

VERTEBRATES

KINDERGARTEN - SECOND

Life Science TEKS

<i>Kindergarten:</i>	K.9A, K.9B, K.10A
<i>First Grade:</i>	1.9A, 1.9C, 1.10A, 1.10C, 1.10D
<i>Second Grade:</i>	2.9A, 2.9B, 2.9C, 2.10A, 2.10C

Vocabulary

amphibian, backbone, bird, carnivore, fish, fur, gill, habitat, herbivore, invertebrate, jelly-like, lungs, mammal, moist, omnivore, reptile, scaly, size, texture, vertebrae, vertebrate

Pre-Show Activity

Pre-Show Lesson: Vertebrates

Post this question on the board: "What is a vertebrate?"

Materials:

Per class: *What is a Vertebrate?* by Bobbie Kalman, pre-made Jello

Per student: vertebrate group data chart (Appendix A-1), vertebrate characteristics pictures for younger students (Appendix A-2) or the diagram for older students (Appendix A-3), vertebrate pictures (Appendix A-4)

Procedure:

1. Ask students, "What is a vertebra?" If they don't know, tell them all humans have vertebrae. Have students feel their backbones, and explain that it is made up of vertebrae. Tell students that today they are going to be learning about all the different animal groups that have vertebrae: humans are not the only ones. All animals that have a backbone are called vertebrates. If an animal does not have backbone, then scientists call them invertebrates.

2. Students will need to cut out the vertebrate characteristics cards in Appendix A-2. If this is too difficult for your students, you can have them work in groups. You can make one set of cards for each group, laminate them and keep them from year to year. Each student (or group of students) will need a copy of the vertebrate data chart (Appendix A-1). Older students may not need the cards; they should be able to record the characteristics of each group just by listening and writing.
3. Read the book *What is a Vertebrate?* Pause after each type of vertebrate is discussed and lead students to understand the characteristics of each group. As you read, students will place the characteristics on the chart for each group. For example, when you are reading about birds, the class will discuss the characteristics of birds: they breathe with lungs, they have feathers, they lay hard shelled eggs, etc. Students will place these in the bird characteristics row on their chart. You may want to check students' progress before reading about the next type of vertebrate. Continue reading, discussing characteristics and checking the students' work. When you get to the amphibians, be sure to show students some Jell-O and have them touch it to imagine what an amphibian's skin feels like.

If you did not give your older students the characteristic cards, then you may want to give them the diagram in Appendix A-3 to check their work and make sure they have included all the important details.

4. Students will classify the vertebrate pictures in Appendix A-3. Students will place the appropriate pictures on the vertebrate mat under the "Animals in Group" column.

Post -Show Enrichment Activities

Activity One: Vertebrate Charades

Materials: vertebrate pictures, small dry-erase boards (optional)

Procedure:

1. A student will come to the front of the class and act out being a vertebrate. You may want to have some vertebrate pictures that they can choose from. You can find these at <http://kids.nationalgeographic.com/kids/animals/creaturefeature/>.
2. Students will guess what animal they are acting out. The student who guesses the correct answer first gets one point for their team.
3. Next, students will raise their hands if they can tell you something about the group that the animal is in: mammal, live birth, hair, mother gives milk to young, etc. Groups will get one additional point for each characteristic that they can give.

Modification:

For older students, instead of choosing students to answer, as soon as the animal's name is given, groups should begin quietly collaborating on a list of characteristics of the vertebrate group that it belongs to. Each group should have a small dry-erase board to write these on. After about 15 seconds, call time. Groups will hold their board up. Go over the characteristics and groups will score one point for each characteristic that they got correct. Each group will be responsible for keeping track of its own score.

4. Continue the game by choosing another student to come to the front.

Activity Two: Vertebrate Song

Procedure:

1. To help students remember the five categories of vertebrates, try singing this original little verse:

Sung to the tune of "Oh Christmas Tree, Oh Christmas Tree"

Oh Vertebrates, Oh Vertebrates,
There are five kinds of Vertebrates.

Oh Vertebrates, Oh Vertebrates,
There are five kinds of Vertebrates.
Reptiles, birds and amphibians,
Mammals, fish – let's sing again.
Oh Vertebrates, Oh Vertebrates,
There are five kinds of Vertebrates.

Source: <http://www.brighthubeducation.com/lesson-plans-grades-1-2/64882-categories-of-vertebrates/>

Activity Three: Vertebrae Model

Materials:

Per child: chenille stem (pipe cleaner), wagon-wheel pasta, uncooked*candy gelatin rings (like Life-Saver gummies)

Procedure:

1. Bend one end of the chenille stem so that the pasta cannot fall through. Put six pieces of wagon-wheel pasta through the stem down toward the bent end. Bend the stem above the pasta to hold the pasta in place.
2. Bend and twist the stem. What do you see and hear?
3. Take all the pasta off the stem except one. Place a gelatin ring on the pasta. Alternate between pasta and gelatin ring.
4. Add pasta and rings until the stem is almost full. Bend the stem above the pasta and rings to hold them in place.
5. Bend and twist the stem. What do you hear?
6. Draw pictures of the model backbones you made. Compare your model with a picture of a real backbone. This can be found in the science text book, reference book, or on-line. What does each part of your model stand for? What is the purpose of each part? What parts are missing from the model? How could you improve this model?

Teacher Information:

Vertebrae: The spine is a column of small bones, or vertebrae, that support the entire upper

body. The column is grouped into three sections of vertebrae:

- Cervical (C) vertebrae are the seven spinal bones that support the neck.
- Thoracic (T) vertebrae are the 12 spinal bones that connect to the rib cage.
- Lumbar (L) vertebrae are the five lowest and largest bones of the spinal column. Most of the body's weight and stress falls on the lumbar vertebrae.

Each vertebra can be designated by using a letter and number; the letter reflects the region (C=cervical, T=thoracic, and L=lumbar), and the number signifies its location within that region. For example, C4 is the fourth bone down in the cervical region, and T8 is the eighth thoracic vertebra.

Below the lumbar region is the sacrum, a shield-shaped bony structure that connects with the pelvis at the sacroiliac joints. At the end of the sacrum are two to four tiny, partially fused vertebrae known as the coccyx or "tail bone."

The Disks. Vertebrae in the spinal column are separated from each other by small cushions of cartilage known as intervertebral disks. Inside each disk is a jelly-like substance called the nucleus pulposus, which is surrounded by a tough, fibrous ring called the annulus fibrosus. The disk is 80% water. This structure makes the disk both elastic and strong. The disks have no blood supply of their own, relying instead on nearby blood vessels to keep them nourished.

Spinal cord: A column of nerve tissue that runs from the base of the skull down the back. It is surrounded by three protective membranes, and is enclosed within the vertebrae (back bones). The spinal cord and the brain make up the central nervous system, and spinal cord nerves carry most messages between the brain and the rest of the body.

Source: University of Maryland Medical Center

Activity Four: Mammals

Materials: *Animals Born Alive and Well* by Ruth Heller, sticky notes

Procedure:

1. Read Ruth Heller's book *Animals Born Alive and Well*.
2. Provide sticky notes with the name of each animal discussed. Older students can write these themselves as the animals are mentioned in the book.
3. Have students sort sticky notes.

Students can sort the sticky notes by:

Mammals that live on land, water or fly

Mammals that eat plants (herbivores), animals (carnivores) or both (omnivores)

Mammals that have live birth and mammals that lay eggs (spiny ant eater and the platypus)

Mammals that live in a desert, ocean, forest or polar region

Mammals with gills, mammals with lungs (This is a trick question, no mammals have gills.)

For younger students, you may need to do this as a class.

Activity Five: Bears

Materials: stuffed bear or bear picture, *Bears: Polar Bears, Black Bears and Grizzly Bears* (Kids Can Press Wildlife Series), chart paper

Procedure:

Students will need to bring a stuffed bear from home before participating in this activity. If they do not have one, they can bring a picture of a bear. All students will sit in a circle on the carpet in the front of the room with their bears.

1. Ask students what they know about bears.
2. Ask students to turn and talk to their neighbor, describing their bear: color, size, texture, type of bear, body features, etc. Partner A will go first. After one minute, partner B will talk. Discuss observations as a class. Are they good models of a real bear? Why or why not?
3. Have students put all their bears in front of them. Ask: "What colors are the bears?" Have kids one by one put their bear next to a bear that matches their bear's color until all like colored bears are together. Ask students why real bears have different colors. Which bears would probably live in a cold area? Why? Which bears would probably live in the forest? Why? Which color group has the most bears? What color group has the fewest bears?
4. Remind students of what they already know about bears; that they are vertebrates, mammals, etc. Ask students if they have questions about bears. Record some of their questions on chart paper.
5. Tell students that you are going to read a book about bears and that they are going to look for the answers to their questions. If they hear an answer, they will raise their hand and you will write it on the paper in a different color.
6. Read *Bears: Polar Bears, Black Bears and Grizzly Bears* (Kids Can Press Wildlife Series) by Deborah Hodge and Pat Stephens. As you read, put answers to your questions about

bears up on the chart paper. Be sure that you have covered all the characteristics of bears that make it a mammal.

7. Ask kids which real-life bear their stuffed bear is a model of. Have them turn and talk to their neighbor and tell them at least one thing that they learned about their bear.

Appendix

A-1

Vertebrate Mat

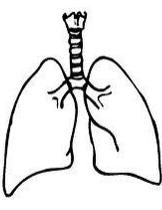
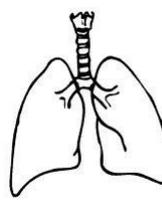
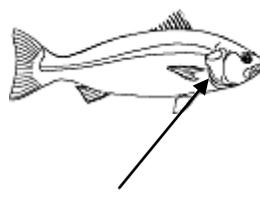
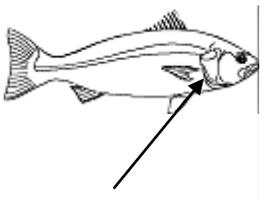
Characteristics of Group:

Animals in Group:

<p>Birds</p>	
<p>Fish</p>	
<p>Reptiles</p>	

<p>Amphibians</p>	
<p>Mammals</p>	

How does it breathe?

 <p>Lungs</p>	 <p>Lungs</p>	 <p>Lungs</p>	 <p>Lungs</p>	 <p>Gills</p>	 <p>Gills</p>
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What kind of **skin** does it have?

 <p>Hair or fur</p>	 <p>Scaly Skin</p>	 <p>Scaly Skin</p>	 <p>Feathers</p>	 <p>Smooth and Moist Skin</p>
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How does it reproduce?

 <p>Hard shelled Egg</p>	 <p>Hard shelled Egg</p>	 <p>Jelly like Eggs</p>	 <p>Jelly like Eggs</p>	 <p>Live Birth</p>
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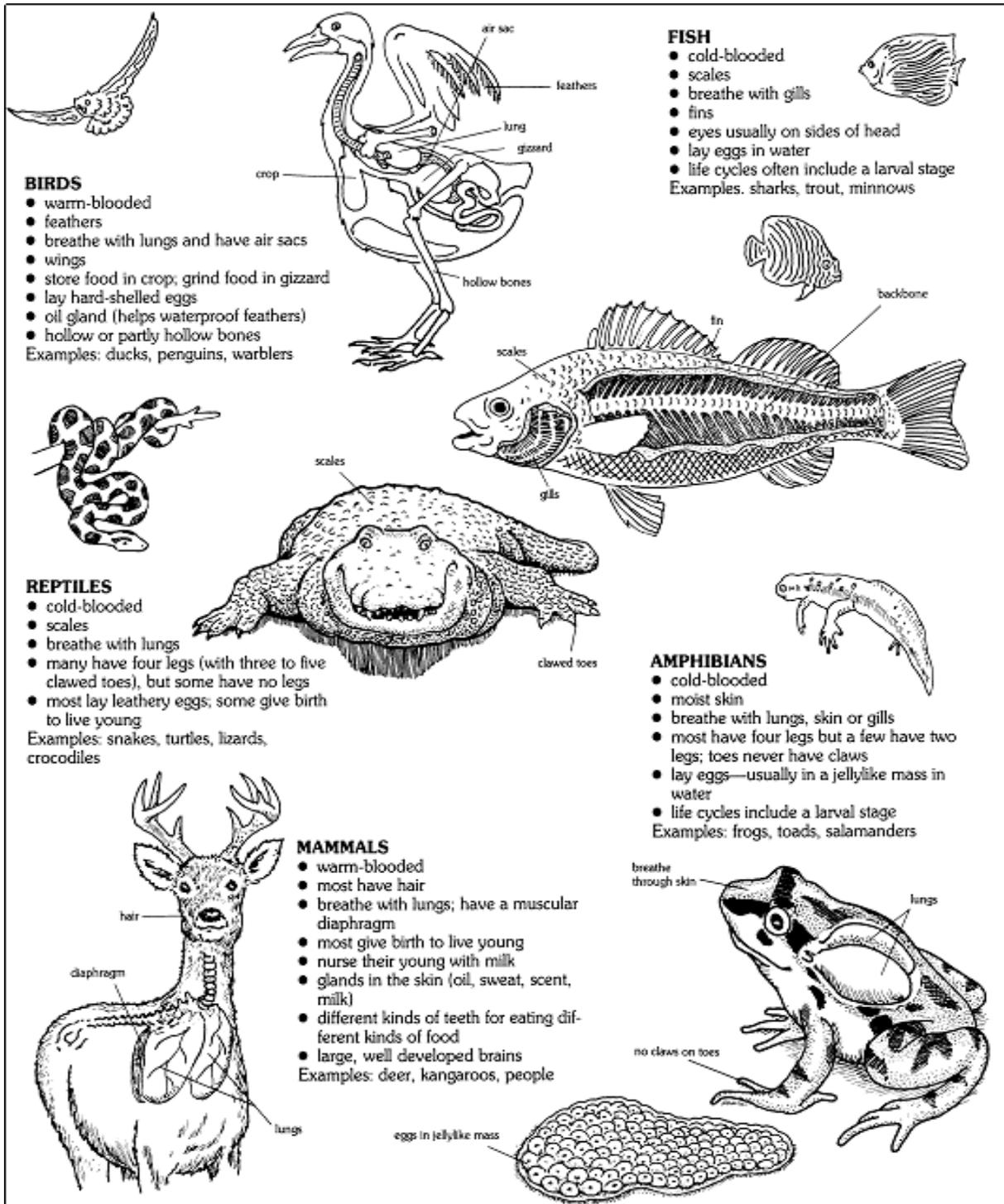


Mother milks young

Graphic Sources:

Lungs: teacherresourcesgalore.com
Fish gills: Arthur's clip art
Scaly skin: raguett.hubpages.com
Hair: fotosearch.com
Feathers: themeanings.com
Jello: seeswhilesitting.com
Egg: school.discoveryeducation.com
Fish eggs: billybear4kids.com
Baby: faithclipart.com
Milk: usmessageboard.com

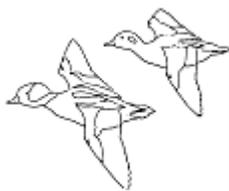
Vertebrate Characteristics Diagram



Copycat Page from National Wildlife Federation, Nature Scope - Amazing Animals, Part I, 1988

A-4

Vertebrate Pictures:



All pictures are from Arthur's Clipart: <http://www.arthursclipart.org/index%20comp.htm>