

LS7B Week 2 Lab Worksheet

In this lab you will use LEGO chromosome models to relate the events of meiosis relate to Mendel's Laws.

Part 1. Modeling Meiosis

Using your LEGO models as an aid, draw the chromosomes as they would appear in each cell shown in the diagram below. For simplicity, you only need to include Gene A and Gene D in your drawings. Be sure to designate which genes/alleles are present in each cell.

Gene A

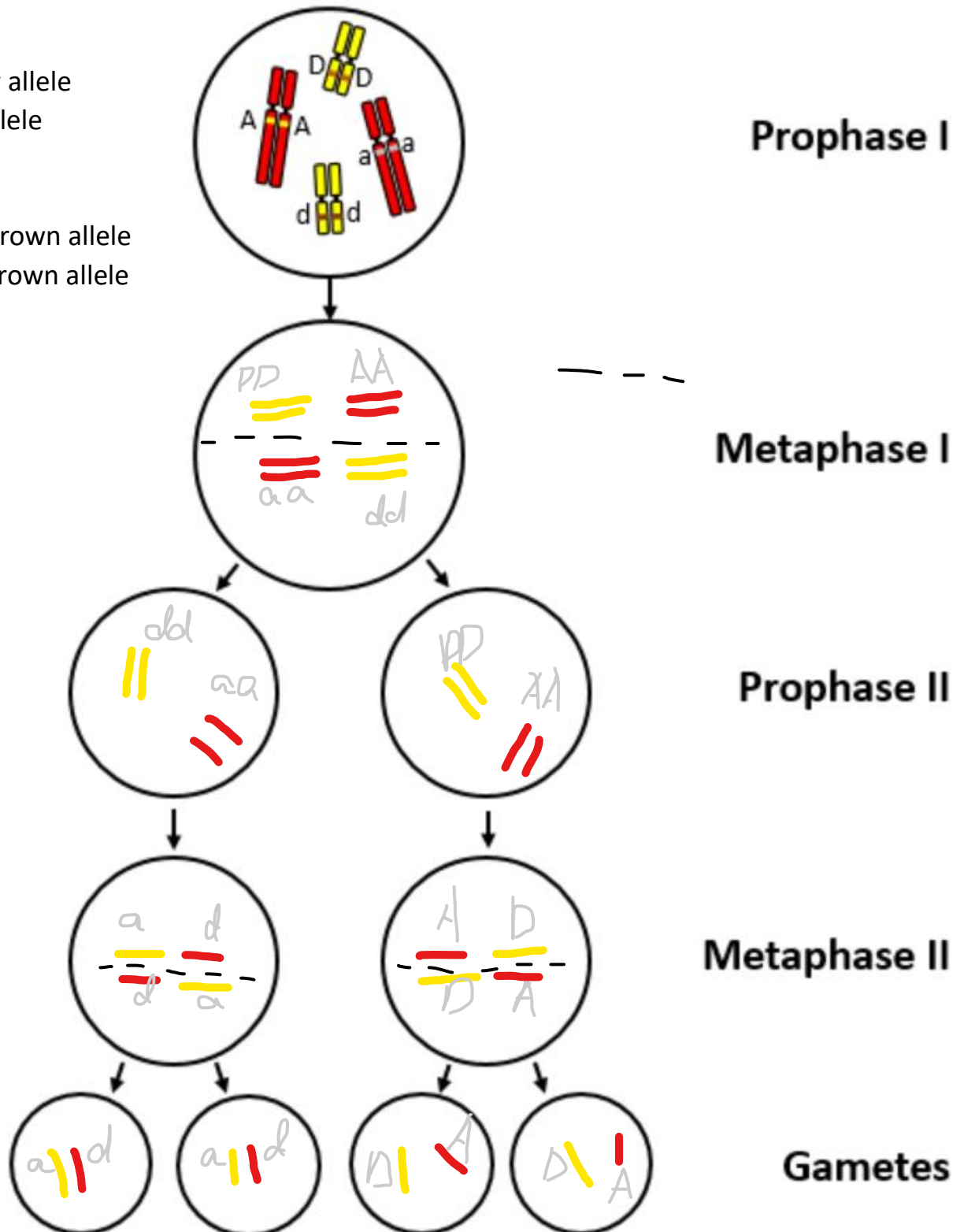
"A" = yellow allele

"a" = grey allele

Gene D

"D" = light brown allele

"d" = dark brown allele



1. Explain Mendel's principles of segregation and independent assortment.
2. At which phase(s) in your meiosis diagram does segregation of alleles take place? Explain your reasoning.
3. At which phase(s) in your meiosis diagram does assortment of genes take place? Explain your reasoning.

Part 2. LEGO Linkage

How does crossing over affect assortment of genes into gametes? To understand the physical basis for gene linkage and recombination, you will conduct a simulation and gather data about the recombination frequencies of Genes A, B, and C. For detailed instructions, please refer to the laminated lab guide. Record data from your simulation in the table below. When your group is finished collecting data, add up every column (TOTAL) and enter this in the TA's spreadsheet.

Simulation	Gene A & Gene B		Gene A & Gene C		Gene B & Gene C	
	R	NR	R	NR	R	NR
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
TOTAL						

4. You are now trying to map a new gene locus (Gene X) on chromosome 9. You have determined that the recombination frequency between Gene X and Gene A is 12.5%, recombination frequency between Gene X and Gene B is 25%, and the recombination frequency between Gene X and Gene C is 31.25%. Use this information to determine the location of Gene X. Show your work and explain your reasoning.