

'Class'ification

Video Titles:

Taxonomy

Activity Subject: Introduction to taxonomy and classification.

Grade Level: 7 – 12 grades

Introduction

In this lesson, students will be introduced to the concept of taxonomy, and categorization of organisms based on Carl Linnaeus's system of classification. The class watches the Taxonomy video from shapeoflife.org and reviews the concept of classification. Then, the class is divided into groups to begin classifying themselves. Classification starts at the 'Class' level, and continues through division and classification down to the species level. Along the way, students are researching their classification level, and recording derived characteristics that separate them from other groups within that level.

Assessments

Written

Time

60 minute class period

Group Size

Varies throughout the activity. Example provided:

Class-whole class (i.e. 32 students)

Order-2 groups; divide the class in half (i.e. 16 per group)

Family-4 groups; divide each order in half (i.e. 8 per group)

Genus -8 groups; divide each family in half (i.e. 4 per group)

Species-16 groups; divide each genus in half (i.e. 2 per group)

NEXT GENERATION SCIENCE STANDARDS

PERFORMANCE EXPECTATIONS:

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

For centuries taxonomists have been organizing the diversity of life based on observing and measuring animals' body plans.

Standard:

Cross Cutting Concepts: Patterns

The patterns evident in animal body plans directly show evolutionary relationships.

LEARNING OBJECTIVES:

Given an introduction to taxonomy and an opportunity to classify themselves based on patterns and similarities, students will be able to classify their determined groups and describe their derived characteristics in order to demonstrate their understanding of Linnaeus' principles of classification and binomial nomenclature.

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Materials, Preparation and Procedure

Materials and Preparation:

- Access to the Internet. You will be referencing one video:
Taxonomy [Under Topics, click on Other Topics, click on *Taxonomy*. (2:52 minutes)]
- Group Handouts
Kingdom, Phylum, Class (one worksheet for the class - prepared beforehand)
Order (one worksheet per order group ~ 2 total)
Family (one worksheet per family group ~ 4 total)
Genus (one worksheet per species group ~ 8 total)
Species (one worksheet per species group ~ 16 total) **dependent on class size*
- Slides - Introduction to Taxonomy and Explanation of Activity (attached)
- Reference materials for research
Access to Internet, text, and/or research articles, etc.
- Group preparation: Teacher pre-determines group members for the activity. (See group size)

Procedure:

1. Teacher introduces the *Taxonomy* video. The class watches the taxonomy video from the shapeoflife.org.
2. Teacher elaborates upon and explains the history of classification (slides attached).
3. Teacher introduces the 'Class'ification activity. Teacher explains chosen Kingdom, Phylum and Class choices, discussing derived characteristics within each choice.
4. Students are divided into their Order groups and instructed to research an Order of their choice that falls within the Class. As a group, they need to fill out the Handout: Order.
5. When each Order is finished, the teacher brings the class together to share which two Orders were chosen and what their distinguishing characteristics are.
6. From their Orders, students are divided into their Family groups and instructed to research a Family of their choice that falls within their Order. As a group, they need to fill out the Handout: *Family*.

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Materials, Preparation and Procedure

7. When each Family is finished, the teacher brings the class together to share which two Families were chosen from each Order (four total) and what their distinguishing characteristics are.
8. From their Families, students are divided into their Genera groups and instructed to research a Genus of their choice that falls within their Family. As a group, they need to fill out the Handout: Genus.
9. When each Genus group is finished, the teacher brings the class together to share which two Genera were chosen from each Family (eight total), and what their distinguishing characteristics are.
10. From their Genera, students are divided into their Species groups and instructed to research a Species of their choice that falls within their Genus. As a group, they need to fill out the Handout: Species.
11. When each Species is finished, the teacher brings the class together to share which two Species were chosen from each Genus, and what their distinguishing characteristics are.
12. Teacher concludes the discussion with a summary of classification and the importance of taxonomy in naming organisms.
13. These pre-designated groups can now be used for the rest of the unit, etc. when groups of different sizes are needed.

'Class'ification

Handout - Order

Directions:

With your group members, determine which Order you will be classified as under the Class _____. As a group, research your Order, and record your findings here.

Order Name: _____

Group Members:

Description:

Derived Characteristics:

Picture:

Fill in the class information below!

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graph TD; A[Class _____] --- B[Order _____]; A --- C[Order _____];
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'Class'ification

Handout - *Family*

Directions:

With your group members, determine which Order you will be classified as under the Class _____. As a group, research your Order, and record your findings here.

Order Name: _____

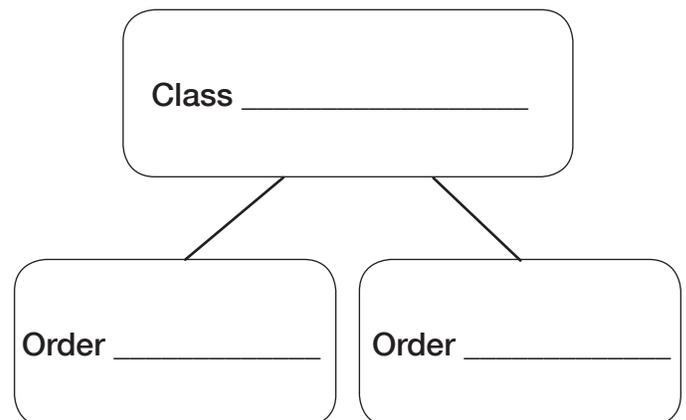
Group Members:

Description:

Derived Characteristics:

Picture:

Fill in the class information below!



'Class'ification

Handout - *Genus*

Directions:

With your group members, determine which Order you will be classified as under the Class _____. As a group, research your Order, and record your findings here.

Order Name: _____

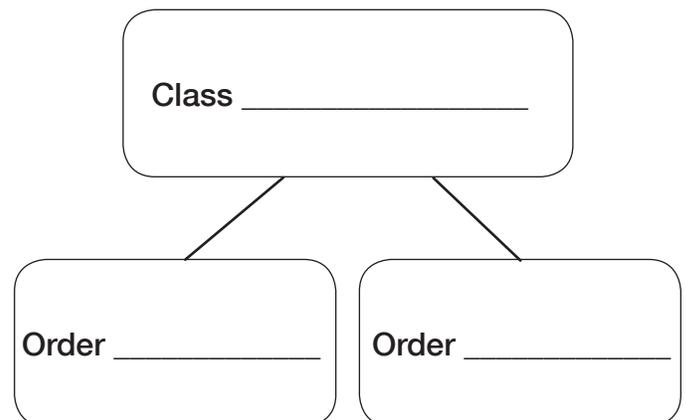
Group Members:

Description:

Derived Characteristics:

Picture:

Fill in the class information below!



'Class'ification

Handout - *Species*

Directions:

With your group members, determine which Order you will be classified as under the Class _____. As a group, research your Order, and record your findings here.

Order Name: _____

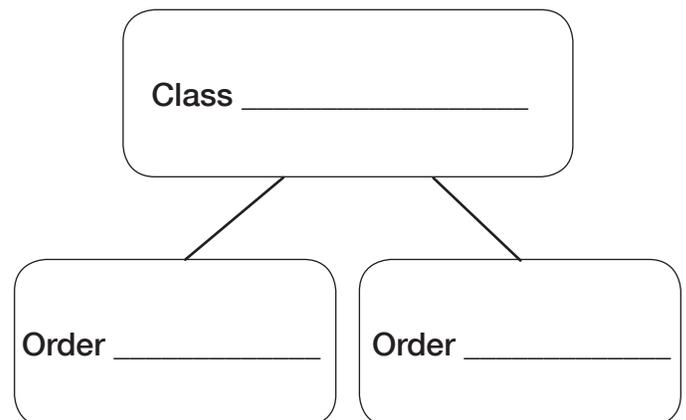
Group Members:

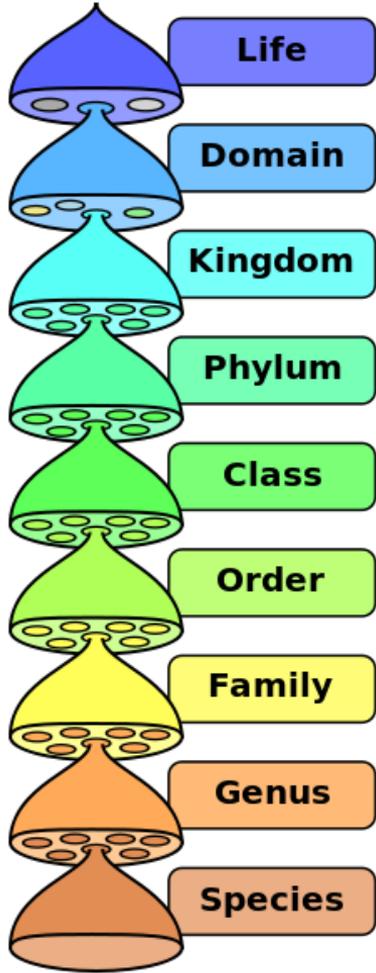
Description:

Derived Characteristics:

Picture:

Fill in the class information below!





Taxonomy



Introductory Video:

<http://shapeoflife.org/video/other-topics/taxonomy>

Why classify?

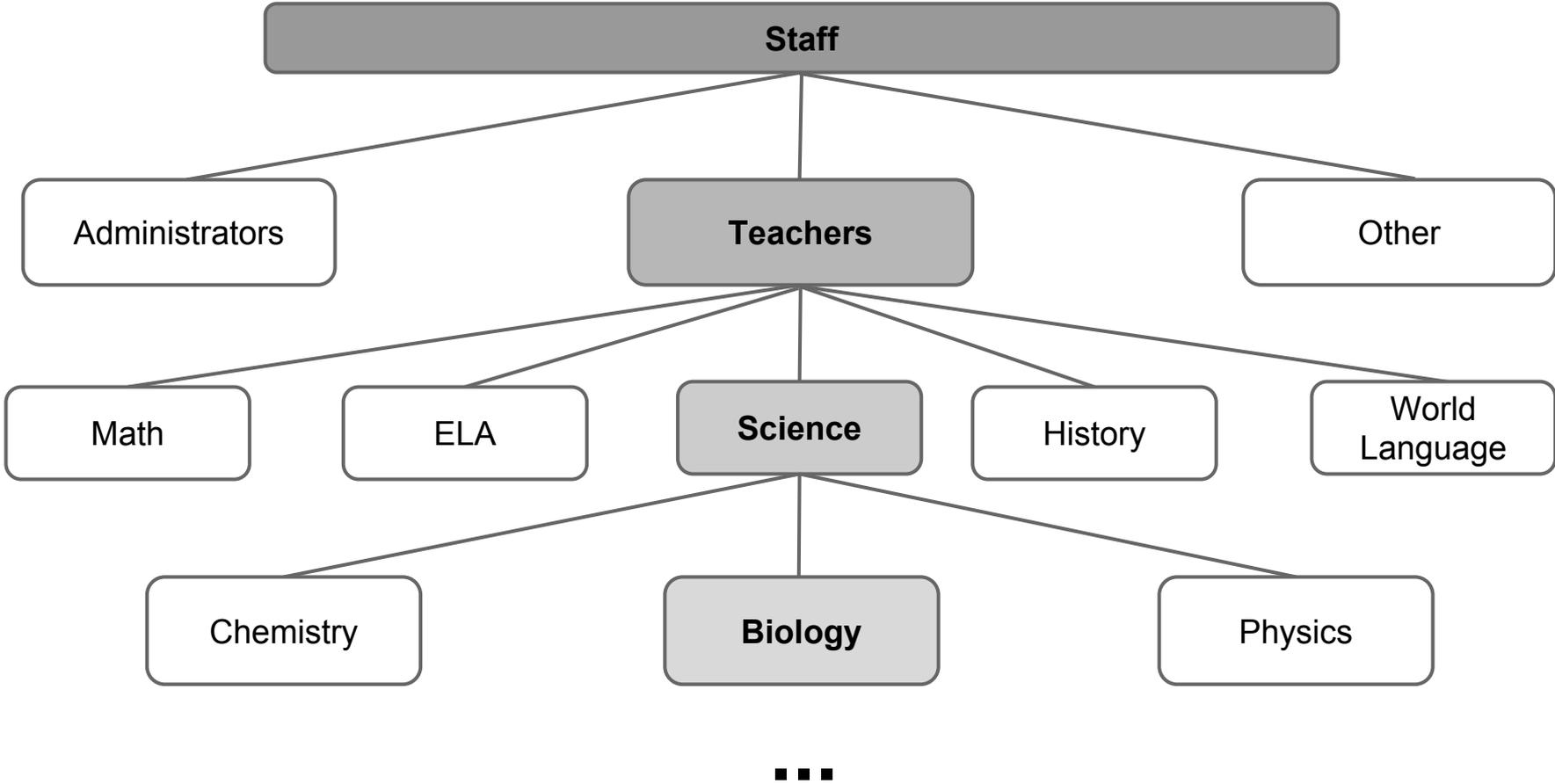
- Must organize living things into groups that have biological meaning.
- Biologists use a classification system to name organisms and group them into a logical manner.
- Taxonomy** is the discipline of classifying organisms and assigning each organism a universally accepted name.

Classification

-In a good system of classification, organisms placed into a particular group are more similar to one another than they are to organisms in other groups.

-For example: Staff → Teachers → Science Teachers → Biology Teachers → Ms. Welsh

(increase in specificity and similarity of the groups within the larger group)



Common names

-Vary among languages, regions, etc.

In the early 18th century...

→ To eliminate such confusion, scientists agreed to use a **single name** for each species.

→ Latin and Greek used for scientific naming.

Binomial Nomenclature

Carolus Linnaeus (18th century)

- two-word naming system
- each species is assigned a two-part scientific name
- still used today!



Binomial Nomenclature

The **first part** of the scientific name, is the **genus** to which the organism belongs. A genus is a group of closely related *species*.

The **second part** of the name is unique to each species within the genus.

For example...

Grizzly Bear - *Ursus arctos*



Polar Bear - *Ursus maritimus*

Binomial Nomenclature

- *Genus species*
 - always in italics
 - Genus name is capitalized, species is not
- increase in specificity and similarity of the groups within the larger group...

What about this?

Grizzly Bear - *Ursus arctos*



Polar Bear - *Ursus maritimus*



Giant Panda - *Ailuropoda melanoleuca*



Linnaeus's System of Classification

Linnaeus's hierarchical system of classification includes seven levels:

**Kingdom → Phylum → Class → Order →
Family → Genus → Species**

Kingdom: *Animalia*
Phylum: *Chordata*
Class: *Mammalia*
Order: *Carnivora*
Family: *Ursidae*
Genus: ***Ursus***
Species: *arctos*



martimus

**Back to our
example...**

Ailuropoda
melanoleuca



Classification:

Kingdom - **Animalia**

Phylum - **Chordata**

Class - **Mammalia**

Pick an **Order**...

- With your group, decide on an **Order** within the Class - **Mammalia**.
- Make sure that you note the **derived characteristics** that separate your Order from other Orders in the Class.

Order

Hugo Dane	Violet Vadim	Anthony Katherine	Danny C. Nina
Oscar Chiara	Kaitlyn Austin	Hunter Alana	Nitza Kieran
Charlie Fernanda	Andre Bolden	Daniel E. Daniel L.	Alexa Marlon
Griffin Samsun	Bodhi Alex	Noah Albert	Omar Welch

Pick a **Family**...

- With your group, decide on a **Family** within the Order _____.
- Make sure that you note the **derived characteristics** that separate your Family from other Families in your Order.

Family

Hugo Dane	Violet Vadim	Anthony Katherine	Danny C. Nina
Oscar Chiara	Kaitlyn Austin	Hunter Alana	Nitza Kieran
Charlie Fernanda	Andre Bolden	Daniel E. Daniel L.	Alexa Marlon
Griffin Samsun	Bodhi Alex	Noah Albert	Omar Welch

Pick a Genus...

- With your group, decide on a Genus within your Family.
- Make sure that you note the **derived characteristics** that separate your Genus from other Genae in the Family.

Hugo
Dane

Violet
Vadim

Anthony
Katherine

Danny C.
Nina

Oscar
Chiara

Kaitlyn
Austin

Hunter
Alana

Nitza
Kieran

Charlie
Fernanda

Andre
Bolden

Daniel E.
Daniel L.

Alexa
Marlon

Griffin
Samsun

Bodhi
Alex

Noah
Albert

Omar
Welch

Finally, pick a **Species**...

- With your group, decide on a **Species** within your Genus.

- Make sure that you note the **derived characteristics** that separate your Species from other Species in the Genus.

Hugo
Dane

Violet
Vadim

Anthony
Katherine

Danny C.
Nina

Oscar
Chiara

Kaitlyn
Austin

Hunter
Alana

Nitza
Kieran

Charlie
Fernanda

Andre
Bolden

Daniel E.
Daniel L.

Alexa
Marlon

Griffin
Samsun

Bodhi
Alex

Noah
Albert

Omar
Welch