# HOMESCHOOL SCIENCE EXPERIMENT

Name: _____

Date: _____

# Making a Model of Meiosis with Clay or Beads

**OBJECTIVE:**
To make a model of meiosis and understand how one diploid cell (2n) divides to produce four genetically different haploid cells (n).

**WHAT IS MEIOSIS?**

Meiosis is a special type of cell division that makes gametes (sperm or egg cells). It cuts the number of chromosomes in half and creates genetic variation.

**MATERIALS:**

- Clay or beads in different colors (at least 4 colors)
- Small plate or tray
- Paper or notebook
- Marker or pencil

**MODEL KEY** (Example: 2n = 4)

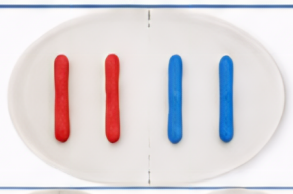
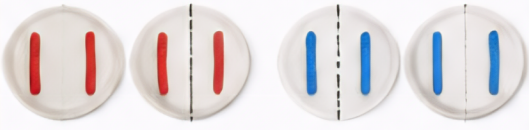
- = Chromosome from one parent
- = Matching chromosome from the other parent
- = Different gene (allele) or color variation

= Homologous pair (one from each parent)



= Sister chromatids (copied chromosome)

**PROCEDURE:** Follow the steps below to model meiosis. (Example uses 2n = 4 chromosomes)

| | | | |
|---|---|---|---|
| 1 | **Start: Interphase**<br>• Make 4 chromosomes using clay or beads (2 red, 2 blue).<br>• Each color represents a pair of homologous chromosomes. |  | This is one diploid cell (2n = 4). The chromosomes have not been copied yet. |
| 2 | **After DNA Replication**<br>• Each chromosome copies itself. Now each has two sister chromatids (make X shapes). |  | The cell still has 2n = 4 chromosomes, but each is made of two chromatids. |
| 3 | **Meiosis I: Prophase I**<br>• Pair up homologous chromosomes (red with blue).<br>• You can twist or wrap to show crossing over (optional). |  | Homologous chromosomes pair up to form tetrads. Crossing over may occur. |
| 4 | **Meiosis I: Metaphase I**<br>• Line up the homologous pairs in the middle. |  | Pairs line up randomly. The orientation will affect the final gametes. |
| 5 | **Meiosis I: Anaphase I**<br>• Separate the homologous chromosomes.<br>• Move one from each pair to each side. |  | Homologous chromosomes are pulled apart. Sister chromatids stay together. |
| 6 | **Meiosis I: Telophase I**<br>• You now have two cells. Each cell has n = 2 (still X-shaped chromosomes). |  | Meiosis I is complete. There are two haploid cells. |
| 7 | **Meiosis II**<br>• In each cell, separate the sister chromatids (like mitosis).<br>• You will end with four cells, each with n = 2. |  | **Sister chromatids separate. Meiosis II is complete. You now have four genetically different haploid cells.** |

**THINK & REFLECT**

1. How did crossing over change the chromosomes? _____
2. Why is it important that meiosis produces four different cells? _____
3. What is the difference between mitosis and meiosis? _____