*NGSS ALIGNMENT DNA ORIGAMI TEMPLATE VIDEO ILLUSTRATION

DNA ORIGAMI

THE SCIENCE MENTOR

NGSS ALIGNMENT FOR DNA ORIGAMI

Science and Engineering Practices	Developing and Using Models
Disciplinary Core Ideas	MS-LS3 Heredity: Inheritance and Variation of Traits HS-LS3 Heredity: Inheritance and Variation of Traits *LS1.A: Structure and Function
Crosscutting Concepts	Structure and Function
Instructions for coding and folding, with illustration video. With color coding and folding, this activity can last one 90-minute class period.	These instructions are also reviewed in this video I made for students to use if they were absent and ones from my tutoring sessions. Set-Up of Template 1. Observe where all of the bold lines and lighter lines are on your template. Notice the sides with the bold diagonal lines and the side with the bold horizontal lines. 2. Set your template on the table with the light diagonal lines to the right. 3. Down the center is a bold line. This line separates the front and back of the strand. 4. The center of the strand are the nitrogenous bases, and the columns are the backbones or strands. DNA Code 5. Start with the side with the bold horizontal lines. 6. For some classes, I provide a DNA sequence and have them develop the complementary strand. Other classes, I allow them to make up their own. For mixed level classes, I will provide the option. 7. The complementary code must remain inside of the bold lines. For the horizontal side, the complementary code will be on the other side of light diagonal lines, which is across from the initial code. 8. Next, I tell them to make up a code for the strand on the second half. 9. Remember that the complementary code must remain inside of the bold lines. The complementary code for the diagonal side will be on the other side of the light line and diagonal from the initial code.

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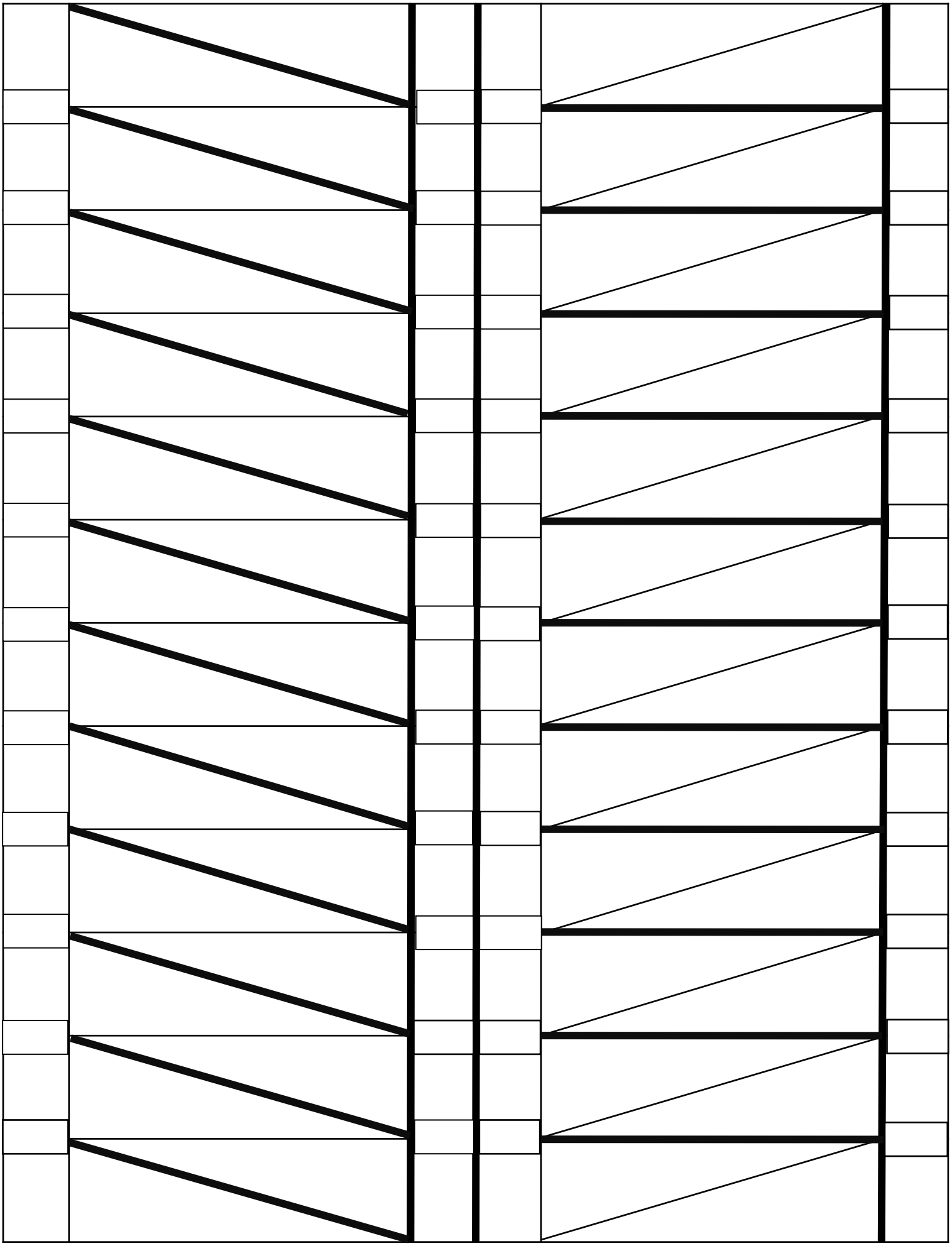
Color Coding the Strands

10. In each strand, the larger empty spaces represent the sugars, and the small boxes represent the phosphates.
11. Select 6 different colors.
12. Use a separate color for each of the following: the phosphate, sugar, and each of the four nitrogenous bases.
13. Use the last one on the left for your name and period number.
14. Cut out the template by removing the excess paper from the sides.

Folding

15. You will fold along each of the bold lines but in a specific order and way.
16. First, fold the template in half, down the bold lined in the center (hot dog)
17. Turn the template with the bold horizontal lines facing up and the opening facing to the right.
18. Fold the template along each of the bold lines, one at a time, pushing the paper away from you. Once done, the paper will curl into a circle-like shape.
19. Fold each side at the bold line of the sugars. This will fold the backbone away from you.
20. Turn the template with the bold horizontal lines facing you. Fold along each horizontal line, pushing the paper away. The paper will begin to fold into a circle.
21. Take your time with this part, making sure to crease each fold and tuck paper where needed.
22. Once all is folded, gently pull on the opposite ends to stretch out the molecule, but only partway.

The video at the start of these instructions illustrates the project and how to fold it. Don't hesitate to reach out to me at kwilliams@thesciencementor.com if you have any questions!



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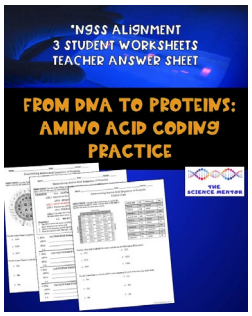

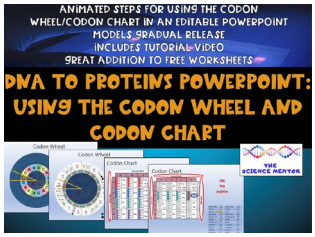

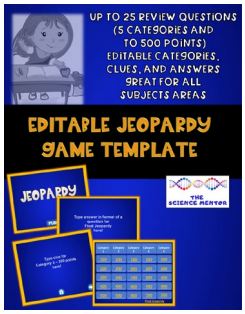

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