Name _____ Per ____ Date _____

Resource - Chromosome Viewer (www.teachersdomain.org)

Inside every one of our cells (except red blood cells) is a nucleus containing 23 pairs of chromosomes. These chromosomes are built from long strands of a ladder-shaped molecule called deoxyribonucleic acid (DNA). The DNA molecule, in turn, is made up of many smaller components. These nucleotides, or bases, pair up to form the rungs of the DNA ladder. Although there are only four different types of nucleotides in DNA (usually referred to by the first letter of their chemical name, A, T, C, and G), these molecules, repeated 3 billion times in the human genome, carry the instructions required to build our bodies and regulate our functions.

Usually, nucleotides are not particularly meaningful on their own. Combined, however, specific sequences of nucleotides -- ATTTCG·, for example -- spell out the genetic instructions for building proteins. A gene is one such sequence, one section of a chromosome that provides the code that influences a trait -- like eye color, for instance. (Scientists believe that three or more genes interact to determine a person's eye color.)
Locating genes that influence specific physical traits among the 3 billion nucleotides in the human genome is a notoriously difficult task. To find genes, researchers often try to correlate physical differences with genetic differences. Genetic diseases are often caused by striking genetic differences, so one method gene hunters use is to compare the DNA of people who have a disorder with those who do not. When a scientist finds differences in DNA sequences between these groups, they have a clue to one possible culprit in the disease. Other methods are used to identify genes not implicated in disease. They include computational methods such as comparing human DNA sequences to those in animals that have been well studied and in which many genes have been identified. Current estimates of human genes are about 30,000-40,000, but the functions of the vast majority of these remain unknown.

Questions for Discussion

1. On which chromosome would you find: Tay-Sachs disease? Sickle cell anemia? Ellis-van Creveld syndrome? Huntington's disease?

2. Name 5 diseases, which are found on the X chromosome. How would their pattern of inheritance differ from diseases found on autosomal chromosomes (non-sex chromosomes)?

3. On which chromosome is the CCR5 gene found? (Hint: Use your NCBI worksheet.) What is the CCR5 gene called in the chromosome viewer? Name the 5 genes located “below” the CCR5 gene on the chromosome.