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Georgia Performance Standards Framework for Science – GRADE 7

Unit Organizer: “You Be the Taxonomist”

OVERVIEW:

Students step into the shoes of a taxonomist. Students make observations and inferences of specimens from the six kingdoms of living things. They use a dichotomous key to key out these organisms and compare and contrast the specimens in terms of cellular organization, method for obtaining oxygen, method for excreting wastes, method for obtaining food, etc. Fledgling taxonomists learn about one species in depth, and create an illustration of this organism’s classification. Finally, they create a dichotomous key for arthropods as a culminating activity.

STANDARDS ADDRESSED IN THIS UNIT

Focus Standard(s):

Content Standards:

S7L1. Students will investigate the diversity of living organisms and how they can be compared scientifically.

- a. Demonstrate the process for the development of a dichotomous key.
- b. Classify organisms based on physical characteristics using a dichotomous key of the six kingdom system (archaebacteria, eubacteria, protists, fungi, plants and animals).

S7L3. Students will recognize how biological traits are passed to successive generations.

- b. Compare and contrast that organisms reproduce asexually and sexually (bacteria, protists, fungi, plants & animals).

Habits of Mind:

S7CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

- a. Understand the importance of—and keep—honest, clear, and accurate records in science.
- b. Understand that hypotheses can be valuable, even if they turn out not to be completely accurate.

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S7CS2. Students will use standard safety practices for all classroom laboratory and field investigations.

- a. Follow correct procedures for use of scientific apparatus.
- b. Demonstrate appropriate techniques in laboratory situations.
- c. Follow correct protocol for identifying and reporting safety problems and violations.

S7CS3. Students will have the computation and estimation skills necessary for analyzing data and following scientific explanations.

- d. Draw conclusions based on analyzed data.

S7CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific investigations.

- a. Use appropriate technology to store and retrieve scientific information in topical, alphabetical, numerical, and keyword files, and create simple files.
- c. Learn how to use on a regular basis standard safety practices for scientific investigations.

S7CS6. Students will communicate scientific ideas and activities clearly.

- c. Organize scientific information using appropriate simple tables, charts, and graphs, and identify relationships they reveal.

S7CS7. Students will question scientific claims and arguments effectively.

- d. Recognize that there may be more than one way to interpret a given set of findings.

Nature of Science:

S7CS8. Students will investigate the characteristics of scientific knowledge and how that knowledge is achieved

- c. As prevailing theories are challenged by new information, scientific knowledge may change.

S7CS9. Students will investigate the features of the process of scientific inquiry.

- a. Investigations are conducted for different reasons, which include exploring new phenomena, confirming previous results, testing how well a theory predicts, and comparing, competing theories.
- b. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected data.
- d. Scientists often collaborate to design research. To prevent this bias, scientists conduct independent studies of the same questions.

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ENDURING UNDERSTANDINGS

Students will understand that:

levels of cellular organization serve the needs of cells for obtaining oxygen and food, and removing wastes, differences and similarities exist within the structures and functions among the six kingdoms, and dichotomous keys are made of paired and opposite statements that allow the reader to identify an organism.

ESSENTIAL QUESTIONS:

What are the physical characteristics that define specimens from the six kingdoms?

How can we use a dichotomous key to classify various specimens from the six kingdoms?

How can we create an illustration of classification?

How can we create a dichotomous key for arthropods?

CONCEPTS:

Organisms are classified into the six kingdoms based on cellular organization, method of obtaining food for energy, and cellular structure.

Levels of cellular organization serve the needs of cells for obtaining oxygen and food, and removing wastes.

Differences and similarities exist within the structures and functions among the six kingdoms.

Dichotomous keys are made of paired and opposite statements that allow the reader to identify an organism.

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LANGUAGE:		
<ul style="list-style-type: none"> • Classification • Taxonomy • Dichotomous key • Paired statements • Opposite statements • Unicellular • Multicellular • Heterotroph • Autotroph • Cell wall/no cell wall • Eukaryotic • Prokaryotic 	<ul style="list-style-type: none"> • Kingdom Animalia • Kingdom Plantae • Kingdom Fungi • Kingdom Protista • Kingdom Eubacteria • Kingdom Archaeobacteria • Kingdom • Phylum • Class • Order • Family • Genus • Species 	<ul style="list-style-type: none"> • Photosynthesis • Cellular respiration • Diffusion • Osmosis • Active transport • Cellular organization • Oxygen • Food • Wastes
MISCONCEPTIONS	PROPER CONCEPTIONS	
Organisms are classified based on where they live.	Organisms are classified based on genetic similarity.	
Organisms are classified based on the way that they move.	Organisms are classified based on genetic similarity.	
Mushrooms are plants.	Mushrooms are classified in kingdom Fungi.	
Algae, seaweed, and kelp are plants.	Algae, seaweed, and kelp are protists.	
Humans are not animals.	Humans are animals.	
All bacteria are harmful	Most bacteria are helpful. For example, many species are important decomposers, and the bacteria in our digestive tract produce vitamin K for the body.	
Fungi photosynthesize.	Fungi are heterotrophs.	
Snakes are invertebrates.	Snakes are vertebrates.	
All animals must move.	Animals such as sponges do not move.	

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Evidence of Learning

Outcome / Performance Expectations:	Students will choose one animal to research. They will create a poster to represent the classification of this animal. Finally, they will create a dichotomous based on their poster.
General Teacher Instructions:	<p>I. Teaching and Learning Strategy: Research</p> <ol style="list-style-type: none"> 1. Inform students that they are going to create a classification poster on an animal of their choice. 2. Give each student a classification poster rubric and go over the rubric with each student. 3. Give each student a graphic organizer to do research on their animal before they create their poster. 4. Take the students to the library or computer lab to fill out their graphic organizer. 5. Allow students to print off their images for their poster in the computer lab/library. Or have students save their images to a floppy disk and instruct them to print the images at home. <p>II. Teaching and Learning Strategy: Creating the Poster</p> <ol style="list-style-type: none"> 1. Provide an 18 X 12 piece of construction paper to each student as well as scissors and glue. 2. Allow class time for students to complete their poster. 3. Remind students to use the classification poster rubric when they construct their poster. <p>III. Assessment</p> <ol style="list-style-type: none"> 1. Use the classification poster rubric to assign student posters a grade. <p>IV. Teaching and Learning Strategy: Creating a Dichotomous Key Using the Poster</p> <ol style="list-style-type: none"> 1. Challenge the students to use their poster to create a dichotomous key with all the organisms on the poster. 2. They need to do a rough draft, and put the final key on the back of their classification poster. 3. Instruct students to use the dichotomous key rubric for a guide during this activity. <p>V. Assessment</p> <ol style="list-style-type: none"> 1. Assess student dichotomous keys using the dichotomous key rubric.

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Materials Needed:	<ul style="list-style-type: none">• Library or computer lab• Classification poster rubric for each student• Research graphic organizer for each student• 8 x 12 construction paper for each student• Glue• Scissors• Dichotomous key rubric
Safety Precautions:	None

Classification Poster

Name: _____

Assignment:

1. Create a classification diagram/picture like the one on the right for *Bubo virginianus* (Great Horned Owl).
2. Please note that the image gives you the basic idea for how to construct your poster, but more details are needed as indicated by the rubric below.
3. You can complete your picture on a piece of 18 X 12 inch construction paper.
4. You are not allowed to do your project *Bubo virginianus*

Image scanned from:

Prentice Hall Science Explorer: Life Science, 2002, pg. 187.

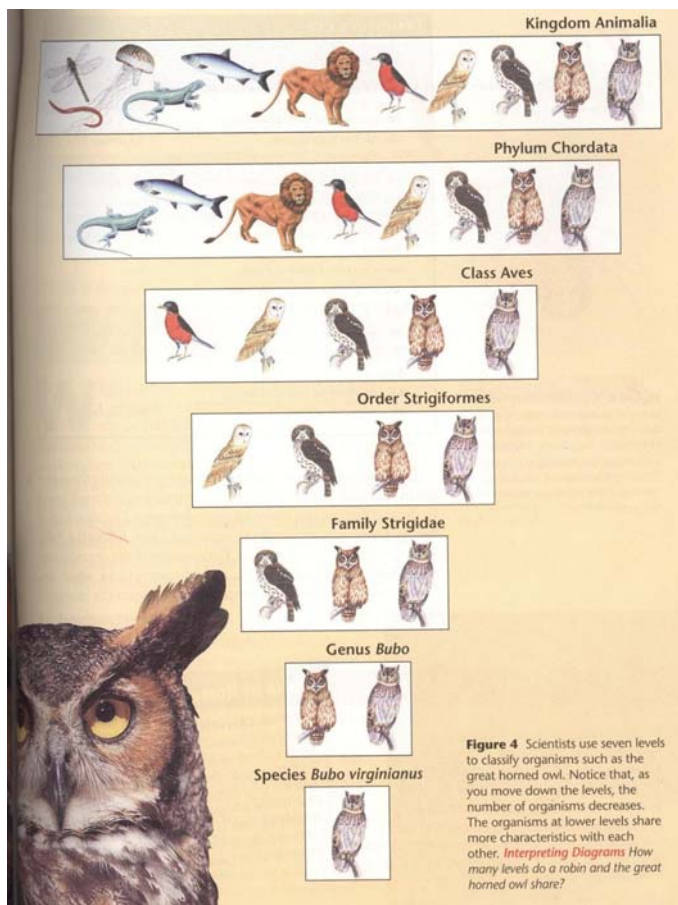


Figure 4 Scientists use seven levels to classify organisms such as the great horned owl. Notice that, as you move down the levels, the number of organisms decreases. The organisms at lower levels share more characteristics with each other. *Interpreting Diagrams* How many levels do a robin and the great horned owl share?

Rubric:

1. A title that includes the common and scientific name of your organism.....	5pts
2. At least eleven organisms in the kingdom row	11pts
3. At least eight organisms in the phylum row.	8pts
3. At least five organisms in the class row.	10pts
5. At least four organisms in the order row.	8pts
6. At least three organisms in the family row.	6pts
7. At least two organisms in the genus row.	4pts
8. Include the scientific name (written in italics with the correct capitalization) of your organism on the species row.....	5pts
9. Explain each classification level. For example, if your animal is in Class Mammalia, then you would explain that "Mammals are warm-blooded animals that have hair or fur, give live birth, care for their young , and feed their young milk."	20pts
10. Neatness and aesthetics.	8pts
11. Orient the classification levels so that they form an upside down triangle.....	5pts
12. Scientific correctness/accuracy.....	10pts

Classification Poster Research

Name _____

1. Choose an animal to research. Go to this website: <http://animaldiversity.ummz.umich.edu/site/index.html>. In the bar, type in the animal you have chosen and click on search.

2. Fill out the following information on your animal using this site.

A. Common Name of my organism _____

B. Scientific Name of my organism (Genus and species)

<u>C. Level of Classification</u>	<u>Explanation for Classification Name</u>
Kingdom _____	_____
Phylum _____	_____
Class _____	_____
Order _____	_____
Family _____	_____
Genus _____	_____
Species _____	_____

D. Other organisms that share the classification levels with my animal.

Species (1) _____

Genus (2) _____

Family (3) _____

Order (4) _____

Class (5) _____

Phylum (8) _____

Kingdom (11 Animals) _____



DICHOTOMOUS KEY RUBRIC

Dichotomous Key Rubric	Student name:
1. Statements are paired.	15 pts
2. Statements are opposite.	15 pts
3. Statements incorporate scientific vocabulary.	10 pts
4. Classmates could effectively use your key to identify unknown arthropods.	50 pts
5. The key is legible and neat.	10 pts

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