

## Topic Review Guide: Biologically Important Molecules, Part 2

**To Think About:** How do molecules and atoms from the environment build new molecules? In what ways do DNA and RNA molecules have similarities and differences that define their function? In what ways do the subcomponents of biological molecules and their sequences determine the properties of those molecules? What interactions between molecules affect their structure and function?

**Watch:**

**First:** : [Mr. Andersen's "Proteins" video](#)

**Next:** [Mr. Andersen's "Nucleic Acids" video](#)

**Read:** Chapter 3, pages 36-52: Mader, Biology, 9<sup>th</sup> ed. (2007).

**Supplementary Resources:** Click the links below for more information to help you learn more about this lesson.

- John Kyrk: [Amino Acids](#)
- Crash Course Biology: [That's Why Carbon is a Tramp](#)
- Crash Course Biology: [Biological Molecules—You Are What You Eat](#)
- Learn.Genetics: [DNA to Protein](#)
- DNA From the Beginning: [DNA and Proteins are key molecules of the cell nucleus](#)

**Listen and Look:** Here is a list of key terms and concepts you will hear about and see during these podcasts and chapter readings. Get to know them! Be able to connect them to one another using a concept map.

**Don't just simply define the terms—you must understand the relationships among and between them!**

### KEY TERMS

Protein	Polypeptide	Hydrophobic	Hydrophilic
Amino acid	Peptide bond	Polar amino acid	Nonpolar amino acid
Primary structure	Secondary structure	Tertiary structure	Dehydration synthesis (condensation)
Quaternary structure	Denaturing	Nucleic acid	Nucleotide
DNA	RNA	Hydrogen bonds	Complementary base pairing
Transcription	Translation	Replication	

**Recall and Review:** Use the lecture in the videos and your textbook reading to help you answer these questions in your independent reading notes.

1. **Explain** why the shape of a molecule is critical to determining its function.
2. **Draw** the generalized structure of an amino acid. **Label** where dehydration synthesis will occur when amino acids join together to build proteins. **Explain** how changing the R group changes the properties of the amino acid.
3. **Draw** an example of two amino acids forming a dipeptide through dehydration synthesis (condensation).
4. **Identify:**
  - a. the biological process that produces proteins
  - b. where this process occurs and in what types of organisms
5. **Create** a 4-panel cartoon that illustrates the differences between the four levels of protein structure.
6. **Explain** how the environment surrounding a protein influence its shape and structure.
7. **Explain** the importance of hydrogen bonding in maintaining the structure of the nucleic acids DNA and RNA.

8. **Explain** the roles of DNA and RNA in making proteins.
9. **Describe** the similarities between ATP and nucleotides in DNA/RNA.
10. **Explain** how scientists think that DNA evolved from RNA and **describe** the bonds that hold the DNA molecule together.
11. **Explain** how DNA molecules can be so diverse even though they are structurally similar.

Learn More: For more examples of biologically important molecules, use the links below:

- [Foldit](#): play a game to practice folding proteins
- [Eterna](#): play a game to design RNA molecules
- NobelPrize.org Chirality Game: [learn about “handedness” of molecules](#)

