



# Integrated Science

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الصف الأول الثانوي الأسبوع

12

Weekly Assignment

إعداد ومراجعة

مكتب تنمية مادة العلوم

## Weekly assignment

### Chapter 4: Lesson (1) Biotechnology in energy development

#### Choose the correct answer

1. **The gas that is often produced in the process of biological decomposition is .....**  
  
A) Carbon dioxide  
B) Methane  
C) Oxygen  
D) Nitrogen
  
2. **The first step of the biological decomposition process is .....**  
  
A) Acidogenesis  
B) Acetogenesis  
C) Hydrolysis  
D) Methanogenesis
  
3. **The step at which, acidophilic bacteria convert the sugars and amino acids into short-chain fatty acids or alcohol, along with producing gases such as carbon dioxide and hydrogen.**  
  
A) Acidogenesis  
B) Acetogenesis  
C) Hydrolysis  
D) Methanogenesis
  
4. **The stage at which, bacteria perform an additional process to convert the fatty acids and gases produced in the second stage of biodegradation into acetic acid, hydrogen, and carbon dioxide.**  
  
A) Acidogenesis  
B) Acetogenesis  
C) Hydrolysis  
D) Methanogenesis

5. **Protein**  $\xrightarrow{\text{Hydrolysis}}$  .....
- A) Simple sugars
  - B) Fatty acids
  - C) Amino acids
  - D) Methane
6. **Carbohydrates (Starch)**  $\xrightarrow{\text{Hydrolysis}}$  .....
- A) Simple sugars
  - B) Fatty acids
  - C) Amino acids
  - D) Methane
7. **Fats**  $\xrightarrow{\text{Hydrolysis}}$  .....
- A) Simple sugars
  - B) Fatty acids
  - C) Amino acids
  - D) Methane
8. **CH<sub>3</sub>COOH**  $\xrightarrow{\text{methanogenic bacteria}}$  .....
- A) CH<sub>4</sub> + CO<sub>2</sub>
  - B) CH<sub>4</sub> + H<sub>2</sub>O
  - C) CH<sub>4</sub> + CO<sub>2</sub> + H<sub>2</sub>O
  - D) C + CO<sub>2</sub> + H<sub>2</sub>O
9. **Glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)**  $\xrightarrow{\text{Yeast}}$  .....
- A) ethanol (C<sub>2</sub>H<sub>5</sub>OH) + CO<sub>2</sub>
  - B) methane (CH<sub>4</sub>) + CO<sub>2</sub>
  - C) ethanol (C<sub>2</sub>H<sub>5</sub>OH) + H<sub>2</sub>O
  - D) methane (CH<sub>4</sub>) + H<sub>2</sub>O

10. **Oil + ethanol**  $\xrightarrow{\text{NaOH catalyst}}$  .....
- A) biodiesel + glycerin
  - B) methanol + glycerin
  - C) methane + biodiesel
  - D) methane + water
11. **What can be converted into ethanol during the fermentation process?**
- A) Vegetable oils
  - B) Sugars
  - C) Natural gas
  - D) Coal
12. **Vegetable oils react with alcohol in the presence of sodium hydroxide as a catalyst to produce.....**
- A) Ethanol
  - B) Glycerin
  - C) Methane
  - D) Carbon dioxide

## **Second: Essay Questions**

### **Answer the following:**

1. **How can the efficiency of energy production be improved using biotechnology?**

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2. **Compare: The production of bioethanol and biodiesel in terms of raw materials used and chemical equation**

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3. **How you obtain methane from: -**

**First: acetic acid  $\text{CH}_3\text{COOH}$  ( write the chemical equation)**

**Second: carbon dioxide gas and hydrogen gas ( write the chemical equation)**

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