

# Lesson 4.1

# What is DNA?

Name

Date

Period

## Key Terms

nucleotide  
hydrogen bond

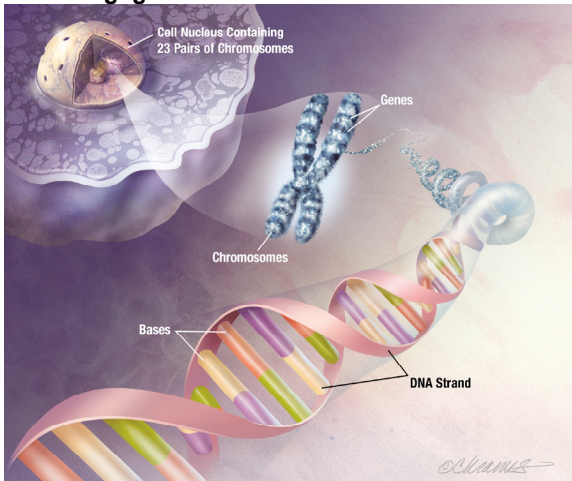
covalent bond

DNA

double helix

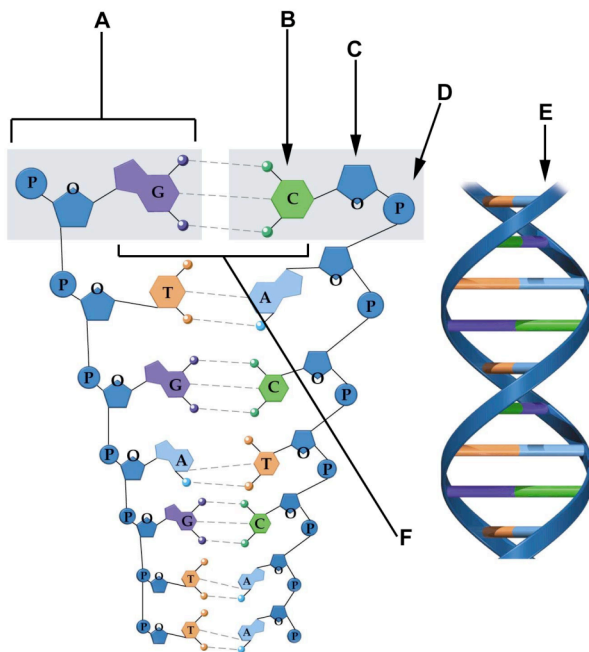


### Engage I



In this unit we will carefully investigate the characteristics of the DNA molecule, and how it transmits information from one generation to the next, and how it is involved in the production of **proteins** that define the traits of the organism.

1. Examine the illustrations below left. Pair the terms and definitions to the provided illustrations.



#### \_\_\_ DNA

a nucleic acid molecule in the form of a twisted double strand (double helix) that is the major component of chromosomes and carries genetic information. Full form deoxyribonucleic acid.

#### \_\_\_ Phosphate

A compound of phosphorous and oxygen that forms part of the backbone of a DNA molecule.

#### \_\_\_ Deoxyribose

A five-carbon simple sugar that is a structural component of DNA. Covalent bonds form between deoxyribose and phosphate with a DNA molecule.

#### \_\_\_ Nitrogen Base

A component molecule of DNA. Guanine (G), Cytosine (C), Adenine (A) and Thymine (T) are nitrogen bases.

#### \_\_\_ Base Pair

Hydrogen bonds form between specific pairs of nitrogen bases in a DNA molecule. Guanine and cytosine form a base pair, and adenine and thymine form another pair in DNA. eg. Guanine never matches with adenine or thymine.

#### \_\_\_ Nucleotide

A component of a DNA molecule that includes one nitrogen base, one deoxyribose sugar, and one phosphate molecule. Nucleotides are linked together to form strands of the DNA molecule.

#### \_\_\_ Hydrogen bond

Weak attraction between a positive hydrogen atom and a negative atom, such as oxygen or nitrogen.

#### \_\_\_ Covalent bond

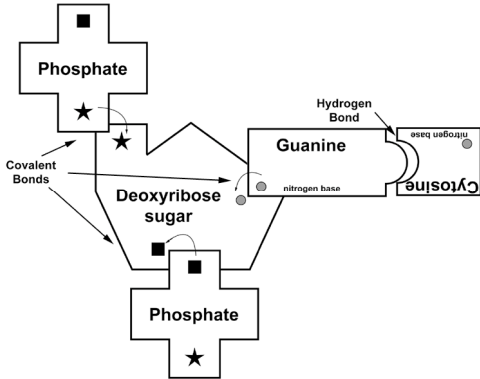
Interaction between two atoms that share electrons to become stable.



### Explore I – Building a model of DNA

The teacher will provide you with sheets of deoxyribose molecules, phosphate molecules, guanine, cytosine, adenine and thymine nitrogen bases.

- Take out only the sheets instructed by your teacher.
- Cut out these components and assemble a double-helix DNA molecule 6 base pairs in length.
- Mix the sequence of nitrogen bases along your sugar phosphate backbone. (eg. AATCGTTA...)
- When preparing to tape the components in place, match up similar symbols on the cut-outs ex.:



- Use clear tape for **covalent** chemical bonds.
- Use blue tape for **hydrogen** bonds.

• Diagram the appearance of your 6 base pair DNA molecule in the space on the right.

• Label the following features on your diagram

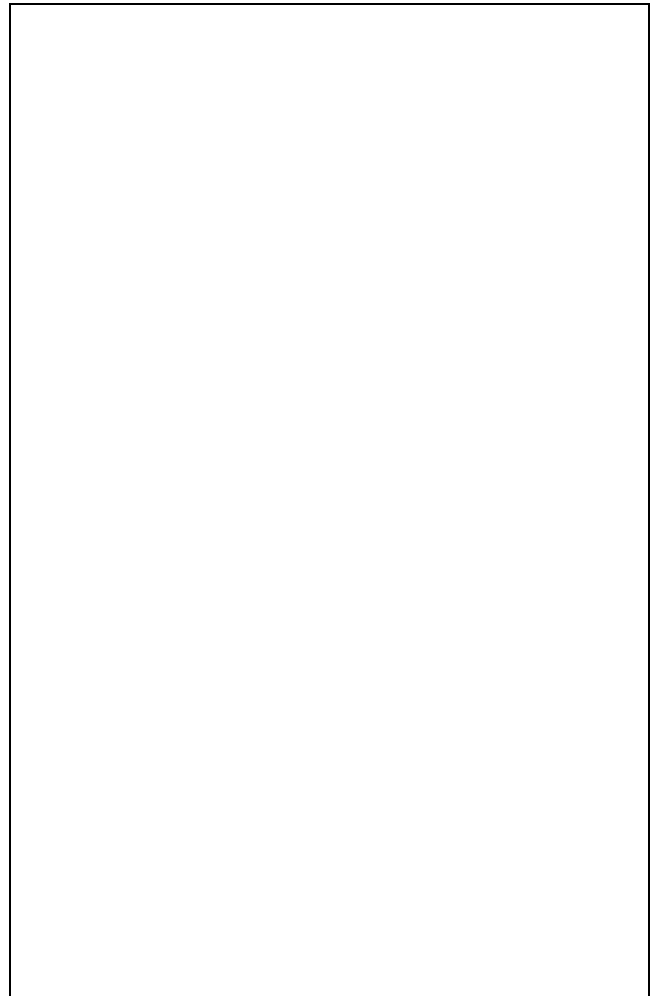
Deoxyribose sugar - (S)

Phosphate - (P)

(1) Nucleotide – (nucleotide)

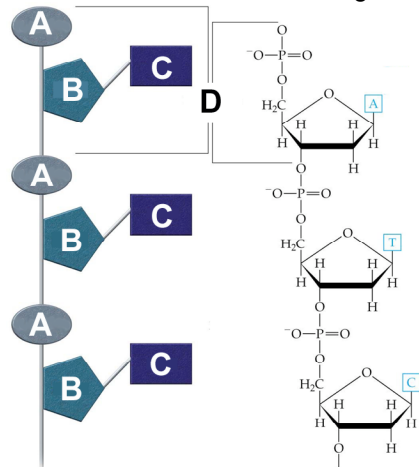
Nitrogen Bases – label all (A, T, C or G)

(1) Base pair – (base pair)



### Explain I

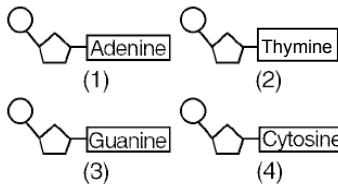
1. Label the letters on this diagram.



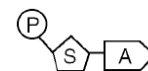
2. Fill in the missing bases.



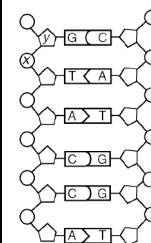
3. Which of the bases below can be linked together through hydrogen bonds?



4. This diagram represents a component of DNA. What is it? What are the labeled parts?



5. This diagram represents a molecule of



6. Give an example of the location of hydrogen bonds in this diagram.

7. What are the structures labeled G, C, T & A?

8. What does the letter X represent?

9. What does the letter Y represent?

Your teacher will show you a video ([http://learn.genetics.utah.edu/content/begin/dna/tour\\_dna.html](http://learn.genetics.utah.edu/content/begin/dna/tour_dna.html)). As you're watching the short video with the class, answer the following questions.

10. What is the location of the group of cells we are examining?

11. Where are the instructions providing all the necessary information for a cell to grow and live?

12. What does DNA stand for?

13. How do scientists refer to the twisted ladder shape of DNA?

14. Which letters are paired together within a DNA molecule?

15. Draw and label a DNA molecule.

16. What is the function of genes?

17. What do the DNA code letters stand for?