Name: _____

DNA PAPER MODELS PROCEDURE

Introduction:

Imagine DNA as a twisted ladder. The outside of the ladder is made up of alternating sugar and phosphate molecules. The sugar is called deoxyribose. The rungs of the ladder are made of a pair of molecules called bases. There are four bases in DNA: adenine, guanine, cytosine, and thymine. Because of the chemical structures of the bases, adenine only pairs with thymine and cytosine only pairs with guanine to form a rung.

Materials:

Templates – you will need 10 Deoxyribose molecules, 10 phosphate molecules, 3 each of cytosine and guanine, and 2 each of adenine and thymine.

Scissors

Tape

Procedure:

1. From the templates provided by your teacher, cut out the pattern for the chemical bases sugars, and phosphates listed above (note – there are more than these on the templates, only cut out the amount listed in the materials section).

2. Arrange the cut outs on your table to form the pattern described in the introduction. BE SURE YOU LAY ALL PIECES OUT BEFORE GLUING THEM TOGETHER! As a guide, you can attach the chemical base to the sugar molecule by matching up the dots (stars with stars, squares with squares, circles with circles). You can attach the phosphate group onto your model by matching up the stars, and you can attach the top of the phosphates to the sugars by matching up the squares.

3. Check your layout by referring to the diagram of DNA in the DNA reading assignment (pg 517).

3. Once your molecule is set up correctly, paste or tape the model together.

4. Now put your lab group initials on your model. With the instructor's help, paste your model to another lab group model.

5. When finished, your class should have constructed a long DNA molecule. We will combine it with other table groups' DNA to form one long strand!

Name:_____ Date:_____

DNA PAPER MODEL: HOMEWORK QUESTIONS

Analysis Questions:

1. What base does adenine pair with?

2. What base does guanine pair with?

3. Describe the shape of the DNA molecule. Draw a picture if it helps!

Connections:

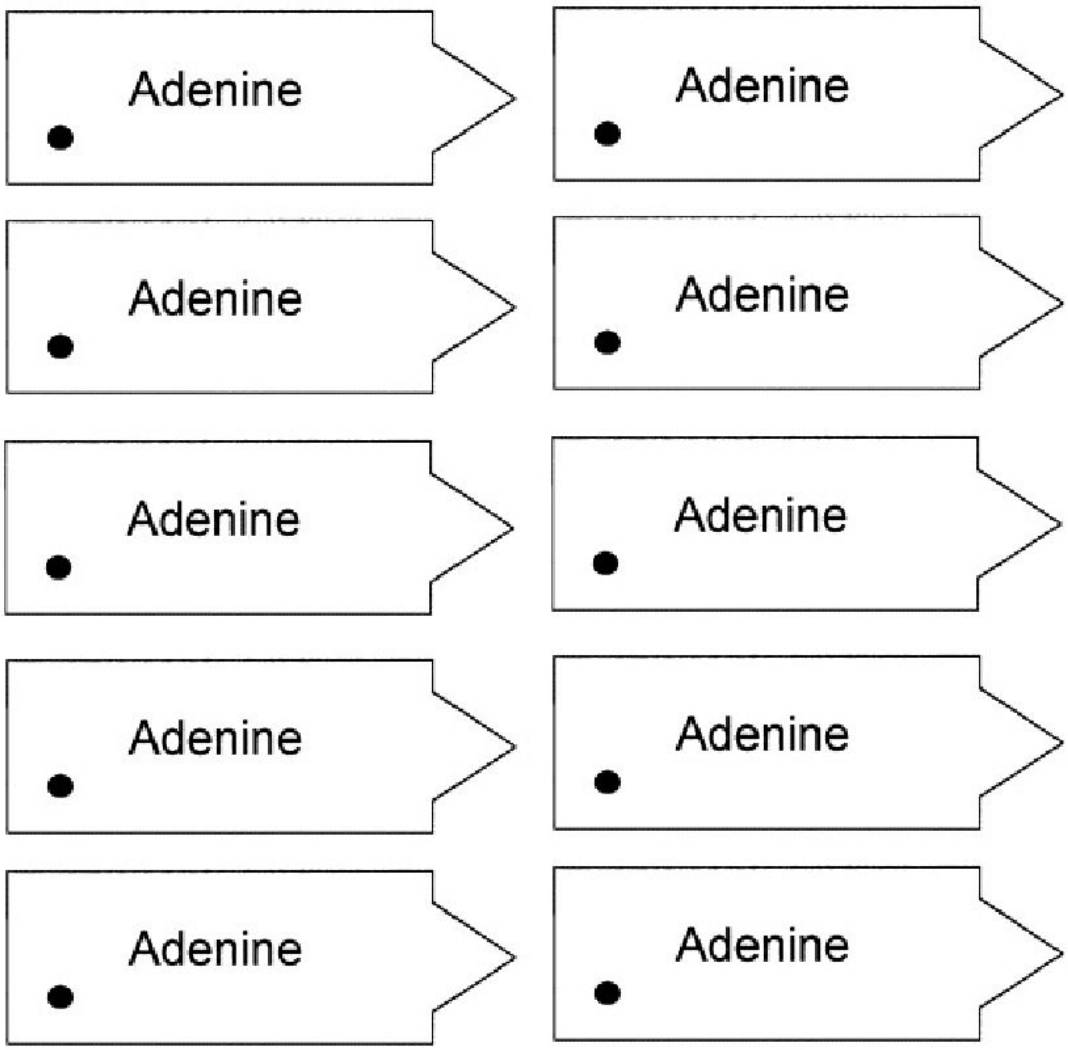
1. What are the three components of a nucleotide? (HINT: What were the three components used in putting the model together? Remember that Adenine, Guanine, Cytosine, and Thymine are all Nitrogen Bases!) Refer to your DNA article if you are still unsure.

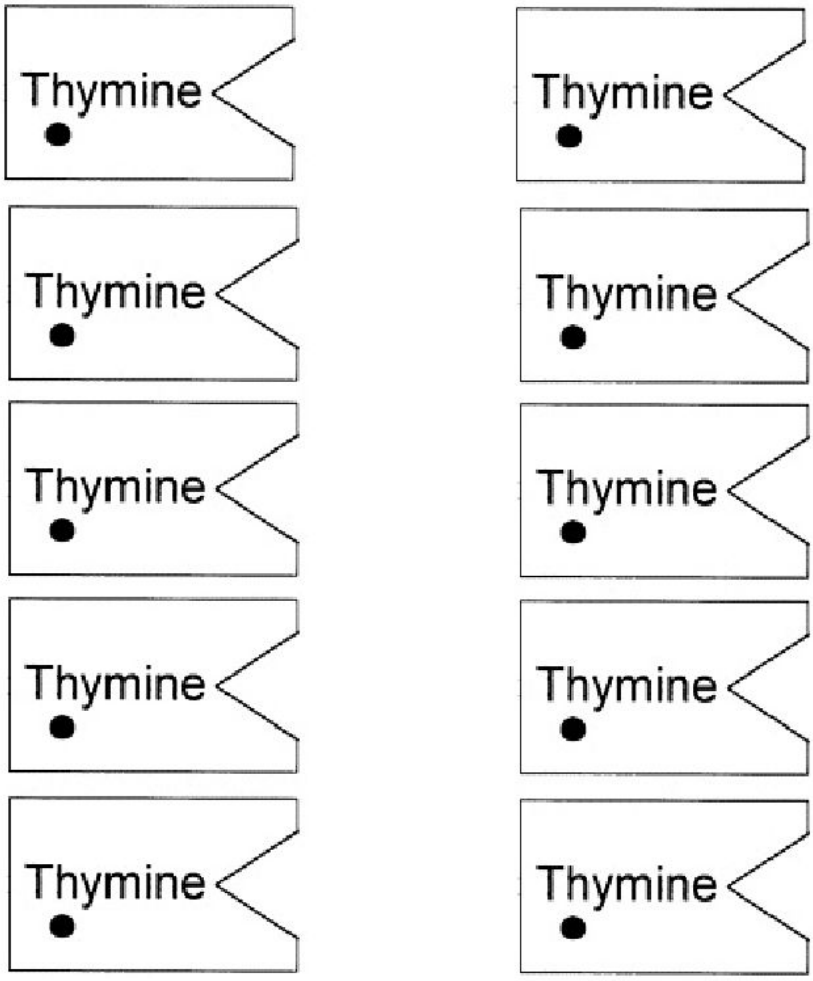
2. What is the name of the sugar molecule in the DNA helix?

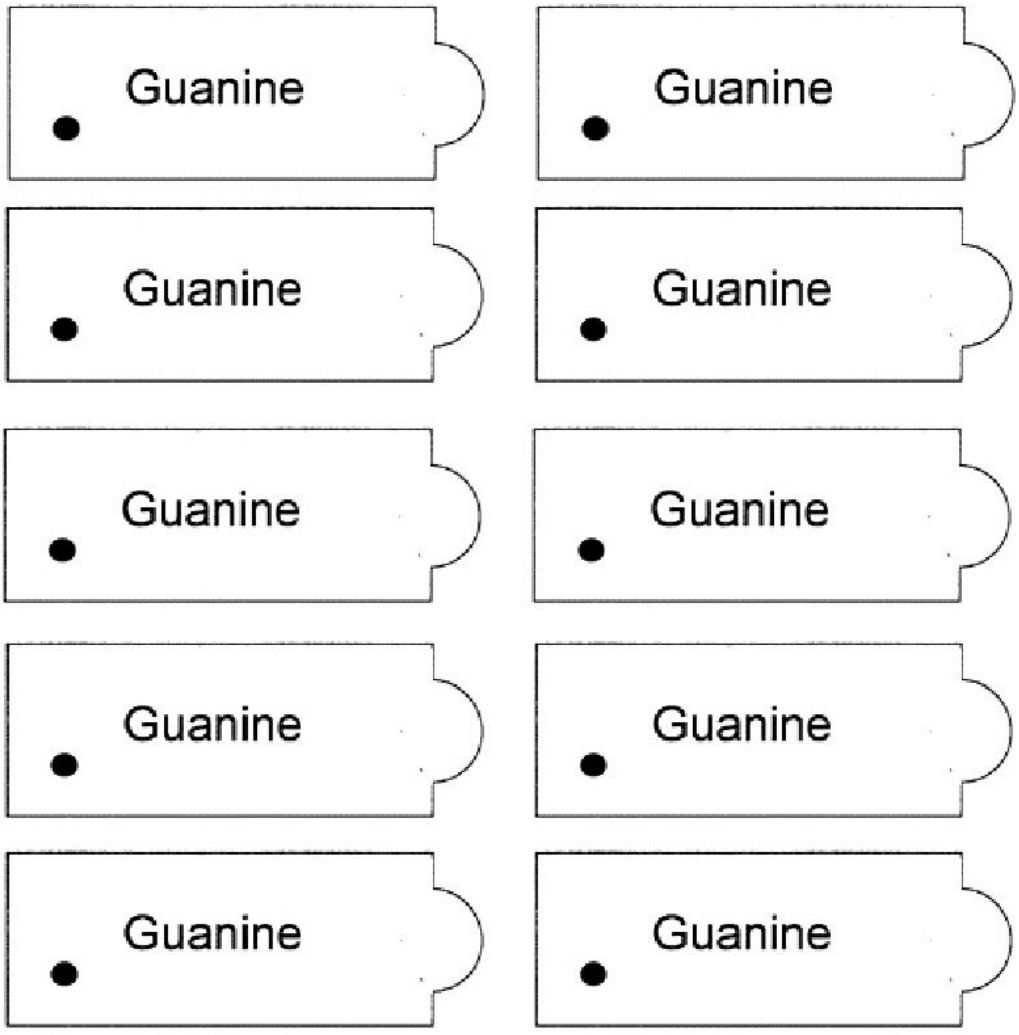
3. Suppose you know that the sequence of bases on one DNA strand (one side of the DNA ladder) is AGCTCAG. What is the sequence of the bases on the opposite strand?

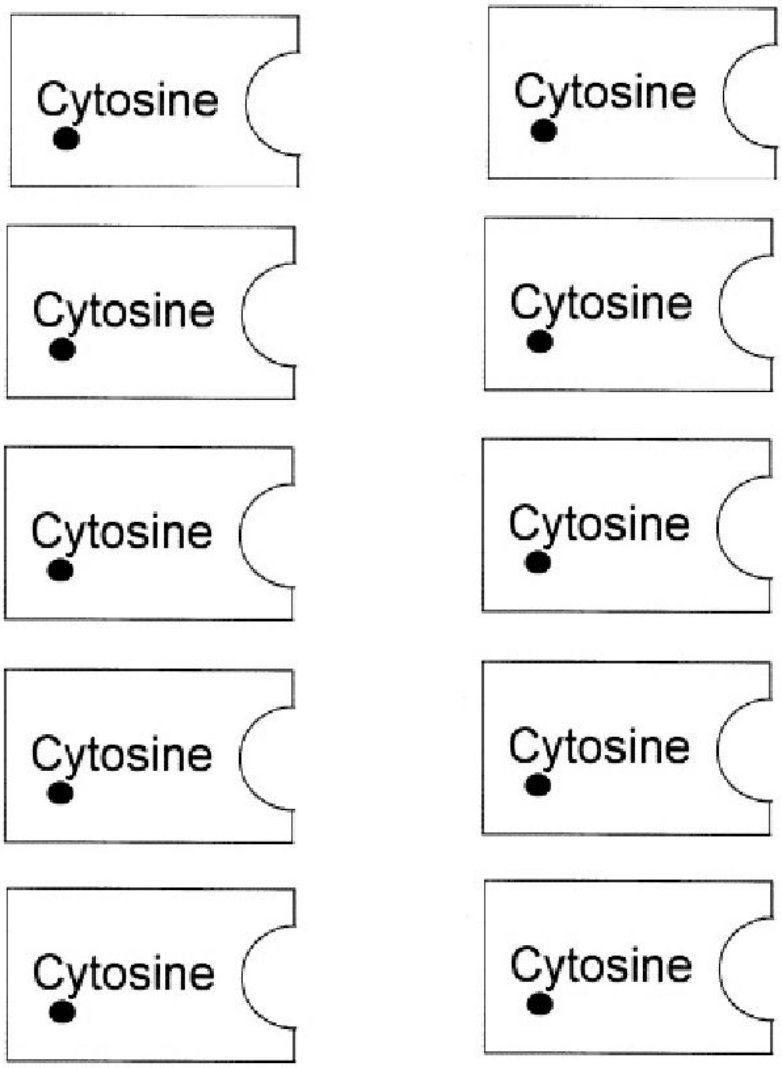
4. Assume that a 100-bair pair DNA double helix contains 45 cytosines. How many adenines are there?

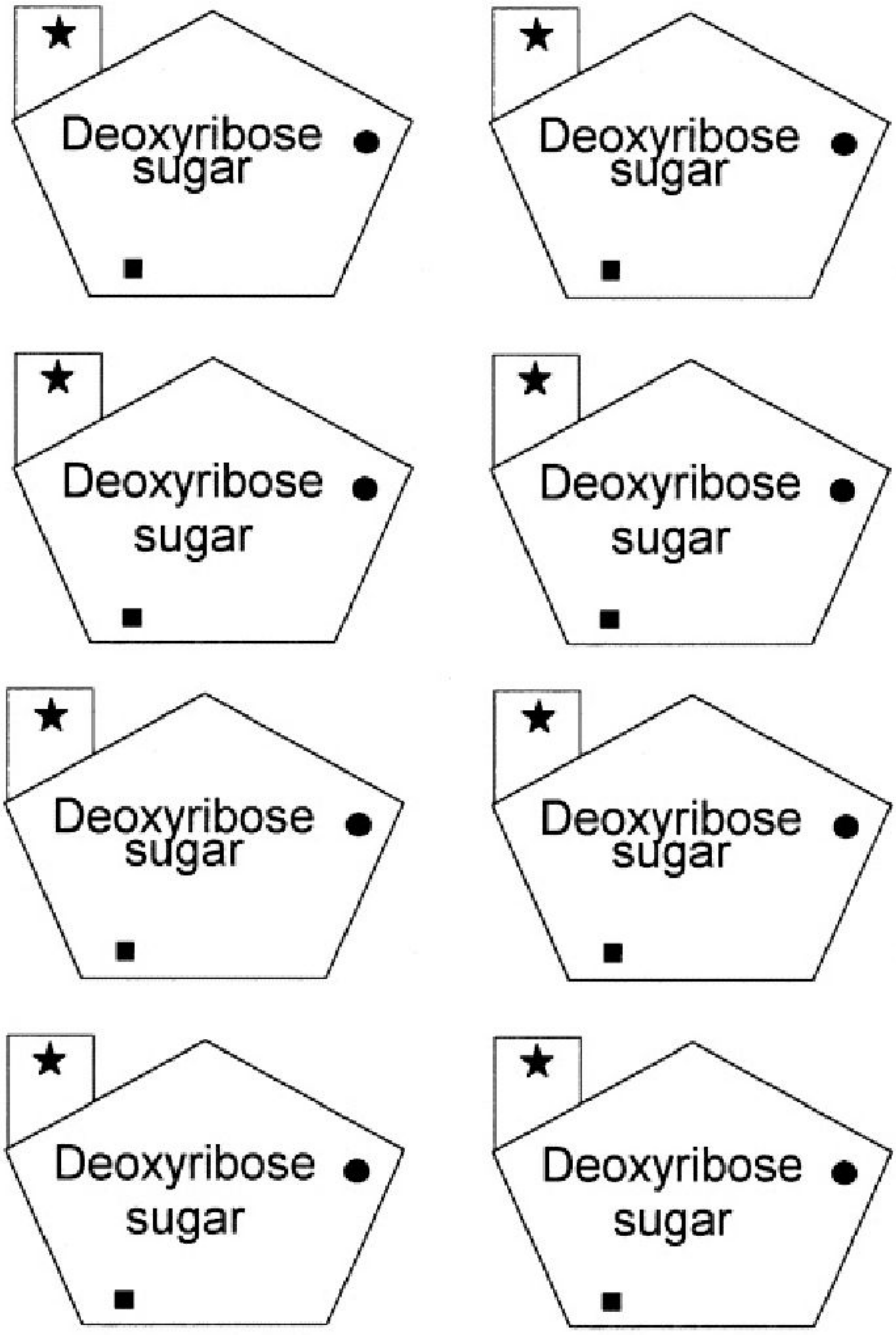
Conclusion: Write a summary of the structure of DNA that (at least) includes the terms: base, sugar, phosphate, nucleotide, (base) pair, and helix.

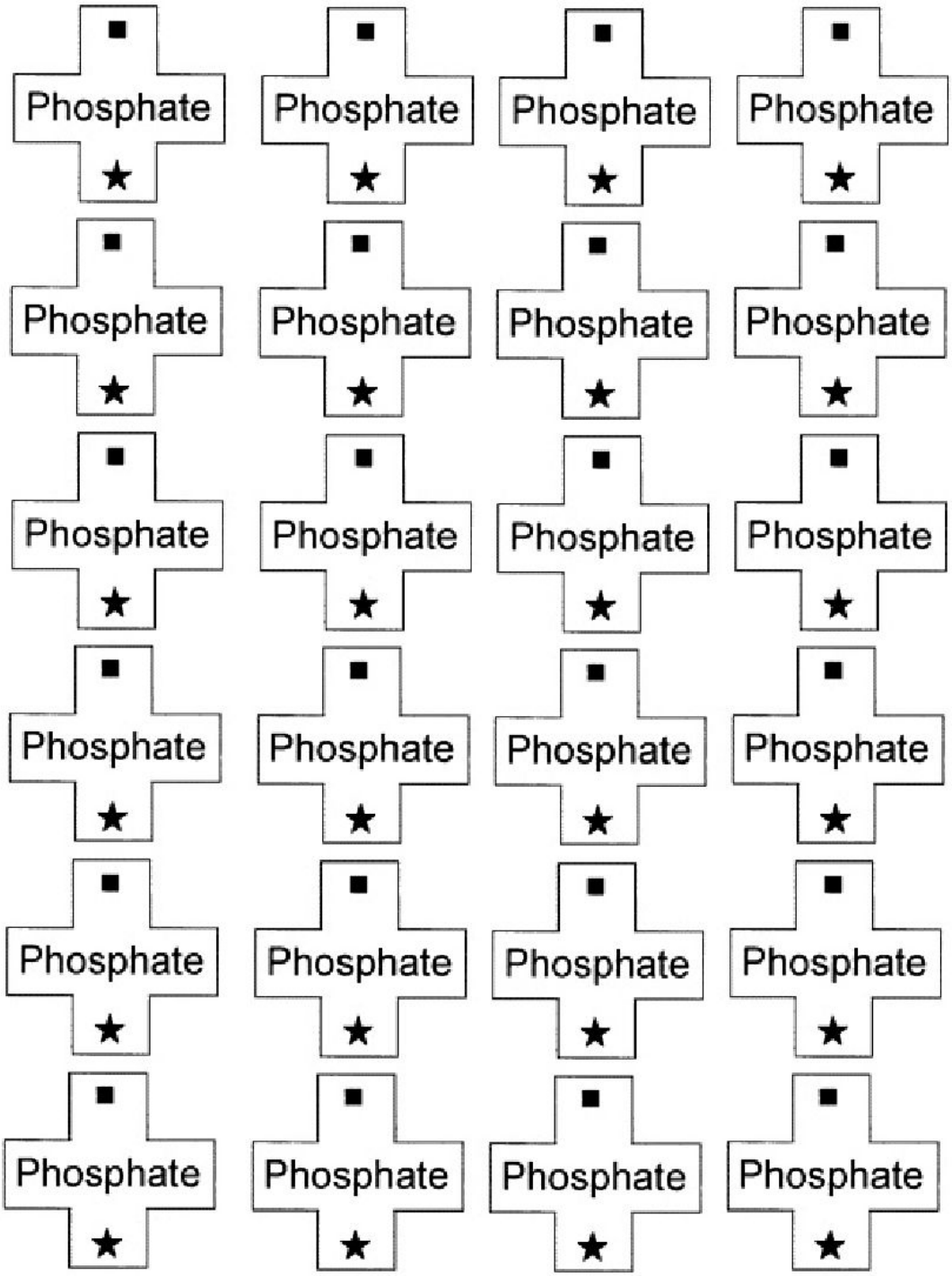

Adenine
Adenine
Adenine
Adenine
Adenine
Adenine
Adenine
Adenine
Adenine
Adenine


Thymine
Thymine
Thymine
Thymine
Thymine
Thymine
Thymine
Thymine
Thymine
Thymine


Guanine
Guanine
Guanine
Guanine
Guanine
Guanine
Guanine
Guanine
Guanine
Guanine


Cytosine
Cytosine
Cytosine
Cytosine
Cytosine
Cytosine
Cytosine
Cytosine
Cytosine
Cytosine


Deoxyribose sugar
Deoxyribose sugar
Deoxyribose sugar
Deoxyribose sugar
Deoxyribose sugar
Deoxyribose sugar
Deoxyribose sugar
Deoxyribose sugar


Phosphate