:

Ms. Becky Wolff, of the Salt Plains National Wildlife Refuge, shows 3rd grade and middle school students of Timberlake Public Schools how to observe bird species that live in this refuge. The students use binoculars and field guides to observe and classify birds. Ms. Wolff helps the students to look for clues that tell of the presence of birds, such as nests, cavities in trees, holes pecked in tree trunks. She also teaches the students how to “phish”. By making a “phish” sound birders are sometimes able to call birds within view.

Ms. Wolff concludes the bird walk by explaining how to use this refuge’s Bird Checklist. This checklist provides a listing of each bird species that has been observed at this refuge. The checklist has the following categories: each species’ favored habitats; seasons of year when present; and if the species is abundant, occasionally seen, or rarely observed at this refuge.

Curriculum Application

***PASS* Process Standards**

Standard 1.2 Use tools to observe organisms (Middle School)

Standard 2.1 Use observable properties to identify an organism

Standard 3.3 Use tools to observe organisms (Elementary School)

Standard 4.1 Record data (Middle School)

Additional Resources

Attached is a portion of the Bird Checklist for the Salt Plains National Wildlife Refuge.

The entire list contains 312 bird species. The website for this refuge is: <http://saltplains.fws.gov>

For information about the national wildlife refuge system, click on: <http://www.fws.gov>

Partial Checklist of Bird Species for the Salt Plains National Wildlife Refuge

Key to Listing

Occurrence Sp for Spring (March thru May)
 S for Summer (June thru August)
 F for Fall (Sept. thru November)
 W for Winter (Dec. thru Feb.)

Abundance A for Abundant (common species that is very numerous)
 C for Common (certain to be seen in suitable habitats)
 U for Uncommon (present, but not certain to be seen)
 O for Occasional ((seen a few times during the season)
 R for Rare (unusual, seen every 1 to 5 years)
 • a bird species that nests at this refuge

<u>Common Name</u>	<u>Sp</u>	<u>S</u>	<u>F</u>	<u>W</u>
American White Pelican	A	U	A	O
Double-crested Cormorant *	C	U	C	O
Great Blue Heron *	C	C	C	C
Snowy Egret*	C	C	C	
Turkey Vulture*	C	C	C	
Canada Goose*	A	U	A	A
Mallard Duck*	A	U	A	A
Blue-winged Teal*	A	O	A	U
Bald Eagle	C		C	C
Red-shouldered Hawk*	R	R	R	R
Red-tailed Hawk*	C	U	C	C
Sandhill Crane	A		A	R
Whooping Crane	R		O	
American Avocet*	A	A	A	
Snowy Plover*	A	A	A	
Least Tern*	C	C	C	
Franklin's Gull	A	U	A	
Great Horned Owl*	C	C	C	C
Ruby-throated Hummingbird	O	O	O	
Red-headed Woodpecker*	C	C	C	R
Scissor-tailed Flycatcher*	C	A	U	
Blue Jay*	C	C	C	C
American Crow*	C	C	C	C
Carolina Chickadee*	C	C	C	C
Eastern Bluebird*	C	U	C	U
Northern Mockingbird*	U	U	U	O
Orange-crowned Warbler	C		U	
Dark-eyed Junco	A		A	A
Northern Cardinal*	C	C	C	C
Painted Bunting*	U	U	O	

Salt Plains National Wildlife Refuge – Middle School

Title: A Study of Macroinvertebrates in the Salt Plains NWR

Video Title on SDE Website: Macroinvertebrates MS

Length: 0:07:26

Description of the Bellringer

Ms. Becky Wolff, an environmental educator for the U.S. Fish and Wildlife Service, helps 6th grade students of Timberlake Middle School, learn how to use dip nets to collect benthic macroinvertebrates for observation. Ms. Wolff provides the students with background information about macroinvertebrates as well as the ecology of the wetland. She also introduces the term detritus, and describes what it is and why it is important to this habitat's food chain.

Curriculum Application

PASS for Science Process Standards

Standard 1.2 Use appropriate tools

PASS for Life Science; Grade 6, Standard 4.1 Organisms within an ecosystem are dependent on one another and on nonliving components of the environment.

Additional Resources

Oklahoma Conservation Commission's **Project WET (WOW! The Wonders of Wetlands)**, and the **Blue Thumb Program**,

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

Project WILD Aquatic okprojectwild@fullnet.net

Project Learning Tree, <http://www.forestry.ok.gov/project-learning-tree>; activities on energy transfer and food chains/webs

Salt Plains National Wildlife Refuge – Elementary

Title: Macroinvertebrates - Finding Treasure in Wetlands of the Salt Plains NWR

Video Title on SDE Website: Macroinvertebrates- Finding Treasure E

Length: 0:06:25

Teacher Tool – Primary Focus: Process Standards for Elementary Grades

Description of the Bellringer:

Led by Ms. Becky Wolff, of the Salt Plains National Wildlife Refuge, 3rd grade students of Timberlake Elementary School, learn about some of the aquatic animals that live in a wetland within northwest Oklahoma's Salt Plains National Wildlife Refuge. Ms. Wolff explains how to use a dip net in catching benthic macroinvertebrates. She also stresses the importance of properly using these nets when collecting aquatic animals.

This bellringer introduces the concepts of wetland, habitat and food chain. The word macroinvertebrate is defined in the introductory narrative of this bellringer.

Curriculum Application

***PASS* Process Standards**

Standard 3.3 Use tools to gather data.

***PASS* Life Science**

Grade 3 Standard 2.3 Animals depend upon plants. Some animals eat plants for food. Other animals eat animals that eat the plants.

Grade 4 Standard 3.1 Organisms can only survive in environments in which their needs can be met.

Additional Resources

Oklahoma Conservation Commission's **WOW! The Wonders of Wetlands**, pages 31 to 40, "Wetlands as Home"; also **Blue Thumb Water Monitoring Program**

Project WILD, www.projectwild@fullnet.net provides a number of activities that focus on food chain and habitat.

Project Learning Tree, <http://www.forestry.ok.gov/project-learning-tree> provides a number of activities that focus on habitat and ecosystems.

Salt Plains National Wildlife Refuge - Elementary

Title: Observing Macroinvertebrates at the Salt Plains NWR

Video Title on SDE Website: Observing Macroinvertebrates E

Length: 0:06:59

Teacher Tool – Primary Focus: Process Standards for Elementary Grades

Description of the Bellringer:

Using such tools as an eye dropper, magnifying glass and microscope, Ms. Becky Wolff, of the Salt Plains National Wildlife Refuge, shows 3rd grade students of Timberlake Elementary School how to observe and classify the aquatic macroinvertebrates that they collected from a wetland habitat.

Curriculum Application

***PASS* Process Standards**

Standard 1.1 Observe organisms

Standard 2.1 Classify organisms using observable properties

Standard 3.3 Employ tools to gather data

***PASS* Life Science**

Grade 3 Standard 2.2 Animals have different structures that serve different functions.

Additional Resources

Images of Benthic Macroinvertebrates: www.bgsd.k12.wa.us/hml/jr_cam/macros/amc/index.html

WOW! The Wonders of Wetlands, page 35, “Wetland Animals”

Salt Plains National Wildlife Refuge - Elementary

Title: Pollution Can Affect Survival

Video Title on SDE Website: Pollution Can Affect Survival E

Length: 0:05:51

Teacher Tool – Primary Focus: 4th Grade

Description of the Bellringer:

Ms. Becky Wolff, of the Salt Plains National Wildlife Refuge, talks to 3rd grade students of Timberlake Elementary School about the importance of an unpolluted habitat to the plants and animals that live there. This bellringer also notes the importance of decaying plant material, called detritus, to the wetland food chain.

Curriculum Application

PASS Life Science

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

Grade 5 Standard 2.2 Changes in environmental conditions can affect the survival of organisms.

Additional Resources

Oklahoma Conservation Commission's **Blue Thumb** and **WOW! The Wonders of Wetlands** programs.

http://www.ok.gov/conservation/Agency_Divisions/Water_Quality_Division/Blue_Thumb/

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

Biological Indicators of Watershed Health: <http://www.epa.gov/bioiweb1/html/benthosclean.html>

Macroinvertebrate Monitoring: www.chicagoriver.org/upload/MacroinvertebrateMonitoring.pdf

Salt Plains National Wildlife Refuge – Middle School

Title: Using Tools to Observe Macroinvertebrates from the Salt Plains NWR

Video Title on SDE Website: Using Tools Macroinvertebrates MS

Length: 0:06:11

Teacher Tool – Primary Focus: Process Standards

Description of the Bellringer:

Ms. Becky Wolff, of the Salt Plains National Wildlife Refuge, shows students of Timberlake Middle School how to transfer macroinvertebrates from a holding tank to a petri dish where they can be observed under a microscope. Ms. Wolff reminds the students to be careful in handling these tiny organisms so as not to harm the specimen during this observation activity. After the investigation, the macroinvertebrates are returned to their aquatic habitat.

Curriculum Application

***PASS* Process Standards**

Standard 1.2 Use tools to observe organisms.

Standard 2.1 Use observable properties to identify an object.

Additional Resources

Oklahoma Conservation Commission's **WOW! The Wonders of Wetlands,**

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