Dehydration Synthesis Reactions/Condensation Reactions:

This formula shows how large molecules are built in living things. The process is called *dehydration synthesis* because water is taken out of the smaller molecules to synthesize/build a larger one. Water is produced by the reaction.

\[ A + B \rightarrow AB + H_2O \]

enzyme

**Example: Amino acids joining to build a protein**

![Amino acid reaction diagram](image)

**Example: Simple sugars (monosaccharides) joining to build a complex carbohydrate (disaccharide)**

![Disaccharide formation diagram](image)
Hydrolysis Reactions:

This formula shows how large molecules are broken down in living things. The process is called hydrolysis because water is added to the larger molecule to lyse/break it down into a smaller one.

$$AB + H_2O \xrightarrow{\text{enzyme}} A + B$$

Example: The breakdown of a disaccharide (double sugar) that uses water to produce 2 simple sugars (2 monosaccharides)

$$C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$$

Lactose + Water $\Rightarrow$ Galactose $+$ Glucose

Example: The breakdown of a dipeptide (2 amino acids) that uses water to produce 2 separate amino acids:

Dipeptide (the smallest possible "protein") $+$ Water $\rightarrow$ One Amino Acid $+$ Another Amino Acid

Protein Hydrolysis
Dehydration Synthesis and Hydrolysis

DIRECTIONS: Below the diagrams are three statements that describe the action shown in the diagram, but they are scrambled up. Rewrite the statement that fits the action on the line under the appropriate diagram. Refer to figure 3.5 on page 38.

THE FOLLOWING DIAGRAMS SHOW THE PROCESS OF

BEFORE:

STEP 1: maltose + H₂O

STEP 2:

Statements to be written on the correct diagram above:

- The 'parts' of water are lost from the bonding ends of the two molecules.
- Two complete, organic molecules—separate from each other (not bonded together)
- Two molecules bond together forming one larger molecule (polymer is formed)
DEHYDRATION SYNTHESIS AND HYDROLYSIS

The diagrams below show the process of: ________________________
(Enzymes allow this process to happen in both process on pp. 2 and 3)

\[ \text{maltose} \rightarrow \text{Glucose} + \text{H}_2\text{O} \]

**Before:**

**Step 1:** ________________________

**Step 2:** ________________________

Statements to match & REWRITE on the correct line above (use figure 3.3B for reference):

- Each sugar molecule gains a 'part' of water to its broken end and is now complete. (Disaccharide)

- One molecule of maltose is made out of two smaller sugar molecules bonded together.

- The disaccharide molecule breaks apart (with the help of enzymes). (Forms 2 monosaccharides)