

TEACHER'S MANUAL

This Suitcase Program provides the materials and lesson plans for teachers of grades 6-8 with content and activities increasing in difficulty by grade level. Activities in this Suitcase Exhibit may assist in meeting the Tennessee State Standards.

ACTIVITIES

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TENNESSEE STATE STANDARDS FOR 6-8

- 6.LS2.3 Draw conclusions about the transfer of energy through a food web and energy pyramid in an ecosystem.
- 8.LS4.2 Construct an explanation addressing the similarities and differences of the anatomical structures and genetic information between extinct and extant organisms using evidence of common ancestry and patterns between taxa.
- 8.LS4.3 Analyze evidence from geology, paleontology, and comparative anatomy to support that specific phenotypes within a population can increase the probability of survival of that species and lead to adaptation.

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY I: Get the Scoop on Skulls

DURATION OF ACTIVITY: 50 minutes

LESSON OBJECTIVES

Students will learn to identify major parts of the mammal skull including the four main bones of the skull, the eye orbits, nasal bones, auditory meatus, and teeth.

GUIDING QUESTION

What are the different parts that make up a skull?

TENNESSEE STATE STANDARDS

- 7.LS1.6 Develop an argument based on empirical evidence and scientific reasoning to explain how behavioral and structural adaptations in animals and plants affect the probability of survival and reproductive success.
- 8.LS4.2 Construct an explanation addressing similarities and differences of the anatomical structures and genetic information between extinct and extant organisms using evidence of common ancestry and patterns between taxa.
- 8.LS4.3 Analyze evidence from geology, paleontology, and comparative anatomy to support that specific phenotypes within a population can increase the probability of survival of that species and lead to adaptation.

MATERIALS INCLUDED

Skulls
Animal Fact cards
See Supplementary Materials for:
 Human skull transparency
 Teachers Guide to Skull Terminology
 Skull Parts worksheet (3 pages)

MATERIALS PROVIDED BY TEACHER

Scissors
Glue sticks
Glue sticks
Overhead or digital projector

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ACTIVITY II: Discovering and Comparing Skulls

DURATION OF ACTIVITY: 50 minutes

LESSON OBJECTIVES

Students will learn the three main skull features used to differentiate between predators and prey: placement of the eye sockets, length of the snout, and types of teeth. Students will learn how mammal skulls differ from each other and how these differences help the animal to survive.

GUIDING QUESTION

What can skull features tell you about the life of an animal?

TENNESSEE STATE STANDARDS

- 7.LS1.6 Develop an argument based on empirical evidence and scientific reasoning to explain how behavioral and structural adaptations in animals and plants affect the probability of survival and reproductive success.
- 8.LS4.2 Construct an explanation addressing similarities and differences of the anatomical structures and genetic information between extinct and extant organisms using evidence of common ancestry and patterns between taxa.
- 8.LS4.3 Analyze evidence from geology, paleontology, and comparative anatomy to support that specific phenotypes within a population can increase the probability of survival of that species and lead to adaptation.

MATERIALS INCLUDED

8 Mammal Skulls – exclude the human, squirrel, and brown bat skulls from this experiment
Poster: Teeth Types
Poster: Eyes in Front
Calipers – 8
Tape Measures – 8
See Supplementary Materials for:
 Skull Discovery Lab worksheet

MATERIALS PROVIDED BY TEACHER

None

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY III: Dichotomous Keys and Scientific Classification

DURATION OF ACTIVITY: 2 50-minute class periods

LESSON OBJECTIVES

The students will learn the definition of a dichotomous key and will create and use a simple dichotomous key.

GUIDING QUESTION

What is a dichotomous key and how is it used?

TENNESSEE STATE STANDARDS

- 6.LS4.1 Explain how changes in biodiversity would impact ecosystem stability and natural resources.
- 7.LS1.6 Develop an argument based on empirical evidence and scientific reasoning to explain how behavioral and structural adaptations in animals and plants affect the probability of survival and reproductive success.
- 8.LS4.2 Construct an explanation addressing similarities and differences of the anatomical structures and genetic information between extinct and extant organisms using evidence of common ancestry and patterns between taxa.

MATERIALS INCLUDED

9 skulls for group activity – jackrabbit, shrew, opossum, deer, squirrel, beaver, raccoon, coyote, and domestic cat
5 Skulls and animal fact cards for display – squirrel, gopher snake, owl, frog and fish skeleton
Vernier Calipers – 9
Tape measures – 9
Poster: Linnaean Classification
See Supplementary Materials for:
Dichotomous Key to Mammals of Southwest Ohio

MATERIALS PROVIDED BY TEACHER

Marker board
The day before this lesson, ask students to bring in a shoe – any type of shoe, but explain that you want a variety of shoe types

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY IV: Biome Food Chain and Food Webs

DURATION OF ACTIVITY: 3 50-minute periods

LESSON OBJECTIVES

Students will learn about six major biomes, including the animals that live there and the relationships these animals have with each other. Students will learn that the collection of biomes on the earth creates a biosphere.

GUIDING QUESTIONS

What is a biome and biosphere? Which animals live in different biomes? What are the food chain relationships between different animals in a particular biome?

TENNESSEE STATE STANDARDS

- 6.LS2.1 Evaluate and communicate the impact of environmental variables on population size.
- 6.LS2.2 Determine the impact of competitive, symbiotic, and predatory interactions in an ecosystem.
- 6.LS2.3 Draw conclusions about the transfer of energy through a food web and energy pyramid in an ecosystem.
- 6.LS2.4 Using evidence from climate data, draw conclusions about the patterns of abiotic and biotic factors in different biomes, specifically the tundra, taiga, deciduous forest, desert, grasslands, rainforest, marine, and freshwater ecosystems.
- 6.LS2.6 Research the ways in which an ecosystem has changed over time in response to changes in physical conditions, population balances, human interactions, and natural catastrophes.
- 6.LS4.1 Explain how changes in biodiversity would impact ecosystem stability and natural resources.
- 7.LS2.1 Develop a model to depict the cycling of matter, including carbon and oxygen, including the flow of energy among biotic and abiotic parts of an ecosystem.

MATERIALS INCLUDED

Zoobooks
3 skulls – a carnivore, herbivore, and omnivore
See Supplementary Materials for:
Energy Pyramid transparency or use
Energy Pyramid Poster

MATERIALS PROVIDED BY TEACHER

Research material about Earth's six major biomes: freshwater, marine, desert, forest, grassland, tundra
Access to a computer lab or library for research
Digital or overhead projector

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

ACTIVITY V: Owl Pellets

DURATION OF ACTIVITY: 50 minutes

LESSON OBJECTIVES

Students will learn about owl pellets by observing real samples from an actual owl pellet and participating in a web dissection of owl pellets.

GUIDING QUESTIONS

Do owls have teeth? Can we determine whether an owl is a predator or a prey by looking at what they ate? Do different owls eat different things?

TENNESSEE STATE STANDARDS

- 6.LS2.1 Evaluate and communicate the impact of environmental variables on population size.
6.LS2.2 Determine the impact of competitive, symbiotic, and predatory interactions in an ecosystem.
8.LS4.4 Develop a scientific explanation of how natural selection plays a role in determining the survival of a species in a changing environment.

MATERIALS INCLUDED

Owl Pellets encased in plastic
Dissected Owl Pellet incased in plastic
Great Horned Owl skull and Animal Fact Card
Poster: Investigating Food Webs and Owl Pellets
See Supplementary Materials for:
Virtual Owl Pellet Dissection worksheet (if desired)
Rodent Skeleton sheet

MATERIALS PROVIDED BY TEACHER

Internet access with Macromedia Flash (A link is included on the KidWings website.)
Alternately, owl pellets can be ordered online and dissected by students during a class period.

For the entire activity and materials and to reserve a Suitcase Exhibit, please call 901.636.2362.

SUITCASE EXHIBIT INVENTORY CHECKLIST

School: _____

Check Out: _____

Return Date: _____

MoSH Check In:	Teacher Check In:	Item	Books/Videos/Posters	Teacher Return:
		A	Teacher's Manual	
		B	Binder: Teacher's Resource Materials	
		C	Poster: Investigating Food Webs with Owl Pellets	
		D	Poster: Diets of Animals	
		E	Poster: Eyes in Front	
		F	Poster: Teeth	
		G	Poster: Where Do You Fit In?	
		H	Folder: 13 Animal X-Rays	
		I	Binder: Zoobooks Magazines	
		J	Binder: Milliken Mammals, Birds, Fish, Amphibians & Reptiles	
		K	Book: Eyewitness Mammal	
		L	Book: Eyewitness Skeleton	
		M	Book: A Bold Carnivore	
		N	Chart: Laminated Flip Chart	

SUITCASE EXHIBIT INVENTORY CHECKLIST

MoSH Check In:	Teacher Check In:	Item	Materials	Teacher Return:
		1	Skull: Great Horned Owl	
		2	Skull: Jackrabbit	
		3	Skull: Human (reproduction)	
		4	Skull: Coyote	
		5	Skull: Shrew	
		6	Skull: Tree Squirrel	
		7	Skull: Little Brown Bat	
		8	Skull: Monkey	
		9	Skull: White-Tailed Deer	
		10	Skull: Beaver	
		11	Skull: Domestic Cat	
		12	Skull: Opossum	
		13	Skull: Non-Venomous Gopher Snake	
		14	Skull: Venomous Rattlesnake	
		15	Skeleton: Fish	
		16	Skeleton: Frog	
		17	Skeleton: Bat	
		18-18.3	4 magnifier boxes – #18 Owl pellet; #18.1, #18.2, #18.3 Owl prey remains	
		19	Vernier Calipers – 9	
		20	Tape measures-9	
		21	Grinders-2	
		22	Mat for table display	
		23	Information cards for display	