

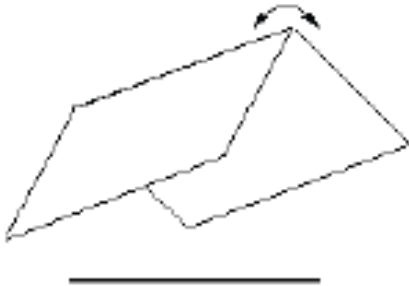
Origami DNA

Standard: *Students know the general structures and functions of DNA, RNA, and a protein.*

Objective: Illustrate basic understanding of DNA double helical structure.

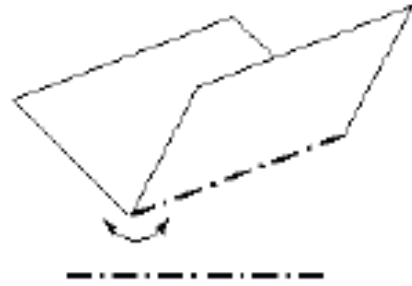
Folds for your DNA model

Mountain fold



Solid lines are "mountains" and are to be folded away from you with the peak pointing towards you.

Valley fold

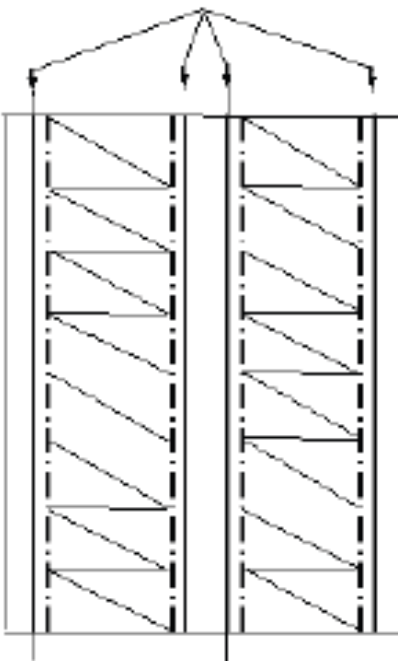


Dashed lines are "valleys" and are to be folded towards you with the peak pointed away from you.

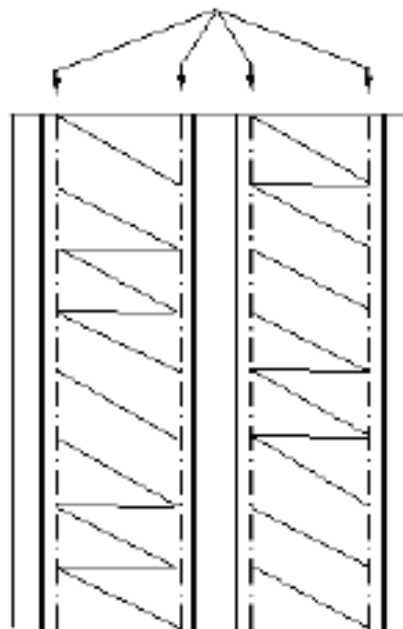
Making your DNA model

1. Fold all solid lines going lengthwise down the page into "mountain folds".
2. Fold all dashed lines going lengthwise down the page into "valley folds".

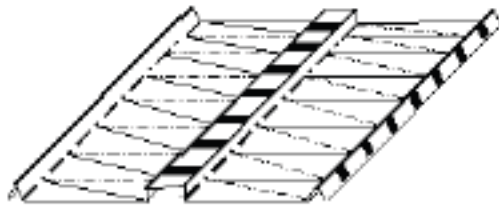
Mountain folds along solid lines.



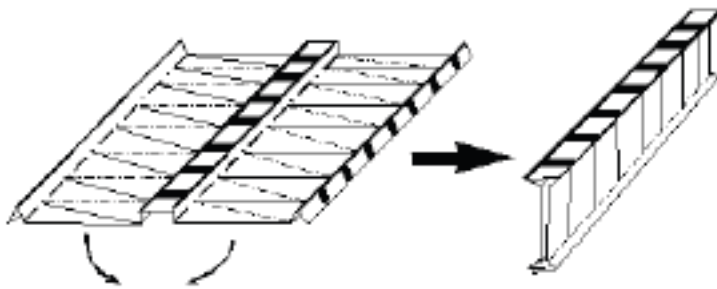
Valley folds along dashed lines.



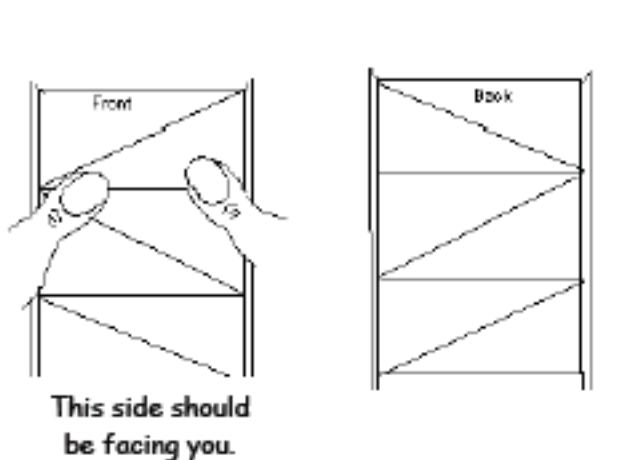
At this point, the paper should look like this:



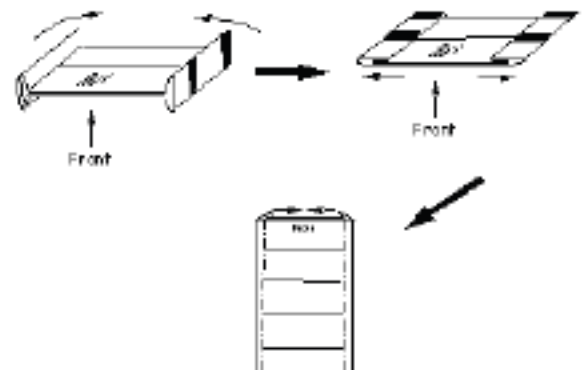
3. Bring the two sides of the model together, similar to an "I" beam.



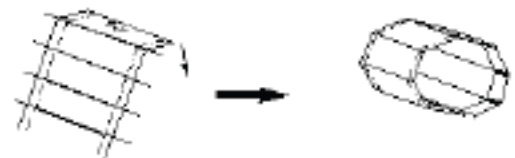
4. Look for the words "front" and "back" at the top of your model. Hold the model with the front side facing you.



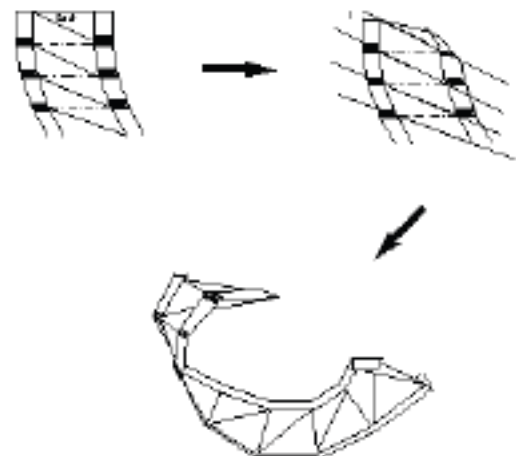
5. Fold the two sides of the DNA model so that the "front" side is flat.



6. Crease each solid, horizontal line into a mountain fold (away from you).



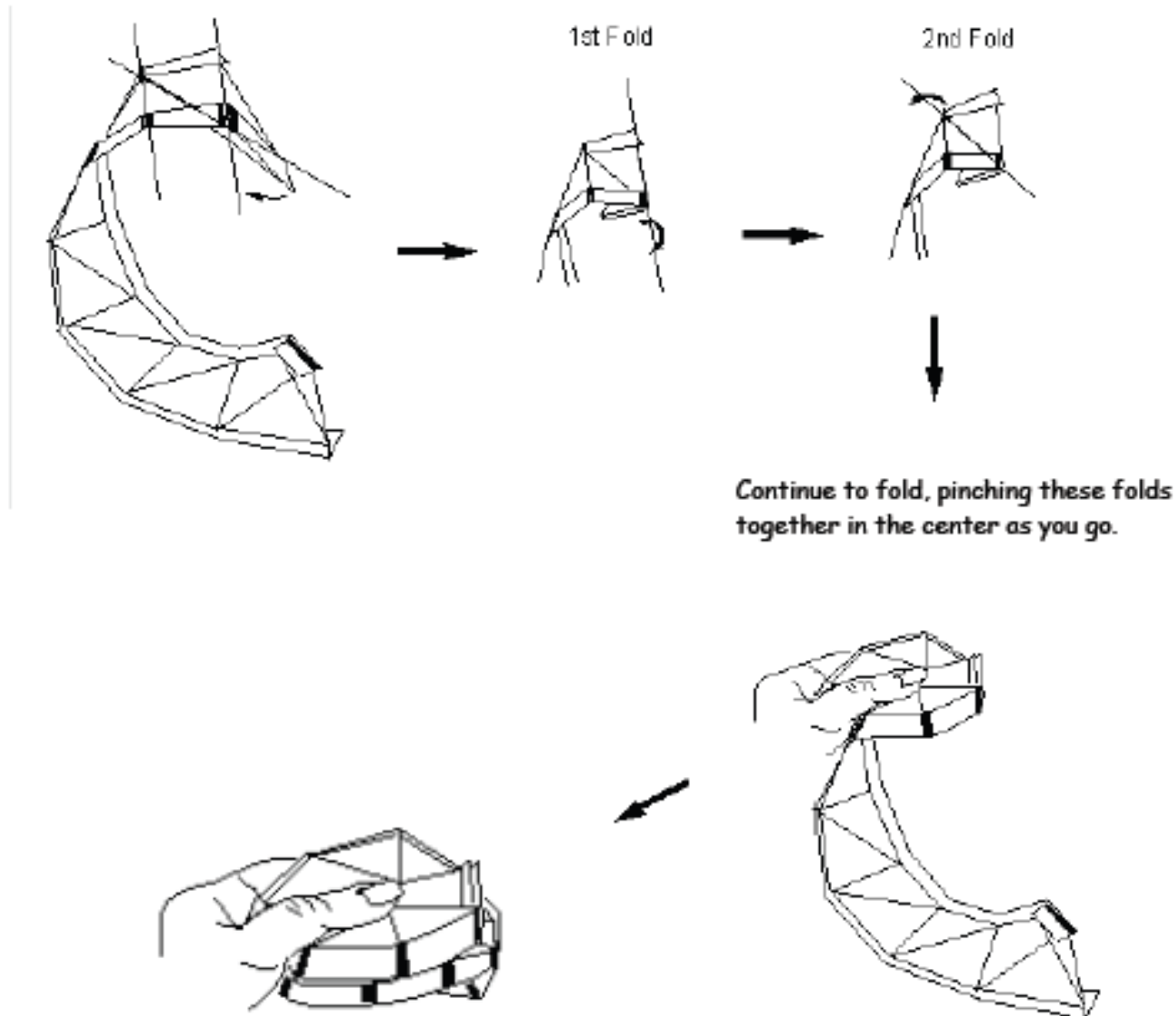
7. Flip the model to the "back" side. Crease each solid diagonal line into a mountain fold (away from you).



Your model should look like this.

8. Fold ALL of the creases together in the directions of the folds made in steps 6 and 7. Your model will fold up like an accordion. While you are folding, pinch the middle of the model to keep it together to make a cylindrical shape.

Fold ALL of the creases together like an accordion.
(The dotted lines in the diagrams below may help)



When you are done folding, the model should resemble the diagram above. You should be able to hold your model in one hand.

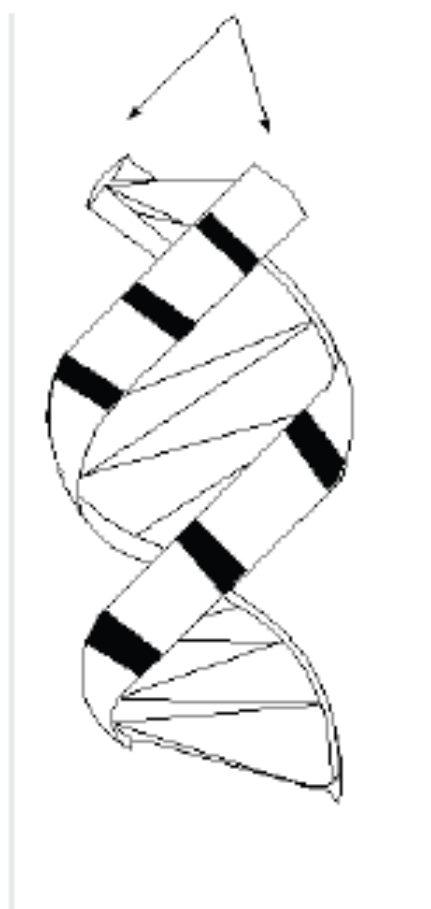
9. Release the model. You should be able to see the shape of a **DOUBLE HELIX**.



10. Straighten out the sides of the DNA model (the DNA "backbones") to make them perpendicular to the creases in the middle (as in step 3).

Take care not to uncurl the spiral shape.

The DNA "backbone"

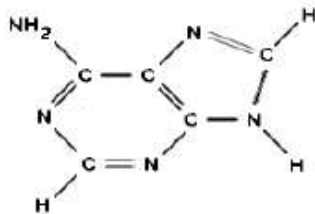


*Fix your DNA model so that all the creases are neat. This will reinforce the spiral shape.

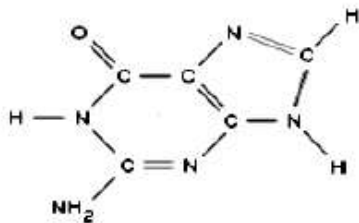
The nitrogenous bases of DNA

The purines

Adenine

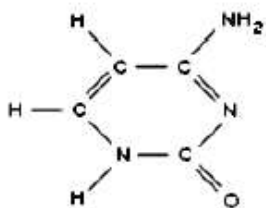


Guanine

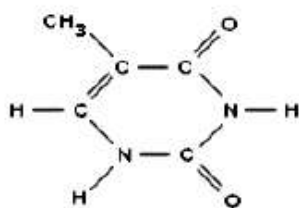


The pyrimidines

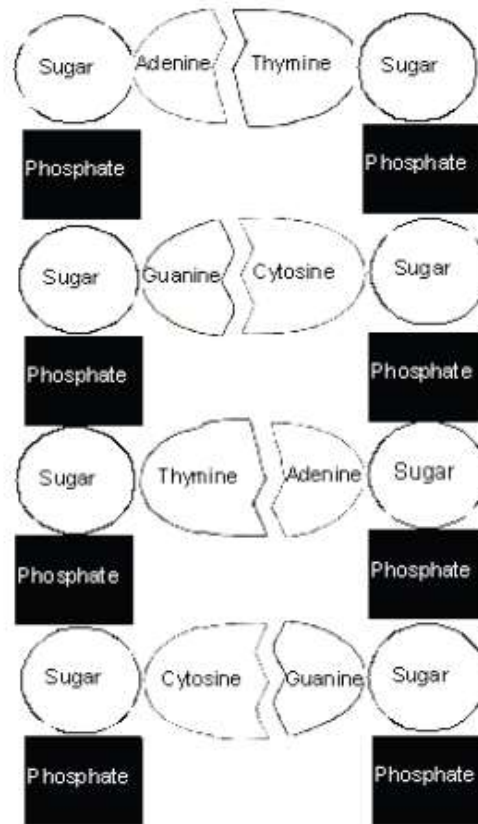
Cytosine



Thymine




The DNA molecule



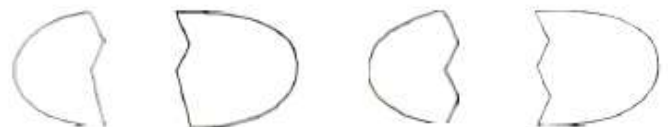
The DNA molecule is made of six parts:

The phosphate-sugar backbone:

 A sugar, called deoxyribose

 A phosphate group

Four bases:



Adenine

Thymine

Guanine

Cytosine

