Unit 6: Genetic Diversity and Inheritance

A. Meiosis Leads to Genetic Variation	Mastery Reflection: What do I need to master before the exam?	Resources for Mastery
 Students who demonstrate understanding can 1A Compare and contrast the roles of somatic cells and germ cells Explain the significance of & difference between diploid (2N) and haploid (1N) cells 2A Describe the following chromosomal entities: chromosome, sister chromatids, homologous chromosomes, centromere, tetrad 3A Describe the major events that occur in each phase of meiosis Compare events and products of meiosis I with meiosis II Identify when the cells change from diploid to haploid 4A Explain how each of the following processes contribute to increased genetic variation independent assortment of chromosomes crossing over random fertilization 		<i>Textbook Sections:</i> • 6.9 – 6.13 • 7.10 <i>On Edline:</i>
 5A Describe the process and purpose of gametogenesis Compare and contrast oogenesis with spermatogenesis Construct an argument for why there is a difference between the two processes 6A Create and analyze karyotype to investigate chromosomal pairing Provide proper karyotype notation for an individual Explain the effects of nondisjunction in gamete production (trisomy & monosomy) 		Videos: http://www.bozemanscien ce.com/meiosis http://www.bozemanscien ce.com/diploid-vs-haploid

B. Basic Genetics and Mendelian Inheritance	Mastery Reflection: What do I need to master before the exam?	Resources for Mastery
 Students who demonstrate understanding can 1B Explain the relationship between a trait and genes that control it Explain the difference between the terms "gene" and "allele" Differentiate between the genotype and phenotype for a given trait Differentiate between a homozygous and heterozygous genotype Differentiate between dominant alleles and recessive alleles 		Textbook Sections: • 7.1 – 7.5 On Edline:
 2B Analyze the work of Gregor Mendel and explain its significance to modern genetics Describe the traits he studied with the pea plant and why they were significant Recite Mendel's Laws and explain the significance of each 		

3B Use a punnett square to calculate the probability of outcomes in a monohybrid cross in which the trait exhibits complete dominance	
 Determine parental genotypes from reading appropriate descriptions Calculate genotypic and phenotypic ratios for the F1 generation 	
 4B Use a punnett square to calculate the probability of outcomes in a dihybrid cross Determine parental genotypes and possible allele combinations Calculate genotypic and phenotypic ratios for the F1 generation 	Videos: http://www.bozemanscien ce.com/biology-main-
5B Construct and analyze a pedigree to trace a trait of interest	page/ (see Unit 4)

C. Advanced Genetics and Complex Patterns of Inheritance	Mastery Reflection: What do I need to master before the exam?	Resources for Mastery
Students who demonstrate understanding can 1C Describe the difference between monogenic and polygenic traits & provide examples		Textbook Sections: • 7.7 – 7.9 On Edline:
 Explain how this differs from a case of complete dominance Use a punnett square to calculate the probability of outcomes in a cross Identify and provide examples of traits that follow this pattern or inheritance 		
 3C Describe the characteristics of a trait that is controlled by co-dominant alleles Explain how this differs from a case of complete dominance Use a punnett square to calculate the probability of outcomes in a cross Identify and provide examples of traits that follow this pattern or inheritance 		
 Explain the roles of co-dominance and multiple alleles in human blood types Predict which blood types can intermix safely and explain why this is so 		
 Explain how this differs from a case of complete dominance Use a number to calculate the probability of outcomparing a grade 		Links:
 Identify and provide examples of traits that follow this pattern or inheritance 		http://www.nobelprize.org/edu cational/medicine/bloodtyping game/game/index.html
 5C Describe the characteristics of a trait that is controlled by sex-linked alleles Explain how this differs from a case of complete dominance Use a punnett square to calculate the probability of outcomes in a cross Identify and provide examples of traits that follow this pattern or inheritance Explain the difference between sex-limited and sex-influenced traits 		Videos: http://www.bozemanscien ce.com/biology-main- page/ (see Unit 4)

D. Applied Genetics in the Modern World	Mastery Reflection: What do I need to master before the exam?	Resources for Mastery
 Students who demonstrate understanding can 1D Apply knowledge of genetics in order to better understand various genetic disorders Identify the type of mutation that causes a genetic disorder of interest Conduct research to better understand the abnormalities that exist within a patient Conduct research to better understand the prognosis and treatments 2D Discuss the significance and applications of the Human Genome Project 		<i>Textbook Sections:</i> • 7.11 – 7.14 • 9.1 – 9.3 • 9.4 (DNA finerprinting) • 9.6 – 9.9 • 10.1 – 10.4 <i>On Edline:</i>
 3D Argue the value of DNA profiling in modern society Describe the process of creating a "DNA fingerprint" Create and analyze a "DNA fingerprint" Discuss multiple reasons for the use of this technology 3D Argue the value of technological advancements in the field of genetics Discuss the potential as well as the areas of concern in each of the following fields Genetically Modified Organisms Cloning Stem Cell Therapy 		Links: Human Genome Project http://www.genome.gov/1 0001772 Cloning: http://learn.genetics.utah. edu/content/cloning/ Stem Cells: http://learn.genetics.utah. edu/content/stemcells/