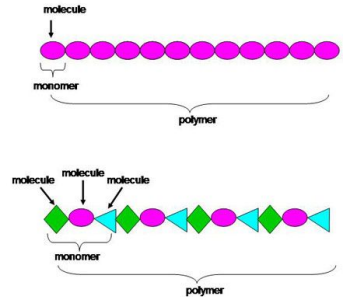


Organic Molecule Synthesis

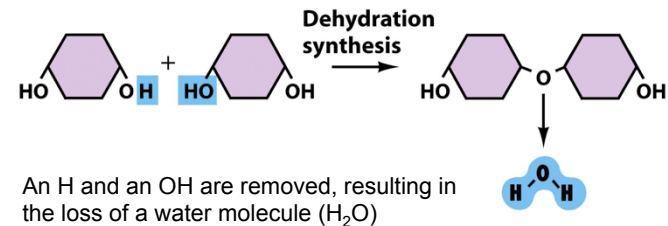
- Biomolecules are **polymers** (chains) of subunits called **monomers**



Organic Molecule Synthesis

- Monomers are joined together through **condensation reactions**

– Also called **dehydration synthesis**



Organic Molecule Synthesis

- Polymers are broken apart through **hydrolysis** (“water cutting”)
 - Water is broken into H and OH and used to break the bond between monomers

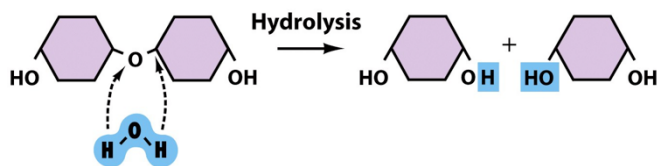


Figure 3-3 Biology: Life on Earth, 8/e
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Organic Molecules

- All biological molecules fall into one of four categories
 - Carbohydrates
 - Lipids
 - Proteins
 - Nucleic Acids

The table in your note packet is not really big enough for all the information on the following slides to be written. You have a choice:

1. Create your own, larger table and staple it to your note packet
2. Write really small.

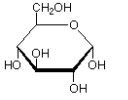
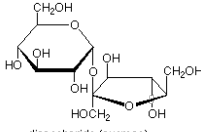
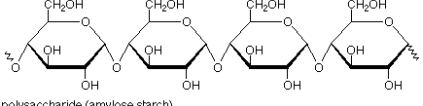
Table 3-2 The Principal Biological Molecules			
Class of Molecule	Principal Subtypes	Example	Function
Carbohydrate: Usually contains carbon, oxygen, and hydrogen, in the approximate formula (CH ₂ O) _n	Monosaccharide: Simple sugar with the formula C ₆ H ₁₂ O ₆	Glucose	Important energy source for cells; subunit of polysaccharides
	Disaccharide: Two monosaccharides bonded together	Fructose Sucrose	Energy-storage molecule in fruits and honey Principal sugar transported throughout bodies of land plants
	Polysaccharide: Many monosaccharides (usually glucose) bonded together	Starch Glycogen Cellulose	Energy storage in plants Energy storage in animals Structural material in plants
			
	monosaccharide (glucose)	disaccharide (sucrose)	
			
	polysaccharide (amylose starch)		

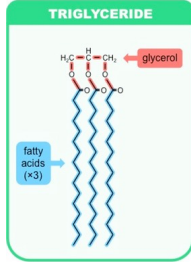
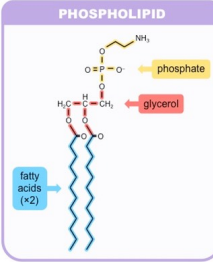
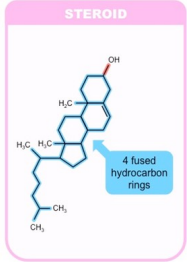
Table 3-2 The Principal Biological Molecules			
Class of Molecule	Principal Subtypes	Example	Function
Lipid: Contains high proportion of carbon and hydrogen; usually nonpolar and insoluble in water	Triglyceride: Three fatty acids bonded to glycerol	Oil, fat	Energy storage in animals, some plants
	Wax: Variable numbers of fatty acids bonded to long-chain alcohol	Waxes in plant cuticle	Waterproof covering on leaves and stems of land plants
	Phospholipid: Polar phosphate group and two fatty acids bonded to glycerol	Phosphatidylcholine	Component of cell membranes
	Steroid: Four fused rings of carbon atoms with functional groups attached	Cholesterol	Common component of membranes of eukaryotic cells; precursor for other steroids such as testosterone, bile salts
			
	TRIGLYCERIDE	PHOSPHOLIPID	STEROID

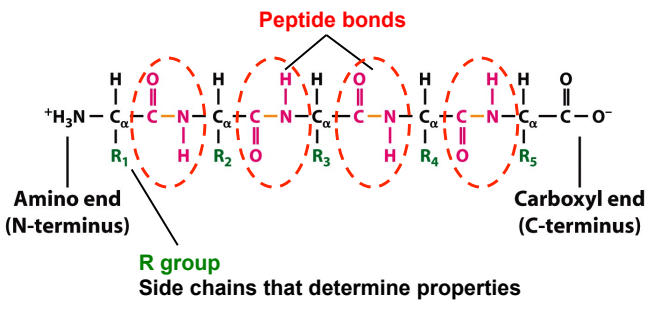
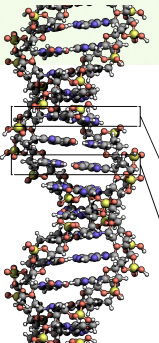
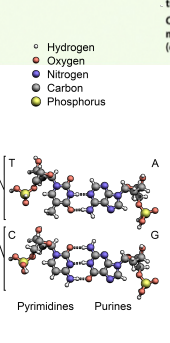
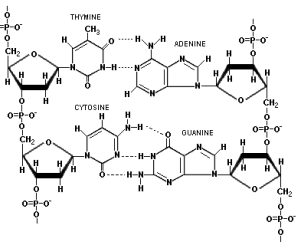
Table 3-2 The Principal Biological Molecules			
Class of Molecule	Principal Subtypes	Example	Function
Protein: Chains of amino acids; contains carbon, hydrogen, oxygen, nitrogen, and sulfur	Peptide: Short chain of amino acids	Keratin Silk	Helical protein, principal component of hair Beta-pleated sheet protein produced by silk moths and spiders
	Polypeptide: Long chain of amino acids; also called "protein"	Hemoglobin	Globular protein composed of four subunit peptides; transport of oxygen in vertebrate blood
			

Table 3-2 The Principal Biological Molecules			
Class of Molecule	Principal Subtypes	Example	Function
Nucleic acid: Made of nucleotide subunits containing carbon, hydrogen oxygen, nitrogen, and phosphorus. May consist of a single nucleotide or long chain of nucleotides.	Long-chain nucleic acids: polymer of nucleotide subunits	Deoxyribonucleic acid (DNA)	Genetic material of all living cells
	Single nucleotides	Ribonucleic acid (RNA) Adenosine triphosphate (ATP) Cyclic adenosine monophosphate (cyclic AMP)	Genetic material of some viruses; in cells, essential in transfer of genetic information from DNA to protein Principal short-term energy carrier molecule in cells Intracellular messenger
			
	Pyrimidines Purines		



The big idea...

- Can you list the 4 major categories of biological molecules?
- Can you recognize the major molecular structures of each class of biological molecule?