**Practice problems for independent assortment**

1. Prior to cell division, each chromosome replicates or duplicates its genetic material. The products are connected by a centromere and are called:
   1. sister chromosomes.
   2. homologous chromosomes.
   3. sister chromatids.
   4. sex chromosomes.
   5. autosomes.

A

a

B

b

1. The image to the right illustrates a diploid cell with two chromosomes: the straight chromosomes are heterozygous for the A and a alleles of one gene, while the curvy chromosomes are heterozygous for the B and b alleles of a second gene. How many different genetic combinations of these alleles could be generated following meiosis?
   1. 1
   2. 2
   3. 4
   4. 6
   5. 8
2. Short hair in rabbits is produced by a dominant gene (*l+*) and long hair by its recessive allele (*l*). Black hair results from the action of a dominant gene (*b+*) and brown hair from its allele (*b*). Determine the genotypic and the corresponding phenotypic ratios of the F1 from a cross of a female rabbit with short brown hair and a male rabbit with long black hair. Assume that the female is homozygous for short hair and the male is homozygous for black hair.
3. A rosy-eyed *Drosophila* with wild-type bristles was crossed with a forked *Drosophila* with wild-type eyes. The F1 were wild type for both traits, whereas the F2 consisted of 306 wild-type, 94 rosy-eyed, 102 fork-bristled, and 33 forked-bristled and rosy-eyed flies. Infer the genotypes of the original parents.
4. Calculate the probability of the all-recessive genotype for the alleles *a*, *b*, *c*, *d*, *e*, and *f* in the following cross: *Aa Bb cc dd Ee Ff* × *Aa Bb Cc dd Ee Ff*.