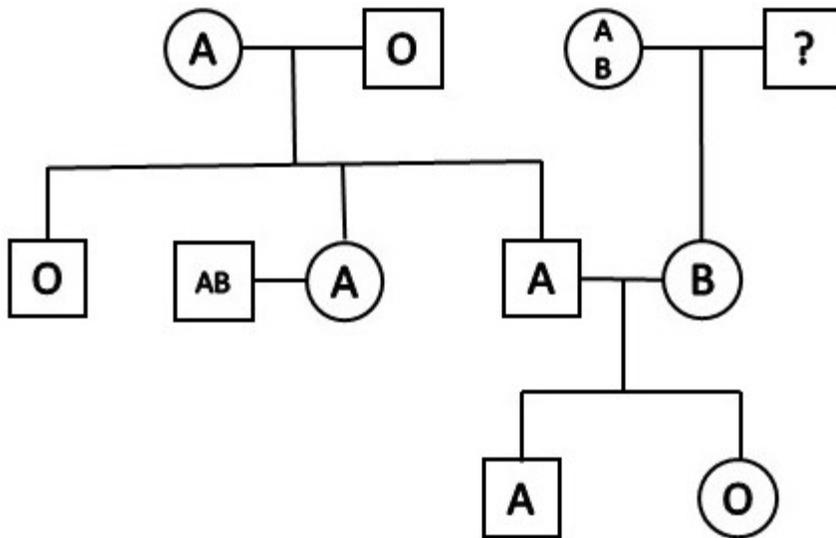


1. You repeatedly cross two yellow mice of unknown parentage. The offspring include 17 black mice and 35 yellow mice. Assuming that this trait is controlled by one gene and that your sample size is large enough to have statistical confidence that your ratios are accurate, how do you explain these results? In your answer, include a list of the three possible genotypes (use whatever symbols you want, as long as it's clear) and their associated phenotypes.
2. In chickens, the dilution trait is controlled by incomplete dominance. Homozygotes are either black or white, and heterozygotes are "blue". Explain why it's impossible to have a true-breeding population of blue chickens.

If you crossed a black chicken with a white one, what would you expect to see in the progeny?

3. In a species of morning glories, the color of pigment that is produced depends on the allele at the *f3'h*; the dominant P allele causes purple flowers, while the recessive p allele causes pink flowers. The gene *chs-d* is necessary for an earlier step in pigment synthesis; aa and Aa individuals lack pigment, while AA individuals are darkly pigmented.
  - A. What kind of gene interaction is this?
  - B. What offspring phenotypes, in what ratios, would you expect from the following crosses?
    - AApp x aaPP
    - AaPp x AAPP
    - AaPp x AaPp
4. In Labrador retrievers, coat color is determined by two genes. One gene determines whether an individual produces black (dominant) or brown (recessive) pigments. Another gene determines whether pigment is laid down in the hairs (dominant) or not (recessive). Lack of pigment in the hairs results in a yellow phenotype. A dog breeder is trying to produce yellow and brown labrador puppies. They breed a yellow male and a brown female. Unfortunately, all of the puppies that resulted were black.
  - A. Explain this result.
  - B. How might the breeder more successfully produce yellow and brown labradors?

**Blood type pedigree**



Next to each individual, fill in the genotypes as completely as possible.

What blood type is **not** possible for the mystery parent?

If the middle child in generation II has a child with their spouse, what are the possible blood type(s) for the kid?

If the oldest child in generation II has a child with someone who also has O-type, what is the possible blood type(s) for their child?