

## SYNTHESIZE THE UNIT



In your Evidence Notebook, make a concept map, graphic organizer, or outline using the Study Guides you made for each lesson in this unit. Be sure to use evidence to support your claims.

When synthesizing individual information, remember to follow these general steps:

- Find the central idea of each piece of information.
- Think about the relationships between the central ideas.
- Combine the ideas to come up with a new understanding.

## DRIVING QUESTIONS

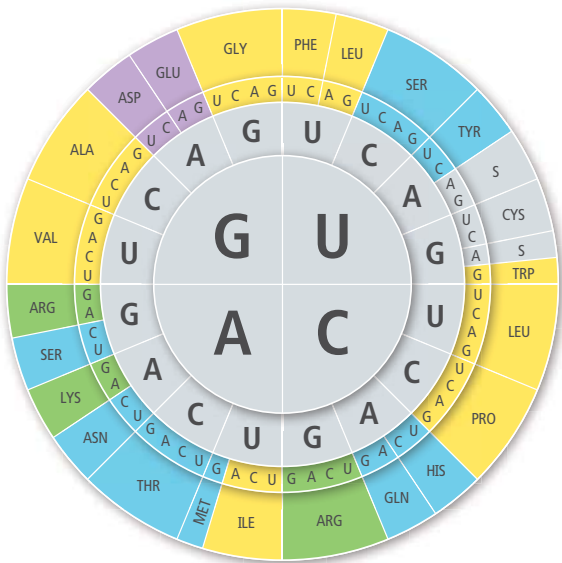
Look back to the Driving Questions from the opening section of this unit. In your Evidence Notebook, review and revise your previous answers to those questions. Use the evidence you gathered and other observations you made throughout the unit to support your claims.

## PRACTICE AND REVIEW

1. What is the primary function of DNA?
  - a. store genetic information
  - b. translate genes into proteins
  - c. replicate genetic information for each cell
  - d. transcribe genetic information into RNA that can leave the nucleus
2. What evidence do codons provide for the common ancestry of all organisms?
  - a. Almost all living things use codons to transcribe RNA to proteins.
  - b. Codons code for amino acids that are found in all living organisms.
  - c. Codons in almost all living organisms code for the same amino acid.
  - d. Codons are used to start and stop protein translation in almost all living things.
3. How does the epigenome assist in gene regulation?
  - a. The epigenome controls which DNA sequences are accessible for transcription.
  - b. The epigenome regulates mRNA processing after transcription.
  - c. The epigenome controls the promoter sequence known as the TATA box.
  - d. The epigenome regulates translation in the cytoplasm.
4. Which element provides instructions for cell differentiation?
  - a. RNA
  - b. codons
  - c. genome
  - d. traits
5. Which characteristics describe both transcription and replication? Select all correct answers.
  - a. unwinds the DNA double helix
  - b. controlled by complex enzymes
  - c. results in a full set of genetic information
  - d. occurs within the nucleus of eukaryotes.
6. What is the connection between a codon and an amino acid? Select all correct answers.
  - a. A codon is a sequence of three nucleotides that specifies a particular amino acid.
  - b. A codon is made up of amino acids.
  - c. Each tRNA binds to a specific amino acid and has an anticodon that binds to a specific codon.
  - d. DNA is made up of codons and mRNA is made up of amino acids that attach to the DNA strand during translation.

Use the chart to answer questions 7–11.

**FIGURE 4:** The genetic code matches each mRNA codon with its amino acid or function.



ALA = Alanine	LYS = Lysine
ARG = Arginine	MET = Methionine
ASN = Asparagine	PHE = Phenylalanine
ASP = Aspartic acid	PRO = Proline
CYS = Cysteine	S = Stop
GLN = Glutamine	SER = Serine
GLU = Glutamic acid	THR = Threonine
GLY = Glycine	TRP = Tryptophan
HIS = Histidine	TYR = Tyrosine
ILE = Isoleucine	VAL = Valine
LEU = Leucine	

7. Which amino acid is represented by the codon CAG?
- histidine
  - alanine
  - arginine
  - glutamine
8. What could happen if this DNA sequence CAG underwent a substitution point mutation? Select all correct answers.
- The sequence could code for a stop codon.
  - The sequence could code for the same amino acid.
  - The sequence could code for a different amino acid.
  - The complete amino acid sequence for the protein could change.
9. What would happen if an adenine replaced the guanine in the DNA sequence GTC?
- The glutamine would become lysine.
  - The glutamine would become valine.
  - The glutamine would remain the same.
  - The glutamine would become a stop codon.

10. Which amino acids would be most likely to be affected by a point mutation in the corresponding DNA sequence? Be specific and use evidence and reasoning to explain your answer.
11. Which DNA sequence would lead to the CAG codon in mRNA?

### UNIT PROJECT

Return to your unit project. Prepare your materials into a final paper. Include an evaluation of your predictions, analysis, and conclusions.

Remember these tips while evaluating:

- Look at the empirical evidence—evidence based on observations and data. Does the evidence support your explanation regarding malformations in frogs?
- Consider if the explanation is logical. Does it contradict any evidence you have seen?
- Is there enough evidence from credible sources to support your conclusions?