**C51 Animal Behavior** (**Ethology** – study of how animals behave).

**Behavior** – action carried out in response to a stimulus.

**Proximate causation** – “how” a behavior occurs.

**Ultimate causation** – “why” a behavior occurs in the context of natural selection.

**Fixed action pattern** – a sequence of unchangeable, innate acts, once started that usually go to completion due to a stimulus. [Ex. Male stickleback fish attack red colored fish or even “poor” models with red.](http://www.youtube.com/watch?v=ZfcGZCGdGVE) [Greylag geese rolling egg.](http://www.youtube.com/watch?v=vUNZv-ByPkU)

**Kinesis** – random movement due to a stimulus, ex. Pill bugs and light.

**Taxis** – directed movement toward (+) or away (-) from a stimulus.

**Migration** – regular, long-distance change in location.

**Circadian rhythm** (or clock) – internal 24-hour cycle of activity.

**Signal** – stimulus transmitted from one animal to another.

**Communication** – transmission and reception of signals, ex. Courtship, bees [waggle dances](http://www.youtube.com/watch?v=-7ijI-g4jHg)…

**Pheromones** – chemical substances (odors).

**Learning** – changed behavior as a result of experiences.

**Innate behavior** – unlearned behavior.

**Habituation** – “cry-wolf” effect, stimuli that are not harmful become ignored.

**Imprinting** – a long-lasting response formed at a specific stage of development called a **sensitive period** or critical period.

**Spatial learning** is carried out by wasps using **landmarks.** Clark’s nutcracker (bird) uses a **cognitive map** (remembers relative distances).

**Associative learning** – connecting a feature, such as color, with another feature, such as taste.

**Classical conditioning** - Pavlov’s dogs. (Association and reward).

**Operant conditioning** – trial and error learning.

**Cognition** – process of knowing represented by awareness, reasoning, recollection, and judgment.

**Problem solving** – devising a method to proceed from one state to another in the face of obstacles.

**Cross-fostering study** – exchanging young of 2 different species for up-bringing to see how “parenting” changes them, ex. Mice. These studies impact generations beyond the first one!

**Twin study** – helps show differences attributed to nature (DNA) versus nurture.

**Regulatory genes** for behavior have been identified. Ex. ***fru*** – male courtship in fruit flies.

**Foraging** – food-obtaining behavior. (Balancing risk or effort and reward).

Mating systems and parental care:

**Promiscuous** – no strong pair-bonds.

**Monogamous** – one male with one female.

**Polygamous** – one gender mating with several of the other gender.

**Polygyny** – single male with many females, ex. elk.

**Polyandry** – single female with several males, ex. Wilson’s phalaropes (birds).

External fertilization makes **certainty of paternity** more evident, thus males give parental care in 69% of fish and amphibians produced via external fertilization and only 7% of fish and amphibians with internal fertilization.