

Name _____ Date _____

Chapter 15 Lab Investigation: Gamete Diversity

Purpose

In this activity you will demonstrate how meiotic cell division creates a gamete with half the chromosomes of other cells. You will also show how the random assignment of chromosomes creates gametes with many different combinations of chromosomes.

Background


The coins represent the 46 chromosomes found in the nuclei of a cell from one person. The pennies represent the 23 chromosomes donated by the person's biological mother. The dimes represent the 23 chromosomes donated by the person's biological father.

Materials

your textbook, 1 quarter, 23 pennies, 23 dimes, a bowl, masking tape, 2 sheets of paper

Procedure

1. Number 1 to 12 on one sheet of paper and 13 to 23 on another sheet.
2. Place a penny and a dime at each number. Using a small piece of masking tape, label each coin with the number. For example, the first penny and dime should each be labeled "1," the next penny and dime should each be labeled "2," and so forth through the 23 pairs of coins.
3. Starting with the penny/dime pair #1, flip the quarter. If the quarter lands heads up, select the penny and place it in the bowl. If the quarter lands heads down, select the dime and place it in the bowl. Repeat the quarter flip and selection at each penny/dime pair until you have selected one coin from all 23 penny/dime pairs.
4. The coins in the bowl represent the chromosomes in one gamete. Record the data in the chart. For example, a penny labeled with a #8 could be recorded as P8.
5. Remove the coins from the bowl and reset the penny/dime pairs. Repeat the flipping and selecting until you have chosen five gametes.

	Flip 1	Flip 2	Flip 3	Flip 4	Flip 5	Flip 6	Flip 7	Flip 8	Flip 9	Flip 10	Flip 11	Flip 12	Flip 13	Flip 14	Flip 15	Flip 16	Flip 17	Flip 18	Flip 19	Flip 20	Flip 21	Flip 22	Flip 23	
Gamete 1																								
Gamete 2																								
Gamete 3																								
Gamete 4																								
Gamete 5																								

Conclusions

1. How many total chromosomes are in one human cell? _____
2. How many total chromosomes are in one gamete? _____
3. What are the names of the two types of human gametes? _____
4. When the two gametes unite to make a new cell, how many chromosomes are in the new cell?

5. Where does meiosis take place in a female? _____
6. Where does meiosis take place in a male? _____
7. Compare your gametes with those generated by other students. Did any two people in the class generate a gamete with the same set of chromosomes? Please explain.

8. You've demonstrated how genetic diversity is created during the random selection of chromosomes during meiotic division. What are *crossovers* and how do they also create genetic diversity?

