



**ST NINIAN'S HIGH SCHOOL**  
**NATIONAL 4 BIOLOGY**  
**LEARNING OBJECTIVES**



**UNIT 1: CELL BIOLOGY**

**SECTION 4(A) ENZYMES IN ACTION**

**CATALYST**

- 1. State the definition of a catalyst: A **CATALYST** speeds up chemical reactions.
- 2. State the **PROPERTIES** of catalysts:
  - a. Catalysts take part in reactions but **remain unchanged** at the end of the reaction they catalyse.
  - b. Catalysts can be **used again** at the end of the experiment.

**ENZYME**

- 3. State the definition of an enzyme:  
**ENZYMES** are **BIOLOGICAL CATALYSTS**
- 4. State that **ENZYMES** are found in **every** living cell e.g **CATALASE**.
- 5. State that an enzyme is **SPECIFIC** as it will only speed up one reaction.
- 6. State that the substance that an enzyme acts on is called the **SUBSTRATE**.
- 7. State that a **PRODUCT** is formed at the end of a reaction between an enzyme and a substrate.

**Enzyme**  
**Substrate**  $\longrightarrow$  **Product**

**ENZYME ACTION**

- 8. Describe the role of enzymes involved in reactions:  
State that some enzymes **BREAK DOWN** large molecules into smaller ones.  
State that some enzymes **BUILD UP** small molecules into larger ones.

- 9. Give an example of an enzyme that **BREAKS DOWN** a large molecule:



- 10. Give an example of an enzyme that **BUILDS UP** a larger molecule:





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**UNIT 1: CELL BIOLOGY**

**SECTION 4(B) ENZYMES IN INDUSTRY**

**DETERGENTS**

1. State the definition of a detergent:  
A **DETERGENT** means "something that cleans".

2. Explain that a **BIOLOGICAL** detergent contains **ENZYMES** but a **NON- BIOLOGICAL** does not contain any enzymes.

3. State that **ENZYMES** are enclosed in **HARMLESS COATINGS** in biological washing powders to prevent **ALLERGIC REACTIONS**, which can cause **SKIN RASHES** and **ECZEMA**.

4. Explain the advantages of using **BIOLOGICAL** washing powder is that enzymes digest the stains at **MODERATE TEMPERATURES**, this saves **ENERGY** and causes less damage to **FABRICS**.

5. State a disadvantage of using **BIOLOGICAL** washing powder is that some people may have an **ALLERGIC** reaction to them.

6. State the advantage of **NON-BIOLOGICAL** washing powder is that people with **SENSITIVE** skin can use it.

7. State the disadvantage of **NON-BIOLOGICAL** washing powder is that it may **NOT** digest stains as well as biological washing powders.

8. Explain that manufacturers of detergents are **REDUCING ENERGY NEEDS** by initiating programmes to **REDUCE WEIGHT** and **VOLUME** of packaging, encourage recycling programmes and encourage safe disposal practices.

9. Explain that **PHOSPHATES** in detergents are released into rivers can encourage plant growth. Algal bloom occurs, bacteria feed on decomposing plant material causing an **BACTERIA INCREASE IN NUMBER** using up **OXYGEN** supply and having a **NEGATIVE** effect on local environment.





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**UNIT 1: CELL BIOLOGY**

**SECTION 4(C) ENZYMES IN INDUSTRY**

**RENNET**

- 1. State that **RENNET** is an enzyme involved in the manufacture of **CHEESE**.
- 2. Explain that rennet **CLOTS MILK PROTEINS** to make **CURDS**, the solid part, and **WHEY**, the liquid part.
- 3. Explain that **UPGRADING** a substance is converting it from a waste product into a useful product.
- 4. State that the process **PASTEURISATION** is when milk is heated to **72 °C** for **10-15** seconds.
- 5. State that **SEMI-SKIMMED MILK** has had around half of the **FAT** removed whereas **SKIMMED MILK** has had nearly all the fat removed.
- 6. State that an advantage of **CALF RENNET** is that it is from a natural source but a disadvantage is that it involved the **KILLING** of animals.
- 7. State that an advantage of **FUNGAL RENNET** is that it is cheap to produce but a disadvantage is that a poor **FLAVOUR** develops.
- 8. State that an advantage of **GENETICALLY MODIFIED RENNET** is that does not involve the killing of animals but a disadvantage is that many people think it is **UNNATURAL** to eat genetically modified food.