Biol 415 Quiz #1 Study Outline

**Mechanisms of Evolution**

-What is evolution, macroevolution, and microevolution? *slide 4*

-What are the differences between genotype and phenotype? How are they related? *slide 4*

-What are the major evolutionary agents? *slide 5*

-What is gene flow and how does it affect populations? *slide 6*

-What is genetic drift and natural selection? What do they do to a population? *slide 7-8*

-What is inbreeding and outbreeding depression? *slide 9*

**Genetic Drift (Dlugosch and Parker 2008)**

-What’s the difference between assortative and disassortative mating? What is the implication to genotype and allele frequencies for them? How might it occur? *slides 4-8*

-What is inbreeding depression? What causes it? What prevents it? *slides 9, 13*

-What does inbreeding do to genotype or allele frequencies? *slides 9-11*

* How do we measure inbreeding? *slide 12*

-What is genetic drift? *slides 15-16*

* What affects the amount of drift that occurs and why? Especially why population size matters. *slides 17-18*

-What is effective population size? *slide 19*

-What affects the effective population size and understand why each does. *slides 19-20*

-What effects the severity of a founder effect and why? *slide 22*

-What happens to allele frequencies during drift? What is the probability of an allele being fixed by drift? *slides 23-24*

-What does theoretical critical value (4Nes) indicate? *slide 26*

-How does drift act within populations and among populations and why? *slide 27*

-What does Fst represent and how is it measured? *slide 29*

**Gene Flow (Ellstrand 2014)**

-What is gene flow, what does it do to populations? *slide 4*

-How does gene flow occur in plants? *slides 5-8*

-How do you measure gene flow?

* directly? what are the shortcomings of each method? *slides 10-14*
* indirectly? What are the caveats? *slides 15-17*

-What are the different implications of seed versus pollen dispersal? *slides 18-20*

-How does gene flow influence species cohesion? *slides 22-23*

-How does selection affect the spread of a mutation? *slides 24-31*

-Why would gene flow reduce inbreeding depression? *slide 33*

* Cause heterosis? *slide 34*
* Cause outbreeding depression? *slide 35*

-Gene flow and transgenics. How would you test if a transgene would spread? *slides 37-39*

**Phylogeography (Sork *et al.* 2016)**

-What is phylogeography? *slides 4-7*

-What influences spatial patterns of genetic variation? *slides 8-9*

-What is reticulate evolution? Does it occur? *slide 10*

-What’s the difference between population genetics, phylogenetics and phylogeography? *slides 11-12*

-What are the pros and cons of using mitochondrial, chloroplast or nuclear DNA for phylogeography? *slide 13*

-Be able to read haplotype networks and when combined with a geographic map be able to postulate forces causing that pattern. E.g. gene flow, vicariance, long distance gene flow, mutation, incomplete lineage sorting, fragmentation. *slide 14-23*

-What is the ABBA-BABA test? What do we expect without gene flow and why? What is the result when there is gene flow? *slides 24-31*

-What is coalescent theory? What is it used for? What does MRCA stand for? *slides 32-34, 39-40*

-What is model based phylogenetics? What are the four steps? How is it better than previous methods? *slides 35-38*