

Final Exam Study Guide

Dr. Jockusch's portion of the final exam will be worth 50 pts. It will be similar to quiz 1 and the midterm in format, and some calculations will be required.

Definitions and concepts (Be able to explain or define these terms, and tell whether/how they apply in particular examples)

- adaptation
- assortative mating
- directional selection (in both the 1-locus and quantitative trait cases)
- disruptive selection (in both the 1-locus and quantitative trait cases)
- effective population size/ideal population
- equilibrium
- evolution
- fitness landscape
- Fisher's fundamental theorem of natural selection
- Fisher's model of evolution by runaway sexual selection,
- other models of evolution by sexual selection
- genetic drift
- heritability
- inbreeding/inbreeding depression
- mean fitness of a population
- Mendelian trait
- migration
- migration rate
- natural selection (also, the conditions under which evolution by natural selection occurs)
- quantitative trait
- random mating
- response to selection
- sampling error
- selection differential
- sexual selection (also, why do we focus on male-male competition and female choice?)
- stabilizing selection (in both the 1-locus and quantitative trait cases)

Examples of applications

- Calculate allele and genotype frequencies from counts of individuals
- Interpret a mating table/fill in blanks in a mating table
- Given allele frequencies, calculate genotype frequencies under H-W equilibrium
- Given a single genotype/phenotype frequency, calculate allele frequencies assuming H-W equilibrium
- Determine whether genotype frequencies in a population are consistent with those expected under H-W equilibrium
- For populations not in H-W equilibrium, analyze deviations in genotype frequency to say which assumption is most likely violated
- Calculate the allele and genotype frequencies across generations under self-fertilization
- Calculate allele frequencies in a population after migration from another population
- Find equilibrium values under continent-island model
- Determine whether populations are likely to diverge due to genetic drift
- Compare the effects of drift in different populations (e.g. different N, different p)
- Interpret simulation results (e.g., say something about relative parameter values)
- Given the frequencies of genotypes or phenotypes before and after selection, identify the kind of selection that is acting and relative fitnesses of the genotypes or phenotypes
- Predict the eventual evolutionary outcome of particular kinds of selection
- Given the relative fitnesses of genotypes or phenotypes and frequencies before selection, calculate the frequencies after selection
- Calculate the mean fitness of a population in different generations
- Predict the evolutionary response of quantitative traits to selection
- Calculate heritabilities given appropriate information