**Lecture 29 – Animal Behavior**

* Behavior is the sum of responses to external and internal stimuli
  + Both muscular and non-muscular activities
  + Everything an animal does and how it does it
  + ( ) - study of ecological and evolutionary basis for animal behavior
* Founders of Modern Behavioral Ecology
  + Niko Tinbergen (1907-1988)
  + Konrad Lorenz (1903-1987)
  + Karl von Frisch (1886-1982)
  + 1973 Nobel Prize in Physiology or Medicine for their discoveries concerning behavioral patterns in animals
* Tinbergen’s four questions in behavioral ecology (know the difference between proximate and ultimate questions)

1. [Mechanism] What stimulus elicits the behavior, and what physiological mechanisms mediate the response?
2. [Ontogeny] How does the animal’s experience during growth and development influence the response?
3. [Adaptation] How does the behavior aid survival and reproduction?
4. [Phylogeny] What is the behavior’s evolutionary history?
   * Proximate Question:
   * Ultimate Question:

* [Proximate Question on Mechanism] What stimulus elicits the behavior, and what physiological mechanisms mediate the response?
  + ( ): a sequence of unlearned acts directly linked to a simple stimulus; unchangeable; once initiated, usually carried to completion
    - Example:
  + ( ): a change in activity of turning rate in response to a stimulus
    - Example:
  + ( ): an oriented movement toward (positive) or away from (negative) a stimulus
    - Phototaxis
    - Chemotaxis
    - Thermotaxis
    - Phonotaxis
  + ( ): a regular, long-distance change in location
    - Example:
  + ( ): circadian clock, circannual rhythms, lunar cycle
    - Example:
  + ( ): a stimulus transmitted from one animal to another
  + ( ): transmission and reception of signals
    - Examples:
    - ( ): typically males generating stimulus that guides the behavior of females
* [Proximate Question on Ontogeny] How does the animals experience during growth and development influence the response?
  + ( ): modification of behavior based on specific experiences
    - ( ): a loss of responsiveness to stimuli that convey little or no new information (getting used to stimuli)
      * Example:
    - ( ): formation at a specific stage in life of a long-lasting behavioral response to a particular individual or object (stimuli get stuck for life)
    - ( ) (critical period) – a limited developmental phase when certain behaviors can be learned; irreversible
      * Example:
    - ( ): establishment of a memory that reflects the environment’s spatial structure
      * Example:
    - ( ): the ability to associate one environmental feature with another

1. ( ) conditioning – arbitrary stimulus becomes associated with a particular outcome
2. ( ) conditioning – trial-and-error learning
   * + ( ): process of knowing represented by awareness, reasoning, recollection, and judgment
       - Problem solving
       - Learning from others
   * Both genetic makeup ( ) and environmental conditions ( ) contribute to the development of behaviors
     + ( ) study: young of one species are placed in the care of adults from another species
     + ( ) study: behavior of identical twin raised apart

* [Ultimate Question on Adaptation] How does the behavior aid survival and reproduction?
  + The genetic components of behavior evolve through ( ) for traits that enhance survival and reproductive success ( ) in a population
    - ( ): food-obtaining behavior
      * ( ): natural selection should favor a foraging behavior that minimizes the costs of foraging and maximizes the benefits
      * Example:
    - ( ): a form of natural selection in which individuals with certain inherited characteristics are more likely than other individuals to obtain mates
      * Female choice
      * Male-male competition
    - ( ): an approach to evaluating alternative strategies in situations where the outcome of a particular strategy depends on the strategies used by other individuals
      * Example:
* [Ultimate Question on Phylogeny] What is the behavior’s evolutionary history?
  + Differences in behavior between populations or species can be attributed to different evolutionary history
    - Example: