

Name \_\_\_\_\_ Period \_\_\_\_\_ Date Assigned \_\_\_\_\_ Due Date \_\_\_\_\_

## Computer Lab Protein Synthesis

How to get to the correct website:

1. Go to <http://www.phschool.com/science/>
2. Scroll down and click on "The Biology Place"
3. Another screen should open. When it does click on "Biocoach"
4. Another screen will open. Click on "From a gene to a protein: Transcription"
5. Late in the lesson you will be asked to go back to the "Biocoach" screen and click on "From a gene to a protein: Translation". DO NOT OPEN THIS PAGE TILL ASKED.

From Gene to Protein: Transcription Lesson

1. Once on the Transcription introduction page read the introduction. Then click on the "Next Concept"

Concept 1: Overview

2. What are the two steps of protein synthesis? \_\_\_\_\_
3. Where can the information (code) for a protein be found? \_\_\_\_\_
4. Click "Next Concept"

Concept 2: Transcription and Translation in cells

5. Why can prokaryotes do transcription and translation at the same time? \_\_\_\_\_  
\_\_\_\_\_
6. Why can eukaryotes not do transcription and translation at the same time? \_\_\_\_\_  
\_\_\_\_\_
7. Click "Next Concept"

Concept 3: Different Genes for different RNAs

8. Are all genes expressed in every organism? \_\_\_\_\_
9. Describe the function of each of the following
  - a. mRNA - \_\_\_\_\_
  - b. rRNA - \_\_\_\_\_
  - c. tRNA - \_\_\_\_\_
  - d. snRNA - \_\_\_\_\_

10. Click "Next Concept"

Concept 4: Basic Structure of a Protein-Coding Gene

11. One gene is made of 3 parts, which are
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
12. The difference between a promoter and a terminator is \_\_\_\_\_
13. Click "Next Concept"

Concept 5: The RNA molecule

14. How can you tell the difference between a DNA nucleotide and a RNA nucleotide? \_\_\_\_\_  
\_\_\_\_\_
15. Identify the base found in RNA that is not found in DNA \_\_\_\_\_
16. State the number of strands that DNA has \_\_\_\_\_ verses RNA \_\_\_\_\_
17. Click on "Review" and observe the pictures. Then close that window.
18. Click "Next Concept"

Concept 6: The Transcription Process

19. What direction does RNA polymerase copy DNA? \_\_\_\_\_
20. Compare the base pairing for DNA to RNA. \_\_\_\_\_
21. Click on "Review". Watch the animation. Then close the window.
22. Click on "Practice". Follow the direction and complete transcription by matching the appropriate RNA nucleotide with the sense strand of DNA.
23. Write the complete mRNA sequence below.  
mRNA - \_\_\_\_\_

Name \_\_\_\_\_ Period \_\_\_\_\_ Date Assigned \_\_\_\_\_ Due Date \_\_\_\_\_

24. Close the window. And click “Next Concept”

Concept 7: Complete Transcription of an RNA molecule

25. Where does transcription begin? \_\_\_\_\_

26. Where does transcription end? \_\_\_\_\_

27. Does the mRNA stay attached to the DNA during transcription? \_\_\_\_\_

Concept 8: mRNA in Prokaryotes

28. Is the mRNA in prokaryotes edited before it is translated? \_\_\_\_\_

29. Click “Next Concept”

Concept 9: mRNA in Eukaryotes

30. Is the mRNA in eukaryotes edited before it is translated? \_\_\_\_\_

31. Indicate the difference between an intron and an exon. \_\_\_\_\_

32. Click on “Review”

33. State the purpose of the 5’ cap. \_\_\_\_\_

34. State the purpose of the poly A tail. \_\_\_\_\_

35. Close the window. Click “Next Concept”

Concept 10: Pre-mRNA Processing (Splicing)

36. What process is done by the snRNPs? \_\_\_\_\_

37. Click “Next Concept”

Skip the Self Quiz and go back to the BioCoach menu by clicking the BioCoach button at the top of Concept 10 page

From Gene to Protein: Translation Lesson

1. Once on the Translation introduction page read the introduction. Then click on the “Next Concept”

2. Read through Concept 1 then click “Next Concept”

Concept 2: Protein Structure: Amino Acid Building Blocks

3. List the 4 parts of an amino acid. \_\_\_\_\_

4. Click “Next Concept”

Concept 3: The Different Amino Acid

5. How many different amino acids are there? \_\_\_\_\_

6. Click “Next Concept”

Concept 4: The Peptide Bond

7. What is the name of the bond that joins two amino acids together? \_\_\_\_\_

8. What molecule is removed to join the two amino acids together? \_\_\_\_\_

9. Click “Next Concept”

Concept 5: The Genetic Code: RNA vs Protein

10. How many RNA bases code for one amino acid? \_\_\_\_\_

11. How many different codons are there? \_\_\_\_\_ How many amino acids? \_\_\_\_\_

12. Click “Next Concept”

Concept 6: Translation in a Eukaryotic Cell

13. Identify where each of the following occur:

a. Transcription \_\_\_\_\_

b. Editing \_\_\_\_\_

c. Translation \_\_\_\_\_

14. Click “Next Concept”

Concept 7: Molecular Components of Translation part 1

15. Which parts of the mRNA are translated? \_\_\_\_\_

16. Which parts of mRNA are not translated? \_\_\_\_\_

17. What are the three bases of the start codon? \_\_\_\_\_

Concept 8: Molecular Components of Translation part 2

Name \_\_\_\_\_ Period \_\_\_\_\_ Date Assigned \_\_\_\_\_ Due Date \_\_\_\_\_

18. Identify the two units of a ribosome. \_\_\_\_\_ & \_\_\_\_\_

19. What type of RNA makes up a ribosome? \_\_\_\_\_

20. Click "Next Concept"

#### Concept 9: Molecular Components of Translation part 3

21. Name the function of tRNA. \_\_\_\_\_

22. There are two distinct ends of tRNA. One side has an \_\_\_\_\_ attached while the other possess the \_\_\_\_\_ which pairs with the codon on mRNA.

23. Click "Next Concept"

#### Concept 10: Adding an Amino Acid to tRNA

24. What enzyme is responsible for attaching amino acids to tRNA? \_\_\_\_\_

25. Click "Next Concept"

#### Concept 11: Initiation of Translation

26. Click "Review"

27. Sequence the order of events that for assembling the translation complex. \_\_\_\_\_

28. Click "Next Concept"

#### Concept 12: Elongation of the Polypeptide Chain

29. Click "Review"

30. What site does the new tRNA attach? \_\_\_\_\_

31. After the peptide bond is formed between amino acids what happens to the tRNA that is located in the P-site? \_\_\_\_\_

32. Close the window and Click "Next Concept"

#### Concept 13: Termination of Translation

33. How does the ribosome know when to stop translation? \_\_\_\_\_

34. Click "Review"

35. What happens to the translation complex when the termination code is reached? \_\_\_\_\_

36. Click "Practice"

37. Read the directions and list in order the things that are add each step of the way

Initiation

a.

b.

c.

Elongation (list the amino acids)

d.

e.

f.

g.

Termination

h.

38. Close the window and Click "Next Concept"

#### Concept 14: Polysomes

39. Can only one ribosome translate a mRNA at a time? \_\_\_\_\_

40. What is the advantage of having several ribosomes translate a single mRNA at the same time?  
\_\_\_\_\_