

Replication, Transcription, Translation Worksheet

Name: _____

Period: _____

Start at lapinescience.pbwiki.com. Follow the links on the sidebar

First go to PBS DNA Workshop

First unzip the DNA in the DNA replication simulation.

1. What is the purpose of DNA replication?
2. After you unzip the DNA, it says the molecule was unwound from a spool made of protein. What is that protein called (look in your book)?
3. About how many base pairs of DNA does one human cell's nucleus hold? Assume that this cell is a somatic (non-reproductive) cell with 46 chromosomes.
4. Where does DNA replication take place?
5. What is the product of DNA replication?
6. What causes the DNA to unzip?
7. How many strands of old and new DNA are in the replicated DNA?
8. Write the complementary base pairs to the unzipped DNA

C A T G G G C T C C A

Next, go through the protein synthesis.

9. Where does protein synthesis take place?
10. What is the product of transcription (be specific)? What does it encode?
11. What does tRNA stand for? What is its role in protein synthesis?
12. What are codons and anticodons? (pictures may be helpful here!)

13. What was different between replication and transcription when matching up base pairs?
14. How long are most mRNA molecules?
15. What is the complementary set of bases for a codon called?
16. What carries in each amino acid?
17. Which three amino acids formed the polypeptide chain (protein) that you created?
18. What happens when an amino acid is added to the peptide chain?
19. What is the final product of translation (be specific)? How long can these macromolecules be?
20. Write the complementary mRNA strand:

C A T G G G C T C C A

21. Compare and contrast DNA replication and protein synthesis.

Now, go back to the pbwiki site and click on the Learn Genetics site. Go to “DNA to Protein”, and then to “Transcribe and Translate A Gene”.

22. Look at the diagram on the bottom right. What happens during transcription? Fill in the blanks below:
 _____ is copied from _____.
23. Looking at the same diagram, what happens during translation? Fill in the blanks below:
 The _____ reads the mRNA and translates it into a chain of
 _____ acids called a _____.
24. What three letters of the mRNA are for the “start” codon, methionine?

25. How many different possibilities are there for a stop codon, and what are those letters?

Next, on the Learn Genetics site on “DNA to Protein”, go to “What Makes a Firefly Glow?”

26. Name two reasons why fireflies glow.

27. What is the enzyme called that finds the DNA encoding the *Luc* gene?

28. A copy of the *Luc* gene is transcribed to mRNA in the nucleus. Where does it go from there?

29. How does the Luciferase enzyme produce light?

Lastly, click on the sidebar of the pbwiki site for NOVA online, Explore a Stretch of Code. Click on the terms to the left and read the description below.

30. What does it mean if a gene is turned on or off?

31. What is an intron?

32. What gets spliced together to form the final mRNA?

33. If you took any two humans, what percentage of letters in DNA would be identical?

34. Now that the human genome has been decoded, what do geneticists want to focus on?