**DNA Structure Using Paper Models**

A **nucleotide** is a chemical compound that contains:

1. a molecule of deoxyribose sugar
2. phosphoric acid
3. a nitrogen base.

Nucleotides are named based on the nitrogen base that is attached to the deoxyribose. There are 4 possible nitrogen bases (and therefore, 4 possible nucleotides):

* Adenine
* Thymine
* Guanine
* Cytosine

A molecule of DNA is shaped like a twisted ladder. The long “sides” of the ladder are formed by the deoxyribose and phosphoric acid. The “rungs” of the ladder are formed when the nitrogen bases form pairs.



**3. On the diagram to the right, label the**

**following structures:**

* *Small circle = Phosphoric acid*
* *Pentagon = Deoxyribose*
* *Rectangles = Nitrogen bases*

**4. The picture below shows 2 nucleotides. What are two ways that they are similar?**

**5. The picture below shows 2 nucleotides. What is one way that they are different?**



Now it’s time to assemble your own molecule of DNA!  
  
**6. Using the nucleotides that you have already colored and cut, put the following six**

**nucleotides in the following order, from top to bottom:**

* Cytosine
* Thymine
* Guanine
* Adenine
* Guanine
* Thymine

  
When you are finished it should

look similar to the molecule shown

on the right. When it is correct,

**tape the molecule together**.  
  
Now that you have the left side of the “ladder” complete, use your remaining nucleotides to complete the right side. You will have to turn the nucleotides upside down in order to do this. The nucleotides should only pair up if the end of each base fits together (think of them as puzzle pieces!). When you think you have it, **tape the pieces together**.  
  
**7. What parts of the nucleotide form the “ladder sides” on your DNA molecule?  
  
  
  
8. What parts of the nucleotide from the “ladder rungs” on your DNA molecule?**

**9. Compare the left side of your DNA molecule to the right side. Is the order of nucleotides the same from top to bottom? (Hint: the left side started with cytosine… what did the right side start with?)**

**10. Each nitrogen base has only one “partner.” List the possible combinations below.**

**11. If we were to make a new DNA molecule and had 3 guanine bases, how many cytosine bases should there be?**