



PEST TAXONOMY (GRADES 5 - 8)

Lesson Overview

This lesson is broken into two sessions. During the first session, students study classical taxonomy. They use the different species represented in the PestWorldforKids.org's "Pest Guide" section to learn how living things are grouped together according to the characteristics they share. Students then work in small groups to construct a taxonomy chart for the species represented in the "Pest Guide" and discover how classical taxonomy helps the scientific community organize the natural world.

Correlation with National Science Teachers Association (NSTA) Standards

K - 12

Unifying Concepts and Processes Standard: As a result of activities in grades K – 12, all students should develop understanding and abilities aligned with the following concepts and processes:

- *Systems, order, and organization*

Students use the PestWorldforKids.org "Pest Guide" to classify and organize each organism according to classical Taxonomy.

K – 4

Life Science Content Standard C: As a result of activities in grades K – 4, all students should develop understanding of:

- *The characteristics of organisms*

Students use the PestWorldforKids.org "Pest Guide" to classify and organize each organism according to classical taxonomy. Students may participate in an extension activity in which they classify organisms according to other characteristics than used in classical taxonomy.

5 - 8

Life Science Content Standard C: As a result of activities in grades 5 – 8, all students should develop understanding of:

- *Structure and function in living systems*

Students use the PestWorldforKids.org "Pest Guide" to classify and organize each organism according to classical taxonomy. Students may participate in an extension activity in which they classify organisms according to other characteristics than used in classical taxonomy.



PEST TAXONOMY (GRADES 5 - 8)

Getting Ready:

Estimated Time:

- Preparation: 20 minutes
- Lesson: 45 – 60 minutes for each session

Materials:

Session 1:

- Several copies of the handout “Classification Sort” for each student
- Computer workstation for each individual or student group
- Computer workstation with projector or other display device
- Pencil, pen, and whiteboard marker to use for a demonstration in steps 1 – 3

Session 2:

- Scissors for each student group
- 1 roll of scotch tape for each student group
- 3' x 2' piece of cardboard for each student group
- Paper and pencil or pens for the short-answer assessment question

Preparation:

Session 1:

- 1) Make copies of the handout “Classification Sort”. It may also be helpful to make a single transparency copy.
- 2) Divide your class into groups of 4-5 students each.
- 3) Draw an empty 4 column, 6 row chart on the board.

Session 2:

- 1) Acquire a large piece of cardboard for each group
- 2) Review the procedure. If you believe your students may take longer than a class session to complete the activity, plan for storage.



PEST TAXONOMY (GRADES 5 - 8)

Procedure

Session One: Intro to Taxonomy

- 1) Display pencil and pen. Ask students to describe how each implement is similar and different. Comments will most likely include that both are used for writing but that the pencil is erasable while the pen isn't.
- 2) Display whiteboard marker. Again, ask students to compare the different writing tools and how they might be "classified". Comments might include that one is use more for drawing, another for just writing on whiteboards, while the third might be used when what is written needs to be permanent.
- 3) Explain that while all three writing tools essentially do the same thing but they have different characteristics.
- 4) Display the cockroach page from the "Pest Research" section of PestWorldforKids.org:
<http://www.pestworldforkids.org/cockroaches.html>
- 5) Scroll through the page with students, pointing out that although each cockroach shares the same characteristics, they are also slightly different – just like the writing tools.
- 6) Write **K – P – C – O – F – G S** in the chart's first column that you drew on the board. You'll write the name for each category in step 11.

K			
P			
C			
O			
F			
G	S		

- 7) Pose central question:
Just how do scientists keep track of all the different types of organisms in the world? How do they make sure what a scientist calls a Brown-Banded Cockroach is the same name a scientist in Mexico or Canada or even in the next state calls a cockroach?
- 8) Explain that scientists use a system developed with a system called **classical taxonomy**. The system is used all over the world. Names of species (the "S" on the board") are given in Latin, a language that no one speaks but is uniformly used all over the world for science precisely because no one speaks it – it's stable so no changes are made.
- 9) Emphasize that Latin is used because an animal may have many common names but will only have one Latin name. That allows scientists to discuss and research the animal all around the world without confusion.
- 10) Call students' attention back to the cockroach page on PestWorldforKids.org. Point out that each cockroach as a different species name.
- 11) Complete the words on the board: **Kingdom – Phylum – Class – Order – Family – Genus Species**.

PEST TAXONOMY (GRADES 5 - 8)

Kingdom			
Phylum			
Class			
Order			
Family			
Genus Species			

- 12) Point out that each cockroach belongs to the same group with the exception of Genus Species. Each individual animal has its own unique genus species name.
- 13) Point out that each genus species name has two words. All the cockroaches profiled share the first. The second word, the species, is unique to each cockroach.
- 14) Ask a student to fill out the chart with the names for the Brown-Banded Cockroach.

Kingdom	Animalia		
Phylum	Arthropoda		
Class	Insecta		
Order	Dictyoptera		
Family	Blattellidae		
Genus Species	Supella longipalpa		

- 15) Provide another example. Display the rats page from the "Pest Research" section of PestWorldforKids.org:

<http://www.pestworldforkids.org/rats.html>

- 16) Ask another student to fill out the chart with the names for the Roof Rat.

Kingdom	Animalia	Animalia	
Phylum	Arthropoda	Chordata	
Class	Insecta	Mammalia	
Order	Dictyoptera	Rodentia	
Family	Blattellidae	Muridae	
Genus Species	Supella longipalpa	Rattus rattus	



PEST TAXONOMY (GRADES 5 - 8)

- 17) Point out where the two very different animals share just one common name –the same kingdom. Explain that the kingdom level is the highest level. The animal kingdom includes all animals. Other kingdoms contain plants, fungi, and single-celled organisms.
- 18) Emphasize that it would make sense that they would only share the same kingdom category – after all they are very different animals.
- 19) Explain that the order of this classification system runs from the largest group, kingdom, to smaller and smaller groups that share characteristics. A simple way to remember the names and order of the classification system is this mnemonic device:

Kingdom – Phylum – Class – Order – Family – Genus Species

King – Philip – Cut – Open – Five – Green Species

List each word in the fourth column of the chart.

Kingdom	Animalia	Animalia	King
Phylum	Arthropoda	Chordata	Phillip
Class	Insecta	Mammalia	Cut
Order	Dictyoptera	Rodentia	Open
Family	Blattellidae	Muridae	Five
Genus Species	Supella longipalpa	Rattus rattus	Green Species

- 20) Pose questions:

Aside from kingdom, just how many categories do pests share?

How many species of common pests are there?

Suggest that to answer these questions, an organizational chart would be handy to have.

- 21) Explain that the class will work in small groups to use **classical taxonomy** to create an organizational chart. Assign students to small groups and distribute the handout “Classification Sort”.
- 22) Direct student groups to access the “Pest Research” section of PestWorldforKids.org and assign students in their group a number of species to research and classify.
- 23) Students should use the remainder of the session copying names from the site to their handouts.



PEST TAXONOMY (GRADES 5 - 8)

Session Two: Classifying Pests

- 1) Review **classical taxonomy** and the mnemonic device for remembering the names and order of classification:

King – Philip – Cut – Open – Five – Green Species

- 2) If students were not able to complete the assignment in the first session, provide more time here.
- 3) Once all students have completed their assignment, direct students to cut out the cards and place each animal's cards in an ordered stack starting with kingdom and ending with Genus Species.
- 4) Explain that students' groups will use the cards to create their organizational chart.
- 5) Suggest that students remove the kingdom card, since all animals will belong to the same kingdom.
- 6) The next level is phylum. Suggest that students arrange the stacks by phylum.
- 7) Do students notice that several stacks share the same phylum? Suggest that students remove the phylum card from each stack sharing the same phylum and organize that sub-group by class.
- 8) Repeat for other stacks sharing a phylum and then for stacks sharing the same classes, orders, and families.
- 9) By the end of the session, students should have fairly complex chart that leads all the way from kingdom down to individual species.
- 10) Provide the balls of string and scissors.
- 11) Direct students to check over their chart to be sure that they've arranged it correctly. Then, ask students to cut small pieces of string and use the string and table connect all the species to the family cards. Repeat the process to connect all the family cards to the order cards, order cards to class cards, etc.
- 12) Review charts. Do students notice any family or phylum that has a larger number of pests than others? What about classes or orders?
- 13) Emphasize this closing point:

Although there are over forty pests profiled in the "Pest Research" section of PestWorldforKids.org, isn't it interesting that each group was able to organize each individual species in roughly the same order on their chart?

Think about this point – how helpful is a system that allows different groups to organize a large number of species in the same way? How could that help research and communication between scientists?

Assessment

End the session by proposing the following:

There are an estimated 10 million species in the world. Could there be a better system for classifying all of them?

Ask students to clarify their answers in one or two paragraphs.



PEST TAXONOMY (GRADES 5 - 8)

Handout

- Make several copies of the handout "Classification Sort" for each student.

CLASSIFICATION SORT

KINGDOM _____
pest's common name

pest's kingdom name

ORDER _____
pest's common name

pest's order name

KINGDOM _____
pest's common name

pest's kingdom name

ORDER _____
pest's common name

pest's order name

PHYLUM _____
pest's common name

pest's phylum name

FAMILY _____
pest's common name

pest's family name

PHYLUM _____
pest's common name

pest's phylum name

FAMILY _____
pest's common name

pest's family name

CLASS _____
pest's common name

pest's class name

GENUS
SPECIES _____
pest's common name

pest's genus species name

CLASS _____
pest's common name

pest's class name

GENUS
SPECIES _____
pest's common name

pest's genus species name