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Name _____ Class _____ Date _____

Chapter 14 The Human Genome

Making Karyotypes

Introduction

Several human genetic disorders are caused by extra, missing, or damaged chromosomes. In order to study these disorders, cells from a person are grown with a chemical that stops cell division at the metaphase stage. During metaphase, a chromosome exists as two chromatids attached at the centromere.

The cells are stained to reveal banding patterns and placed on glass slides. The chromosomes are observed under the microscope, where they are counted, checked for abnormalities, and photographed. The photograph is then enlarged, and the images of the chromosomes are individually cut out. The chromosomes are identified and arranged in homologous pairs. The arrangement of homologous pairs is called a karyotype. In this investigation, you will use a sketch of chromosomes to make a karyotype. You will also examine the karyotype to determine the presence of any chromosomal abnormalities.

Problem

How can chromosomes be observed?

Pre-Lab Discussion

Read the entire investigation. Then work with a partner to answer the following questions.

1. What clues to the presence of certain genetic disorders can be seen in a karyotype?

2. Why might a laboratory worker attempting to diagnose a genetic disorder prefer to work with photographs of chromosomes rather than the chromosomes themselves?

3. Why would it be much more difficult to construct a karyotype of unstained chromosomes?

4. Which pair of chromosomes can contain two very different chromosomes and still be considered normal? Explain your answer.

5. How do autosomes differ from sex chromosomes?