Quick Review

- Incomplete dominance or codominance?
  a) A cross between a blue blahblah bird & a white blahblah bird produces offspring that are silver.
  b) A cross between a black cat & a tan cat produces a tabby pattern (black & tan fur together).
  c) A Hoo can have curly hair, spiked hair, or a mix of both curly and spiked.
  d) A mating between two orange snapdragons produces yellow, red, and orange offspring.

- A woman with type B blood (whose father was type O) marries a man with type O. The couple has 4 children.
  - How many of the children are expected to have type O blood?

In northeast Kansas there is a creature know as a wildcat. It comes in three colors: blue, red, and purple.

- A purple wildcat is mated to a red wildcat. (Use R and R' to represent the alleles)
  - What is the genotype of the red wildcat?
  - What percentage of the offspring will be red?

Sex-Linked Traits

- **Sex-linked gene** - carried on the X-chromosome.
- Must keep track of X and Y chromosomes
  - XX = female
  - XY = male

Sex-Linked Traits

- Males and females show different patterns
  - MEN ONLY HAVE ONE X
  - They are twice as likely to show X-linked disorders!
  - Females must be homozygous for the trait

Example

- In fruit flies, eye color is a sex-linked characteristic. Red eyes are dominant to white.

  X^R=red allele X^r=white allele

- What is the genotype of a white-eyed female?
  - X^rX^r
- What is the genotype of a red-eyed male?
  - X^RY

- In humans, red-green colorblindness is a recessive sex-linked trait.

  X^B = normal color vision allele

  X^b = colorblind allele

Phenotype	Genotype
Normal vision male	X^BY
Colorblind male	X^bY
Normal vision female	X^BX^B
Normal vision female (carrier)	X^BX^b
Colorblind female	X^bX^b

- Charlie has normal vision. His wife, Kate, is colorblind.
  - What is Charlie's genotype?
  - What is Kate's genotype?
  - What percentage of their children are expected to be colorblind?
  - What sex will those children be?

- Hemophilia is a sex-linked trait. A person with hemophilia is lacking certain proteins that are necessary for normal blood clotting. Hemophilia is caused by a recessive allele. A woman who is heterozygous (a carrier) for hemophilia marries a normal man:

1. Set up your key
   ($X^?$ = normal; $\dot{X}^?$ = hemophilia)
2. What are the genotypes of the parents?
3. What is the probability that a male offspring will have hemophilia?
4. What is the probability of having a hemophiliac female offspring?

- Which sex is more likely have a recessive, sex-linked trait?
- Which parent do sons inherit recessive, sex-linked traits from?
- A colorblind man has a child with a woman who is a carrier of the disorder.
  - What is the genotype of the man?
  - What is the genotype of the woman?
  - What is the chance that the *child will be colorblind?*
  - What is the chance that a *daughter will be colorblind?*
  - What is the chance that a *son will be colorblind?*