

# Biology Basics Unit Test – Teacher Edition

**Multiple Choice:** Select the best answer.

1. Which of the following correctly defines a scientific law?
  - a) A concise statement which is true under all conditions.
  - b) An in-depth explanation of how or why something occurs.
  - c) A suggestion which is compatible with current research.
  - d) A widely accepted statement which is true under specific conditions.
  
2. Which of the following is used to decide to select a hypothesis?
  - a) Observation and experimentation
  - b) Background research
  - c) Peer review
  - d) Repeat trials
  
3. Which of the following statements is true regarding hydrogen bonds?
  - a) A hydrogen bond is stronger than an ionic bond.
  - b) A hydrogen bond has the same strength as a covalent bond.
  - c) The attraction between the hydrogen atom of one water molecule and the oxygen atom of another water molecule is an example of a hydrogen bond.
  - d) All of the above.
  
4. The process which changes chemical substances into others is a \_\_\_\_\_.
  - a) chemical bond
  - b) chemical reaction
  - c) chemical equation
  - d) chemical formula
  
5. Which of the following macromolecules forms the major component of cell membranes?
  - a) Carbohydrate
  - b) Lipid
  - c) Protein
  - d) Nucleic acid

# Biology Basics Unit Test – Teacher Edition

## II. Complete the following sentences:

1. When a hypothesis has undergone rigorous \_\_\_\_\_ by independent researchers it may form part of a \_\_\_\_\_ and contribute to a wider pool of knowledge on a specific \_\_\_\_\_.
2. An \_\_\_\_\_ is a scientific procedure that is carried out to validate whether a hypothesis is correct or not while an \_\_\_\_\_ refers to any assessment that is used to judge the \_\_\_\_\_ of the data, results and observations.
3. \_\_\_\_\_ and \_\_\_\_\_ are the subatomic particles that found in the nucleus while \_\_\_\_\_ are the subatomic particles that found in the orbitals around the nucleus.
4. In \_\_\_\_\_ we design an experiment to determine the relationship between variables while in the \_\_\_\_\_ we design a product to solve a problem.
5. Nucleic acids are polymers that made up of \_\_\_\_\_ while proteins are polymers that made of \_\_\_\_\_.

## III. Decide if each statement is true (T) or false (F):

1. An atom is smaller than an element.
2. The cell wall of plant is made of glycogen.
3. Ions are atoms which have lost or gained electrons
4. Creating a prototype is usually the first step in the technological design process.
5. The abnormality of the boiling point of water is due to the presence of covalent bonds.

## IV. Describe the structure of a fatty acid and distinguish between the three types of these molecules.

---

---

---

---

---

---

---

---

---

---

# Biology Basics Unit Test – Teacher Edition

V. Draw a labeled diagram of the chemical structure of a nucleotide.

VI. The sentences in column A describe different steps in the scientific method. Match each sentence from column A with its correct name listed in column B.

Column A	Column B
<p>1. Rene grew bacteria from the mouth on special plates in the laboratory. She placed drops of different mouthwashes on bacteria on each plate. _____</p> <p>2. Jose saw bats catching insects after dark. He wondered, "How do bats find the insects in the dark?" _____</p> <p>3. Susan said, "If I fertilize my geranium plants, they will blossom." _____</p> <p>4. Angela's experiment proved that earthworms move away from light. _____</p>	<p>A. Ask a question</p> <p>B. Form a hypothesis</p> <p>C. Test the hypothesis with an experiment</p> <p>D. Draw conclusions</p>

VII. Compare and contrast ionic and hydrogen bonds.

---

---

---

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

# Biology Basics

## Unit Test – Teacher Edition

---

---

---

---

---

### VIII. Compare the structure and function of DNA with RNA.

---

---

---

---

---

---

---

---

---

---

# Biology Basics Unit Test – Teacher Edition

## Answers

I. **Multiple Choice:** choose the letter of the best answer.

- Which of the following correctly defines a scientific law?
  - A concise statement which is true under all conditions.
  - An in-depth explanation of how or why something occurs.
  - A suggestion which is compatible with current research.
  - A widely accepted statement which is true under specific conditions.**
  
- Which of the following is used to decide to select a hypothesis?
  - Observation and experimentation
  - Background research**
  - Peer review
  - Repeat trials
  
- Which of the following sentences is true about hydrogen bonds?
  - The hydrogen bond is stronger than the ionic one.
  - The hydrogen bond has the same strength of the covalent bond.
  - The attraction between the hydrogen atom of one water molecule and the oxygen atom of another water molecule is an example.**
  - All of the above.
  
- A process that changes some chemical substances into others is a \_\_\_\_\_.
  - chemical bond
  - chemical reaction**
  - chemical equation
  - chemical formula
  
- Which category of organic compound is the major component of cell membranes?
  - Carbohydrate
  - Lipid**
  - Protein
  - Nucleic acid

# Biology Basics Unit Test – Teacher Edition

## II. Complete the following sentences:

1. When a hypothesis has undergone rigorous **testing** by independent researchers it may form part of a **theory** and contribute to a wider pool of knowledge on a specific **topic**.
2. An **experiment** is a scientific procedure that is carried out to validate whether a hypothesis is correct or not while an **evaluation** refers to any assessment that is used to judge the **reliability** of the data, results and observations.
3. **Protons** and **neutrons** are the subatomic particles that found in the nucleus while **electrons** are the subatomic particles that found in the orbitals around the nucleus.
4. In **scientific investigations** we design an experiment to determine the relationship between variables while in the **technological design process** we design a product to solve a problem.
5. Nucleic acids are polymers that made up of **nucleotides** while proteins are polymers that made of **amino acids**.

## III. Decide if each statement is true (T) or false (F):

1. An atom is smaller than an element. **True**
2. The cell wall of plant is made of glycogen. **False**
3. Ions are atoms which have lost or gained electrons **True**
4. Creating a prototype is usually the first step in the technological design process. **False**
5. The abnormality of the boiling point of water is due to the presence of covalent bonds. **False**

## IV. Describe the structure of a fatty acid and distinguish between the three types of these molecules.

A fatty acid is a long chain of carbon and hydrogen atoms bonded together. Three of these molecules are then joined to a glycerol to form a lipid molecule.

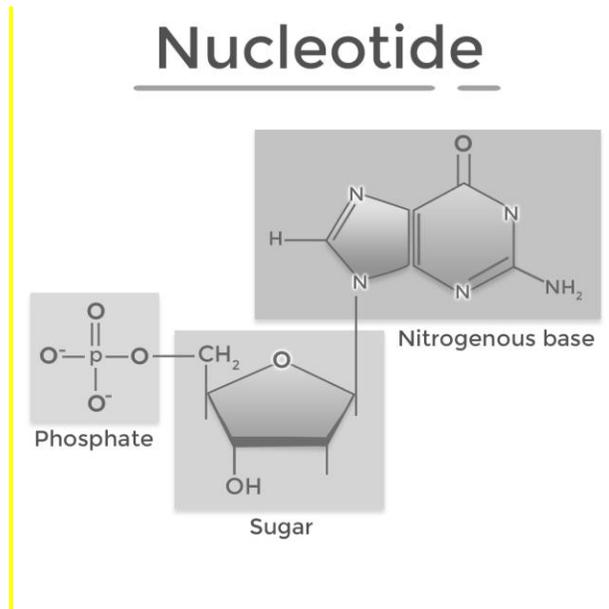
Saturated fatty acids contain carbon atoms which are bonded to other carbons by single bonds.

Unsaturated fatty acids contain a double C=C bond in the chain.

Polyunsaturated fatty acids contain multiple double C=C bonds.

# Biology Basics Unit Test – Teacher Edition

V. Draw a labeled diagram of the chemical structure of a nucleotide.



VI. Each sentence below describes a step of the scientific method. Match each sentence from column A with a step of the scientific method listed in column B.

Column A	Column B
1. Rene grew bacteria from the mouth on agar plates in the laboratory. She placed drops of different mouthwashes on bacteria on each plate. (C)	A. Asking a question
2. Jose saw bats catching insects after dark. He wondered, "How do bats find the insects in the dark?" (A)	B. Form a hypothesis
3. Susan said, "If I fertilize my geranium plants, they will blossom." (B)	C. Test the hypothesis with an experiment
4. Angela's experiment proved that earthworms move away from light. (D)	D. Draw conclusions

VII. Compare between the ionic and the hydrogen bond.

**The ionic bond is considered as a strong bond that requires large amounts of energy to break.**

## Biology Basics Unit Test – Teacher Edition

The atoms that form ionic bonds become more stable by gaining or losing electrons to form ions that make them energetically stable. The atoms form ionic bonds with the electron from one element staying mostly with the other element.

**The hydrogen bond** is a relatively weak bond that requires little energy to break. It's an attraction that occurs between a positive and negative charge. Hydrogen bonds exist when a polar covalent bond that contains hydrogen atoms is formed. Because the sharing electrons is pulled from the hydrogen, it will have a slightly positive charge. This hydrogen atom will be easily attracted to a slightly negative neighboring charge that results in the interaction between these opposite charges.

### VIII. Compare the structure and function of DNA with RNA.

DNA is a double stranded molecule which is found in the nucleus of a cell. Its function is to contain/store the information which determines how the cell is structure (built) and how it functions (its behavior).

RNA is a single stranded molecule which is able to move around the cell. It is much smaller than DNA and codes for proteins.