

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

# 5 Using Molecular Models Worksheet

**Aim:** To understand that protein structure can impact protein function, using the bioinformatics tool Molecule World to visualize molecules.



**Instructions:** Use Student Handout—*Instructions for Using Molecular Models* to complete this worksheet.

## PART I: Viewing DNA Structure

8. There are many ways to view the DNA. Imagine you are teaching a class about DNA. What rendering option(s) would you use to teach students about DNA structure?

(circle one):      **Ball & stick**      **Spacefill**      **Tubes**

Explain the reasons for your decision:

9a. How did the “**Charge**” coloring style change the coloring of the DNA? What does the color key tell you about the the way DNA is charged?

9b. How did the “**Element**” coloring style change the color of the DNA? How many elements are in DNA? What elements are in DNA?

9c. Now look at **Rainbow**: “Rainbow” uses the color red at the start (5’ end) and continues through the rainbow. Why are two regions in the DNA colored red?

9d. Which coloring option do you find most useful? Why?

12. When you select the two guanines that are in the same place for both DNA strands, where are they located on the DNA molecule? Explain why.

13a. You changed the **Coloring style** to "**Molecule.**" What does that do? Explain. How many molecules are in DNA?

13b. You moved the DNA so that the ring structure(s) of the selected nucleotide's base is clearly seen. What did you see?

16a. After choosing the "**Hide Unselected Residues**" button, what do you see?

16b. **Challenge question:** Is the base you selected a purine or a pyrimidine, and how do you know?

### PART II: Viewing the BRCA1 Protein

19. Draw an alpha helix and a beta sheet.

32. **Challenge Question:** What can you see now that you could not see before you annotated this structure? Does this help you understand the consequences of the Lawlers' M1775R mutation?