Unit 2: Taxonomy and Classification

Tuesday, October 8th

Creepy Classification

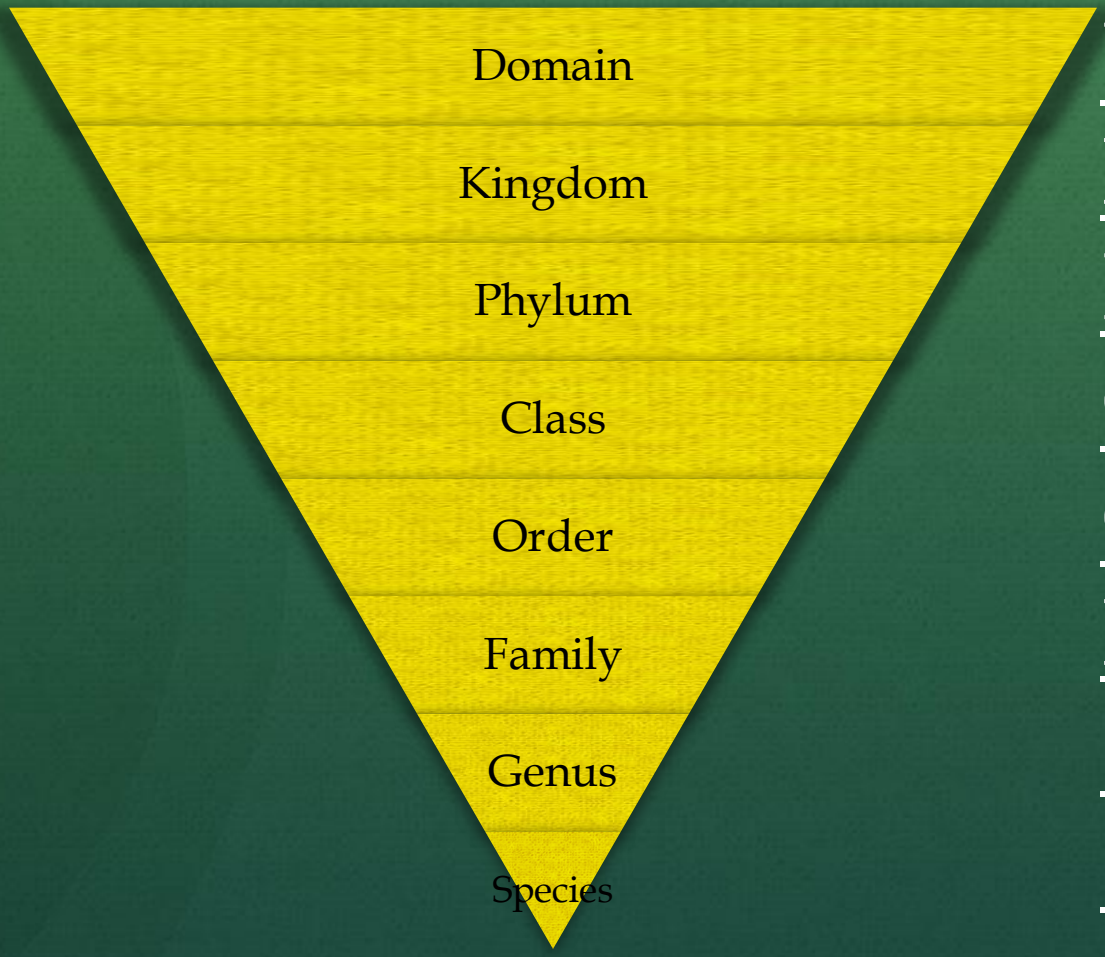
- Using the provided zombie names and their descriptions…
  - Create two groups based on similarities and differences
  - Break these two groups into smaller subgroups
  - If possible, break down the subgroups into pairs or smaller groups
- On a sheet of paper (one per group) write down each group and how you subdivided at each step

Creepy Classification

Why classify?

- Biologists group organisms based on similarities and differences in the organisms':
  - Physical Appearance
  - Genetic Makeup
  - Evolutionary History
- This helps to:
  1. Identify organisms more efficiently
  2. Study group characteristics
  3. Determine relatedness

Taxa→Taxonomy



Dear
King
Phillip,
Come
Over
For
Good
Soup

Binomial Nomenclature

- Carolus Linnaeus is responsible for the development of binomial nomenclature—the use of the genus and species to identify an organisms
- Rules for Nomenclature
  - First letter of genus is always capitalized
  - If printed or typed both should be *italicized*
  - If handwritten both should be <u>underlined</u>
  - After writing a scientific name completely, you can abbreviate thereafter by using the first letter of the genus, a period, and then the species name.

Scientific Name Examples

- Household Cat→*Felis catus*
- Dogs and Wolves→*Canis lupus*
- Lions→*Panthera leo*
- Tigers→*Panthera tigris*
- Humans→*Homo sapiens*
- Neanderthals→*Homo neanderthalensis*
- Staph→*Staphyllococcus aureus*
- E. Coli→*Escherichia coli*

Homework: Taxa Foldable

- Giving each taxon its own page, create a "Layered Look Book" (see page xxvi) with the following information:
  - Name of the Taxon
  - Definition of Taxon (Use pages 486-488)
  - At least three example organisms for each taxon with the appropriate scientific name

Domain

Kingdom

Phylum

Class

Order

Family

Genus

Species

Unit 2: Taxonomy and Classification

Wednesday, October 9th

If you had to choose between a phylum and an order, which taxon would have greater biodiversity? Why?

- Taxons are ordered by increasing similarity and specificity, therefore a ***phylum*** would exhibit more biodiversity than an order.

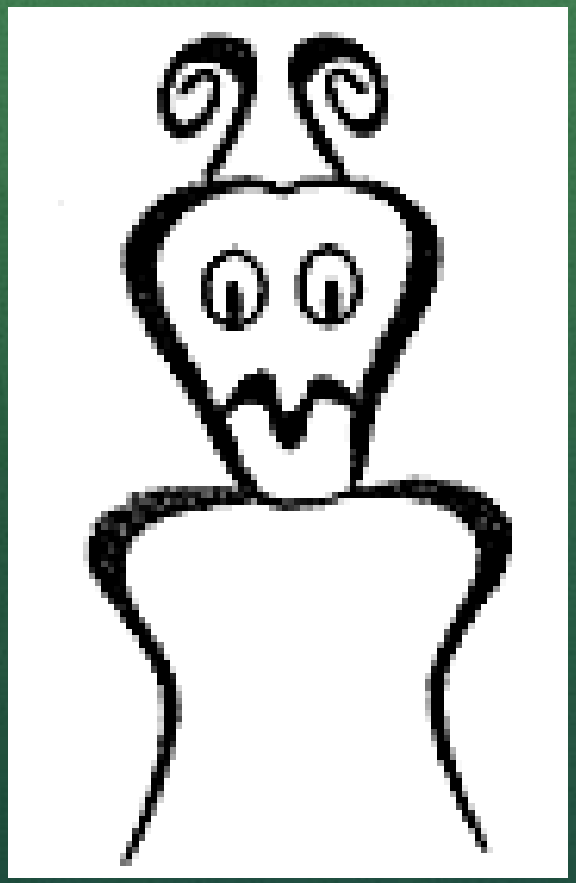
Identifying Organisms

- It's fairly easy to identify which kingdom, phylum, and often class an organism belongs to based on simple, often obvious, characteristics
  - Membrane Bound Organelles→*Eukarya* (Domain)
  - Multicellular, but lacking cell walls→*Animaliae* (Kingdom)
  - Spinal Cord and Tails→*Chordata* (Phylum)
  - Single Tooth Replacement, live offspring→*Mammalia* (Class)
  - Forward Facing Eyes→*Primates* (Order)

Identifying Organisms

- More specific characteristics, require careful observation and are typically used to distinguish between orders, families, genuses, and species.
- Dichotomous keys are often used to determine the exact species and genus of an organism
  - Use visible characteristics to determine an organism's identity
  - Characteristics are presented in pairs (i.e. Blue vs. Not Blue)
  - Progressively reduces the number of potential species
  - Can be presented with text or a flow chart.

Pamishan



Jelly Belly Dichotomous Key

- In each bag there should be 10-15 unique jelly beans
  - There should be more than 10-15 jelly beans, but the surplus should be repeat flavors
- You need to record some characteristics of each jelly bean before tasting them—*you choose the characteristics that will best help you to identify the flavor*
- After recording the characteristics of each jelly bean, you need to taste and identify the flavor—**BEWARE!** There are some "vomit" and "earthworm" flavored beans floating around

Jelly Belly Homework

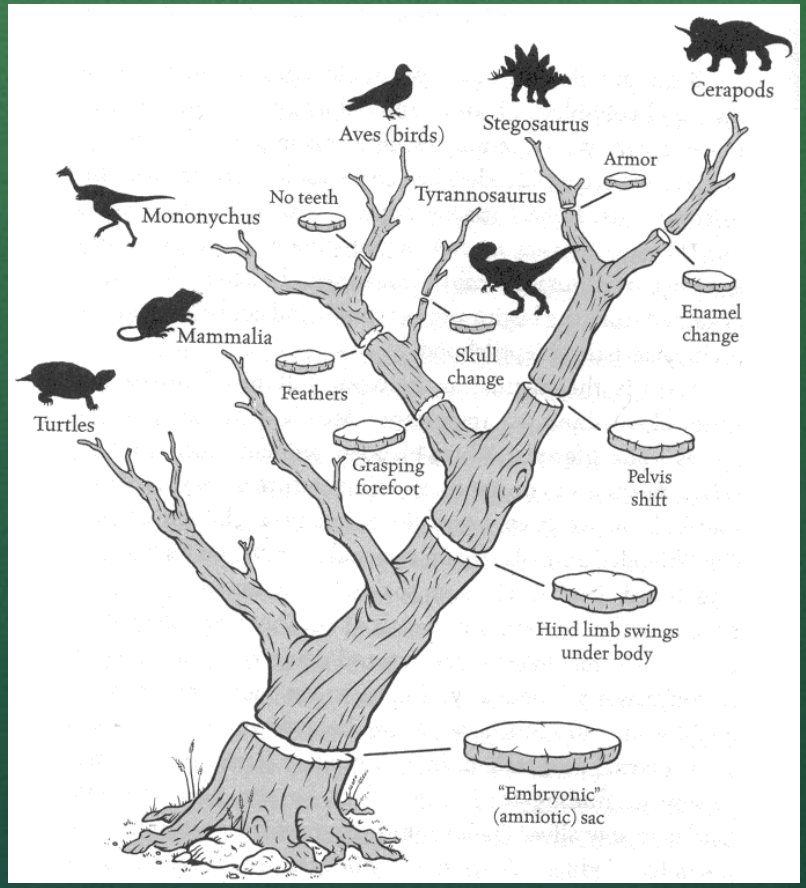
- Using colored pencils or markers, fill in the jelly bean on your chart accurately capturing its characteristics
- Create a dichotomous key to identify your jelly bean flavors.
- Remember you can only have two options and they must be related
- You can do this in either a numbered or flow chart format.

Taxonomy and Classification

Thursday, October 10th

The Tree of Life

- All living things share a single, common ancestor that evolved over millions of years to bring about the biodiversity we see today
- Relatedness is determined by a number of things:
  - Morphology
  - Physiology
  - Biochemistry



Determining Relatedness

Types of Characteristics

- Morphology
  - Form and structure
- Physiology
  - Function
- Biochemistry
  - Genetic makeup

Terms to Know

- Homologous Structures
  - Similar structures with common ancestry; does not always have a similar function
- Analogous Structures
  - Similar functions with different forms/structures
- Vestigial Structures
  - Structures present in current form that do not perform vital functions

Determining Relatedness

- You have each been given a handout with 23 organisms present; you are expected to do the following:
  1. Cut out each organism and glue each image into your lab notebook
  2. Divide the organisms into two "kingdoms"
  3. Develop and record a name for the kingdom on each card
  4. Divide the organisms in *each* "kingdom" into two smaller "phyla"
  5. Develop and record a name for the phyla on each card
  6. Continue to divide the cards into smaller groups; naming and recording each division.

Kingdom: _____

Phylum: _____

Class: _____

Order: _____

Family: _____

Genus: _____

Species: _____

Reflection Questions

- On what basis did you initially separate the organisms?
- After the initial grouping, what characteristics did you use as distinguishing factors?
- Specify the kingdoms that were noted in your separations.
- In terms of shared characteristics, what happens as you make more subdivisions?

Taxonomy and Classification

Friday, October 11th

Visualizing the Tree of Life

- All living things are related and share a *single* common ancestor that existed approximately 3.9 billion years ago.
- Since the beginning of life, there have been hundreds of thousands (possibly millions) of different organisms that have lived on our planet
- What we do know about these organisms, we've used to construct a tree displaying the relationships between these organisms and those we see today

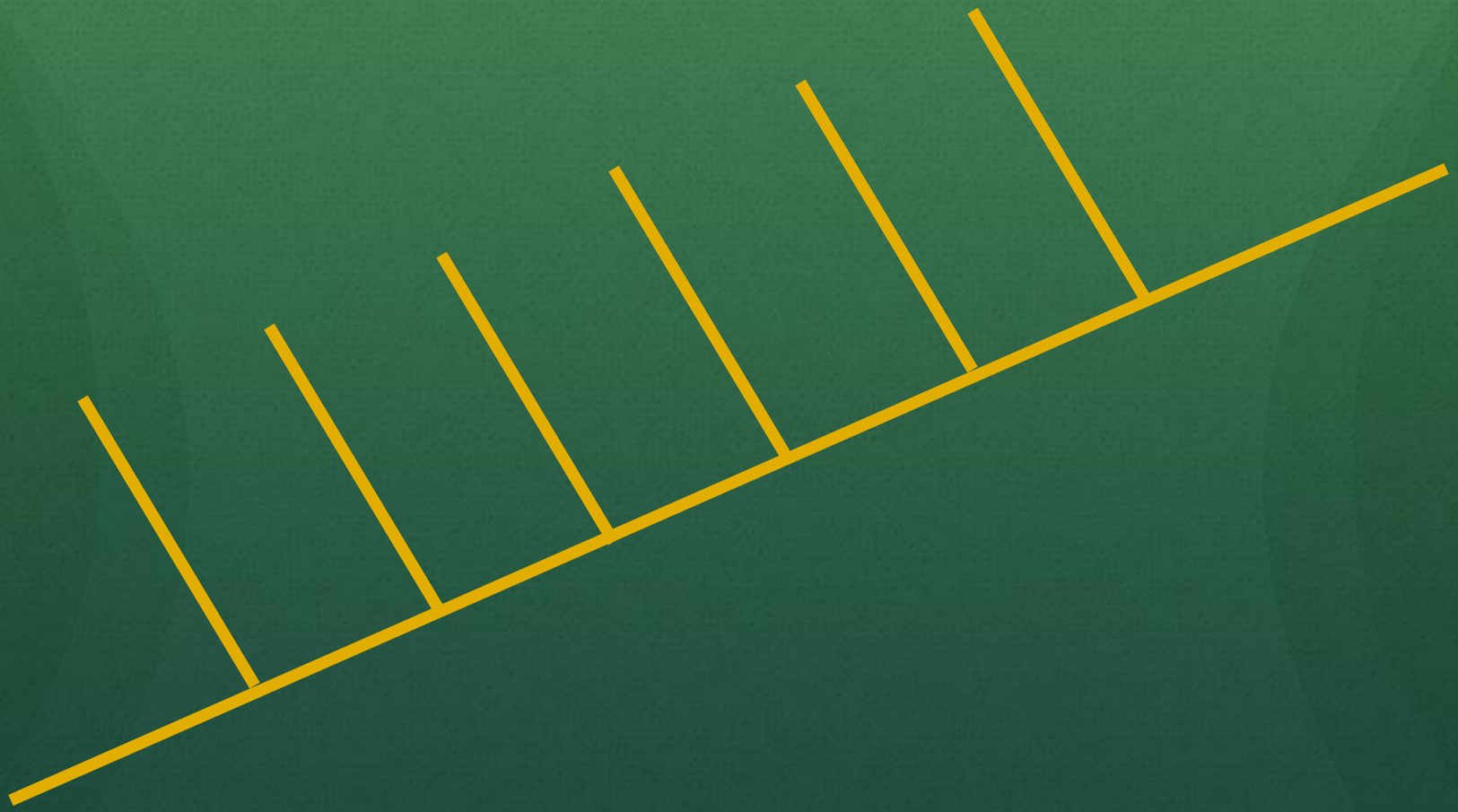
Cladograms

- Cladograms are used to show how organisms are related and have evolved over time.
- They use "nodes" to denote the beginning of a new characteristic (i.e. eggs, hair, milk production, etc.)
- Each "node" represents a common ancestor that may or may not be identifiable

Cladograms

Organism	Jaws	Claws/Nails	Feathers	Lungs	Fur	Thumbs
Perch						
Worm						
Salamander						
Lizard						
Pigeon						
Mouse						
Chimp						

Cladograms



Cladistics Handout

- Working individually, complete the questions on the handout and submit before the end of class.

Homework

- Complete the Chapter 17 Worksheet on constructing and interpreting a cladogram; due Monday!