DNA Structure Activity / Heredity and Interactions

Materials: Constructed DNA model, Extra model pieces, textbook pictures of DNA

Background (discuss with your table):

What is the shape of a DNA molecule? Where is DNA located in a eukaryotic cell? What biochemical family does DNA belong to? What does DNA stand for? The monomer of DNA is a nucleotide. What are the three parts of a DNA nucleotide? Draw and label a nucleotide.

Activity: You will need a constructed model for your table.

Part I: Look at the DNA model from your bag and use the following information to **make a key** that includes all of the pieces.

1. There are only four bases in DNA: Adenine, Guanine, Cytosine, Thymine. In the model, Cytosine is silver and Thymine is black.
2. The orange pieces represent VERY WEAK bonds.

Questions:

1. Which bases are purines? Which bases are pyrimidines? What is different about their structure?
2. What is the name of the sugar in the DNA backbone?
3. Covalent bonds hold the phosphates and sugars together. Are these bonds weak or strong?
4. Assume that a 100 base-pair DNA double helix contains 45 cytosines. How many adenines are there?
5. Look at the three samples in Table 1. Which sample best supports the base pairing rules for DNA?

**Table 1: Percentages of bases in three samples of DNA**

**Sample G C A T**

A 35 35 15 15

B 40 10 40 10

C 25 25 25 25

6. Notice how the phosphates of one strand of DNA point down and the phosphate of the other strand points up. They are anti-parallel. Brainstorm why……

Part II: DNA and RNA

Because of the size of DNA it cannot leave the nucleus. RNA can however and therefore is necessary for taking the information encoded in DNA out to the rest of the cell.

1. Using what you know about your model, build two RNA nucleotides. Use the materials from the kit in the front of the room.
2. Show your nucleotides to Mrs. Hawley.
3. Create a venn diagram comparing and contrasting DNA and RNA.

Clean up:

Return you intact DNA model up to the front table to be added to the other group’s models.

Deconstruct your RNA nucleotides and return them to the kit.