

Mentoring Worksheet #12: Mendel and Extensions

Learning Goals: Can you:

- Distinguish between the blending hypothesis and Mendel's ideas regarding inheritance?
- Distinguish between the law of the segregation of alleles and the law of independent assortment?
- Draw a diagram that shows how alleles for 1-2 genes on different chromosomes would behave during meiosis? What if they were on the same chromosome?
- Predict potential progeny that would be produced from a given cross involving up to 5 different genes?
- Determine the likely mode of inheritance (dominant or recessive) and parental genotypes if given the results of a genetic cross?
- Design a cross that would allow you to determine the genetic make up of an unknown individual?
- Distinguish between different factors that could affect how genotype relates to phenotype (incomplete dominance, codominance, etc.) and how this would affect the types of offspring produced by a given cross.

Terms and Concepts

alleles, loci	dominant, recessive	homozygous, heterozygous
genotype, phenotype	punnett square	multiplication and addition rules
probabilities	hybrid, monohybrid, dihybrid	test cross
P, F1, F2 generations	true breeding	character trait
law of segregation	law of independent assortment	complete, incomplete dominance
co-dominance	Multiple alleles	polygenic/quantitative trait
pleiotropy	epistasis	pedigree
sex linkage	chromosomal linkage	recombination
Penetrance (norm of reaction)	gene mapping	hemizygous

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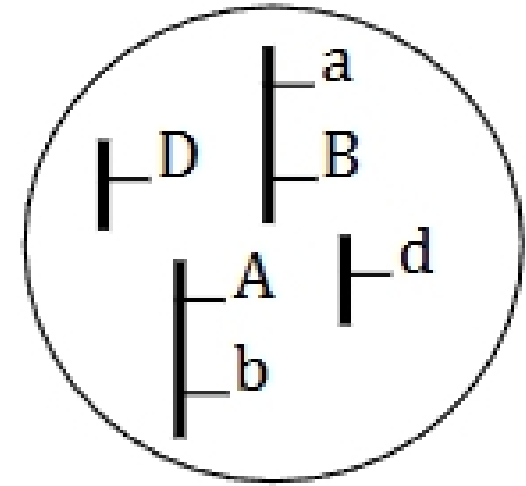
Section: (Please circle) 9 AM / 11:15 AM

Group #: _____

Group Members present: _____

Please turn one copy of this completed worksheet into your mentor at the end of the session.

1) A diploid organism has two pairs of chromosomes, containing three genes. You examine an individual that is heterozygous for all three genes arranged as shown to the right.



a) Draw the arrangement of the chromosomes for a cell at metaphase of mitosis.

b) Draw all of the different possible arrangements of the chromosomes for a cell at metaphase of Meiosis I.

c) What is the **genotype** of all of the gametes that would be produced from meiosis of this cell (Assuming crossing over DOES occur?)

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Parent #1 Parent #2
AaBbccddEe x AabbCcDdEe

- 1) You perform the cross shown above to examine the inheritance of five genes, A-E.
 - a) What is the probability of a gamete containing recessive alleles for all five genes being produced from:
 - i) Parent #1?

 - ii) Parent #2?

 - b) What is the probability this cross might produce the following offspring:
 - i) Heterozygous for all five genes?

 - ii) Homozygous dominant for all five genes?

 - iii) Homozygous recessive for all five genes?

 - iv) Look like Parent #1

 - v) Look like Parent #2