

Name: _____ Date: _____ Period: _____
Biology Level 1- Ms. Strang Optional Dihybrid Crosses Practice

1) In summer squash, white fruit color (W) is dominant over yellow fruit color (w) and disk-shaped fruit (D) is dominant over sphere-shaped fruit (d). If a squash plant true-breeding for white, disk-shaped fruit is crossed with a plant true-breeding for yellow, sphere-shaped fruit, what will the phenotypic and genotypic ratios be for:
a. the F1 generation?
b. the F2 generation?

2) A pea plant is heterozygous for both seed shape and seed color. S is the allele for the dominant, spherical shape characteristic; s is the allele for the recessive, dented shape characteristic. Y is the allele for the dominant, yellow color characteristic; y is the allele for the recessive, green color characteristic. What will be the distribution of these two alleles in this plant's gametes?

3) The gametes of a plant of genotype SsYy should have the genotypes:

4) In a dihybrid cross, AaBb x AaBb, what fraction of the offspring will be homozygous for both recessive traits?

5) Following a $SsYy \times SsYy$ cross, what fraction of the offspring are predicted to have a genotype that is heterozygous for both characteristics?

6) In a dihybrid cross, $SsYy \times SsYy$, what fraction of the offspring will be homozygous for both traits?

7. About 70% of Americans perceive a bitter taste from the chemical phenylthiocarbamide (PTC). The ability to taste this chemical results from a dominant allele (T) and not being able to taste PTC is the result of having two recessive alleles (t). Albinism is also a single locus trait with normal pigment being dominant (A) and the lack of pigment being recessive (a). A normally pigmented woman who cannot taste PTC has a father who is an albino taster. She marries a homozygous, normally pigmented man who is a taster but who has a mother that does not taste PTC. What are the genotypes of the possible children (choose all that apply)?

8. Wolves are sometimes observed to have black coats and blue eyes. Assume that these traits are controlled by single locus genes and are located on different chromosomes. Assume further that normal coat color (N) is dominant to black (n) and brown eyes (B) are dominant to blue (b). Suppose the alpha male and alpha female of a pack (these are the dominant individuals who do most of the breeding) are black with blue eyes and normal colored with brown eyes, respectively. The female is also heterozygous for both traits. List the phenotypic ratio of the offspring of a cross between the alpha male and female.

9. Carrion beetles lay their eggs in dead animals and then bury them in the ground until they hatch. Assume that the preference for fresh meat (F) is dominant to the preference for rotted meat and that the tendency to bury the meat shallow (S) is dominant to the tendency to bury the meat deep. Suppose a female carrion beetle homozygous dominant for both traits mates with a male homozygous recessive for both traits. What will be the genotype of the F1 generation?

a. What will be the phenotype of the F1 generation?

b. What will be the phenotypic ratio of the F2 generation?

c. What will be the genotypic ratio of the F2 generation (FFSS : FFsS : ffss)?

10. In the breeding season, male Anole lizards court females by bobbing their heads up and down while displaying a colorful throat patch. Assume for this question that both males and females bob their heads and have throat patches. Assume also, that both traits are controlled by single locus genes on separate chromosomes. Now, suppose that anoles prefer to mate with lizards who bob their heads fast (F) and have red throat patches (R) and that these two alleles are dominant to their counterparts, slow bobbing and yellow throats. A male lizard heterozygous for head bobbing and homozygous dominant for the red throat patch mates with a female that is also heterozygous for head bobbing but is homozygous recessive for yellow throat patches. How many of the F1 offspring have the preferred fast bobbing / red throat phenotype (assume 16 young)?

a. What percentage of the offspring will lack mates because they have both slow head bobbing and yellow throats?

b. What percentage of the offspring will have trouble finding mates because they lack one of the dominant traits?

11. Suppose in a strain of soybeans, high oil (H) content in the seeds is dominant to low oil content and four seeds (E) in a pod is dominant to two seeds in a pod. A farmer crosses two soybean plants, both with high oil content and four seeds per pod. The resulting F1 offspring have a phenotypic ratio of 9:3:3:1 (High oil / four seeds : High oil / two seeds : Low oil / four seeds : Low oil / two seeds). What genotype were the parent plants?

12. Suppose the farmer chooses two of the high oil / four seed plants and crosses them. The F2 generation have all high oil / four seed phenotypes. What were the genotypes of the plants chosen by the farmer to cross?

13. Which known genotypes might the farmer cross her high oil / four seed plants with to determine their genotype?