



# Skull Morphology & Dichotomous Keys

## Materials:

A wide variety of skull specimens or replicas (Generally available on loan from regional WGFD offices)

Large sheets of butcher block paper

Markers

Popcorn (1 bag)

Beef Jerky (enough pieces for each student to have 1)

Baby carrots (enough carrots for each student to have 1)

Rulers

## Next Generation Science Standards:

Cross-cutting concepts: Patterns; Structure & Function

Science & Engineering Practices: Asking questions; Constructing Explanations; Engaging in argument from evidence

Disciplinary Core Ideas: LS3: Heredity: Inheritance and variation of traits; LS4: Biological evolution: unity & diversity

## Dentition Activity:

- Have each student take a couple pieces of popcorn, 1 piece of beef jerky, and 1 baby carrot.
- Walk students through eating each food item as they normally would while taking special care to note which teeth they used in the process.
- Have students partner up and discuss the following:
  - What might this tell us about the type of teeth that animals may have if they eat primarily:

-Vegetation (herbivore)

-Meat (carnivore)

-Both (omnivore)

- Have a full class discussion to summarize
  - 1. what teeth were used for each food item (typically molars for popcorn to grind, incisors and molars for carrots, and canines to tear beef jerky followed by molars to chew)
  - 2. What their discussions with a partner predicted about animal dentition based upon diet.
- Generally teach about:
  - the 4 types of teeth (incisors, canines, pre-molars, and molars)
  - carnivore vs. herbivore vs. omnivore dentition
  - sagittal crests, and location of orbits (binocular vs. monocular vision).

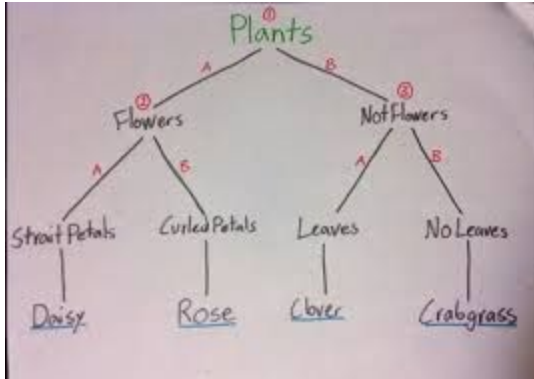
Refer to this document put together by Alaska's Department of Fish & Game for a plethora of information about skulls:

<http://www.adfg.alaska.gov/static/education/educators/curricula/pdfs/skulls.pdf>

- Help students to hone in a definition for **Adaptations**: *A physical (they way it looks) or behavioral (the way it acts) trait that helps an organism "succeed" in its abiotic environment.*

### Dichotomous Key Exercise

- Transition students into creating their own **Dichotomous Keys**. Dichotomous keys are a helpful tool to identify anything down to order or even species level. You always start at the "trunk" of the key, and keep moving down branching paths. Each "fork" or division only has 2 options. It's just like one of those personality quizzes you may have taken before. It may be helpful to google a simple example of a key for wyoming conifers or the like, just to have a visual representation for the students. Below is another example you can easily sketch.



- Break students into groups (ideally no more than 4 per group) with each group having a variety of skulls (no less than 6 per group, the more there are, the longer/more complicated the activity is). Each group should also have a ruler, a large sheet of paper, and markers.
- Give the students these directions:
  - Start with all the skulls in your group at the top of your paper.
  - Find some characteristic (must be OBJECTIVE, not subjective) that divides them into only 2 groups, and draw the branches on the paper that lead to the new placement of the skulls. Label each branch with the defining characteristic that separated out those skulls from the rest. Repeat this process until each skull is alone.
- Conclude the lesson by having students move around and look at each other's keys, noting what is similar and different.