**Biology: Instructions for 3-D DNA Model**

**Name: Due Date**: Worth **20 points** per person

1. You may construct your model alone or with **one** partner.
2. You may use any materials you like.
3. Structural requirements:
   1. You must have **2 helices** (i.e., **curved** spirals) on the OUTSIDE of the molecule that twist around each other but **don’t touch each other** directly, like the railings on a spiral staircase. These helices represent the sugar-phosphate backbone of DNA.
   2. The two helices must be connected by at least **10** crossbars, each representing a pair of nitrogenous bases, for every full twist of the helices. You must have at least one full twist. The **backbone** must be **outside** the bases.
   3. You must use **4 different colors to represent the 4 different bases**, and include a **key** that shows which color corresponds to which base.
   4. **Base pairing**: the adenine bases may be paired only with thymines and vice versa. Likewise, the cytosine and guanine bases may only be paired with each other. Thus you will only have two sets of color combinations. In short **A-T, G-C.** You may show the hydrogen bonds connecting the bases however you like.
   5. You must show the **sugars and phosphates** (it’s the sugar, not the phosphate that connects to the bases.
4. **The model must be 3-dimensional, not flat.** Again, the two backbones may not touch each other.
5. Write your **name** **and block** somewhere visible on the model itself (not on the bottom), as well as face-up on the key.
6. **Extra credit** options (up to 2 points total): Show the **number of H bonds** between the pairs of bases (2 for A-T, 3 for G-C); and/or show the **number of rings in the bases** (2 for purines, 1 for pyrimidines).

See textbook **p. 294** for pictures of DNA. Some of the best models may be put in the showcase in the hallway.

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| 1 | 2 Helices | 2 pts |  |
| 2 | Helices don’t touch each other | 2 pts |  |
| 3 | 10 Crossbars | 2 pts |  |
| 4 | 1 Full Twist | 2 pts |  |
| 5 | 4 Colors for bases | 2 pts |  |
| 6 | Key | 2 pts |  |
| 7 | Correct Pairs | 2 pts |  |
| 8 | 3-D Model | 2 pts |  |
| 9 | Name on project | 2 pts |  |
| 10 | Labels sugars & phosphates correctly | 2 pts |  |
|  | EC |  |  |
|  | Number of H-bonds | 1 pt |  |
|  | Number of rings in bases | 1 pt |  |
|  | Total | 20 pts |  |