

Introductory Biology Genetics Problems – Complete Dominance through Multi-hybrid Crosses

1. Suppose that two true breeding lines of lobsters have the following phenotypes: green and white body color. Hybrids of these two lines are all green.
 - (a) name the two alleles and state which is dominant and which is recessive
 - (b) what is the genotype of the F1 (hybrids) just described?
 - (c) If the F1 is test-crossed what are the expected (i) phenotypic and (ii) genotypic ratios of the F2?
2. Suppose that genes A, B, C and D assort independently of each other. Moreover, assume that:
 - (i) there are only two types of alleles for each gene and
 - (ii) one allele at each locus shows complete dominance

Suppose that:

Parent #1 -- an individual with the phenotype **ABcD** who had true breeding parents with phenotypes ABcD and abcd
is crossed with parent #2 -- an individual with the phenotype **ABCD**.
Some of their offspring are phenotype **abcd**

- (a) What are the genotypes of parent #1 (ABcD) and #2 and (ABCD)?
- (b) What is the chance of these parents producing offspring with the following phenotypes or genotypes?
 - (a) ABCD
 - (b) AABBCcDd
 - (c) abcd
 - (d) AbcD

Do NOT use a Punnett square to solve any of these problems (except to work out the results of monohybrid crosses if you have forgotten the probabilities of various results)

- (c) Could an individual with the phenotype ABcD possibly ever be true breeding? (explain)