**THE AMAZING CANDY RACE**  Name: ­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Now that we know a little bit about DNA, let’s try to figure out how it physically looks by competing in a THE AMAZING CANDY RACE! Pre-assigned teams and meeting locations are listed on the board. Go find your group!

Your team’s mission: To be the first team to accurately complete Parts 1 & 2. A prize will be awarded for first, second, and third place. In order to move from Part 1 to Part 2, your group must be approved by the instructor. Part 2 will be passed out once approved. Work efficiently and accurately- every detail counts! DO NOT open the brown bag until I say begin.

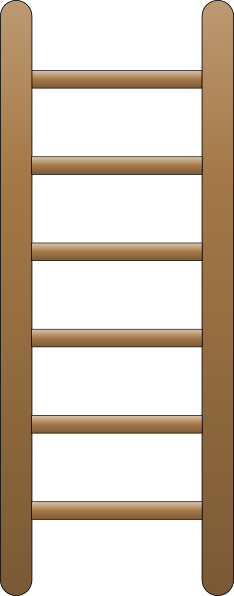
**Part 1: Building the Model**

The brown bag will contain an assortment of candies. Use these candies to build a DNA model. In order to build your model, your group needs to follow these very important rules:

Vertical Frame:

* Overall structure of your model should look like a twisted ladder (Hint: ladder first, twist last)
* 5 green jelly lifesavers should be evenly spaced on each twizzler side
* Green jelly lifesavers will never be directly across from another green jelly lifesaver

Horizontal steps:

* There will be \_\_\_ steps in total: (# of pairs of chromosomes in human body-13) DO THE MATH!
* A green jelly lifesaver will always be in-between a step on one side
* There will be two “types” of steps
* Half of the steps will be made of 3 toothpicks
* Half of the steps will be made of 2 toothpicks
* Each step will contain one gummy bear and one a gumdrop
* Purple will always be on the same step as orange
* White will always be on the same step as yellow
* Steps made of 2 toothpicks will always contain purple and orange
* Steps made of 3 toothpicks will always contain white and yellow
* The order of steps is up to you!

HINT: Collaborate with your group; plan ahead; it may be helpful to cross off rules; GOOD LUCK!

Once you build your DNA ladder, call me over when you think you have it correct. Once approved, your group can move onto Part 2.

**Part 2: Understanding your Model**

Now that you have built your DNA model, we need to analyze its structure. Using your textbooks and/or internet, work with your group to determine the matching candy to its scientific name. Groups may get different names for the gummy bears and gumdrops. It’s okay because it’s based on your model- you decide! Some scientific names may involve more than 1 brown bag item. Fill in the chart below.

|  |  |
| --- | --- |
| Brown Bag Item | Scientific Name |
| Red twizzler | Deoxyribose sugar |
| Green gummy lifesaver | Phosphate |
| Yellow gummy bear | Thymine |
| Orange gummy bear | Guanine/Cytosine |
| Purple gumdrop | Guanine/Cytosine |
| White gumdrop | Adenine |
| Red twizzler, green lifesaver, 1 base (gummy bear/gumdrop of any color) | Nucleotide |
| Toothpicks | Hydrogen bonds |

Based upon your model’s base sequence, write your DNA’s genetic code below and on the classroom board:

Circle a section of bases in your genetic code above. This will be your gene. Create a trait that it may code for (use your imagination!) and write it below.

Describe 3 patterns you observed in your candy model using these scientific names below as a guide.

* Complimentary base pairs (Chargaff’s rules)
* Purple gumdrop always paired with orange gummy bear
* White gumdrop always paired with yellow gummy bear
* This means that that A and T are compliment base pairs; C and G are compliment base pairs
* Hydrogen bond rule
* A/T = 2 hydrogen bonds
* C/G= 3 hydrogen bonds
* Pyrimidine vs. Purine
* Pyrimidines/ Purine are represented by either gummy bear or gumdrop; colors reflect different base (This will depend on student’s model)
* A & G are purines
* C & T are pyrimidines

Fill in the following blanks:

1. The twisted ladder shape of DNA is called a double helix.
2. A gene is a set of instructions for assembling a protein. DNA is the molecular carrier of these genetic instructions.
3. Every organism has DNA in their cells. Humans have about 2m of it in each cell.
4. Each base has a complimentary base so that DNA can eventually become replicated accurately.
5. When DNA is folded and condensed, it forms into a chromosome.
6. A sequence of nucleotides eventually used to code for a protein is a gene.
7. Chargaff found that the amount of adenine in DNA equals the amount of thymine.
8. Chargaff found that the amount of guanine in DNA equals the amount of cytosine.
9. An example of a purine is A/G.
10. An example of a pyrimidine is C/T.