Modeling Mitosis and Meiosis

**A. Modeling Karyotypes and Genotypes**

1. Consider a diploid organism that has four chromosomes, numbered 1, 2, 3, 4. What is a normal karyotype for a **somatic cell** of this organism? To begin, model a normal karyotype of a somatic cell with the appropriate pipe cleaners.

2. Placing genes on chromosomes:

* 1. On chromosome 1 reside genes A and B.
     1. Gene A alleles: black/white (black is dominant to white)
     2. Gene B alleles: dark blue/light blue (dark blue is dominant to light blue)

*Genotype:* Your organism is heterozygous for gene A and heterozygous for gene B. Assume the maternal copy of chromosome 1 has dominant alleles for both genes.

* 1. On chromosome 2 reside genes C and D.
     1. Gene C alleles: green/yellow (alleles have codominant relationship)
     2. Gene D: Red (This gene is monomorphic: it only comes in one form!)

*Genotype:* Your organism is heterozygous for gene C, homozygous for gene D.

* 1. On chromosome 3 resides gene E
     1. Gene E alleles: pink/purple (Pink is dominant to purple)

*Genotype:* Your organism is homozygous for the recessive allele

**B. Modeling Mitosis and Meiosis**

*For #4, each person should select* ***one pair of homologous chromosomes.***

4. Model mitosis with your materials. What do the chromosomes look like in metaphase?

Share your answers for #4 in your group.

*For # 5, work in pairs to model meiosis for* ***either chromosome 1 or chromosome 2.***

1. Model meiosis with your materials. What are possible outcomes of crossing over for each gene? What do the chromosomes look like in Anaphase I? Metaphase II?

Share your answers for #5 in your group.