

Transcription And Translation Practice Worksheet Answer Key PDF

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Part 1: Building a Foundation

Which of the following is the correct base pairing in DNA?

undefined. A) Adenine - Cytosine

undefined. B) Guanine - Thymine

undefined. C) Adenine - Thymine ✓

undefined. D) Cytosine - Thymine

The correct base pairing in DNA is Adenine - Thymine.

Select all the components of a nucleotide.

undefined. A) Sugar ✓

undefined. B) Phosphate group ✓

undefined. C) Nitrogenous base ✓

undefined. D) Amino acid

A nucleotide consists of a sugar, a phosphate group, and a nitrogenous base.

Explain the role of RNA polymerase in transcription.

RNA polymerase synthesizes RNA from a DNA template during transcription.

List the three main types of RNA and their primary functions.

1. What is the function of mRNA?

mRNA carries the genetic information from DNA to the ribosome.

2. What is the function of tRNA?

tRNA brings amino acids to the ribosome during translation.

3. What is the function of rRNA?

rRNA is a component of ribosomes and helps facilitate protein synthesis.

The three main types of RNA are mRNA (messenger RNA), tRNA (transfer RNA), and rRNA (ribosomal RNA).

Where does transcription occur in eukaryotic cells?

undefined. A) Cytoplasm

undefined. B) Nucleus ✓

undefined. C) Ribosome

undefined. D) Mitochondria

Transcription occurs in the nucleus of eukaryotic cells.

Part 2: Comprehension and Application

Which of the following statements about the genetic code are true?

undefined. A) It is universal across organisms. ✓

undefined. B) Each codon specifies multiple amino acids.

undefined. C) It is redundant, meaning some amino acids are coded by more than one codon. ✓

undefined. D) It is unambiguous, meaning each codon specifies only one amino acid. ✓

The genetic code is universal, redundant, and unambiguous.

Describe the significance of the start codon in translation.

The start codon signals the beginning of translation and determines the reading frame.

If a DNA sequence is 5'-ATGCG T-3', what would be the corresponding mRNA sequence?

undefined. A) 5'-UACGCA-3'

undefined. B) 5'- TACGCA-3'

undefined. C) 5'-UAGCGU-3'

undefined. D) 5'-AUGCGU-3' ✓

The corresponding mRNA sequence would be 5'-AUGCGU-3'.

During translation, what roles do ribosomes play?

undefined. **A) Binding to mRNA ✓**

undefined. **B) Facilitating peptide bond formation ✓**

undefined. C) Transcribing DNA into RNA

undefined. **D) Ensuring correct tRNA pairing with mRNA codons ✓**

Ribosomes bind to mRNA, facilitate peptide bond formation, and ensure correct tRNA pairing.

Part 3: Analysis, Evaluation, and Creation

Which process involves the removal of introns from pre-mRNA?

undefined. A) Translation

undefined. **B) Splicing ✓**

undefined. C) Replication

undefined. D) Transcription

The process that involves the removal of introns from pre-mRNA is splicing.

Analyze the following statements and select those that describe transcriptional regulation.

undefined. **A) Involves transcription factors binding to DNA ✓**

undefined. B) Occurs at the ribosome

undefined. **C) Can be influenced by environmental signals ✓**

undefined. D) Directly modifies amino acid sequences

Transcriptional regulation involves transcription factors, environmental signals, and does not modify amino acid sequences directly.

Explain how redundancy in the genetic code can be beneficial to an organism.

Redundancy in the genetic code can provide a buffer against mutations, allowing for some changes without affecting protein function.

Which of the following scenarios best illustrates the concept of gene expression regulation?

undefined. A) A gene is transcribed at the same rate in all cells.

undefined. B) A gene is transcribed only in response to a specific hormone. ✓

undefined. C) A gene is always turned off in all cells.

undefined. D) A gene is translated at the same rate regardless of mRNA abundance.

The scenario that best illustrates gene expression regulation is when a gene is transcribed only in response to a specific hormone.

Evaluate the potential effects of a nonfunctional RNA polymerase on a cell.

undefined. A) Inability to transcribe DNA into RNA ✓

undefined. B) Normal protein synthesis

undefined. C) Accumulation of unprocessed pre-mRNA ✓

undefined. D) Impaired gene expression ✓

A nonfunctional RNA polymerase would lead to an inability to transcribe DNA into RNA, accumulation of unprocessed pre-mRNA, and impaired gene expression.

Design an experiment to test the effect of a specific transcription factor on gene expression in a cell culture. Outline the key steps and controls you would use.

An experiment could involve manipulating the levels of a transcription factor in cell culture and measuring the resulting changes in gene expression.