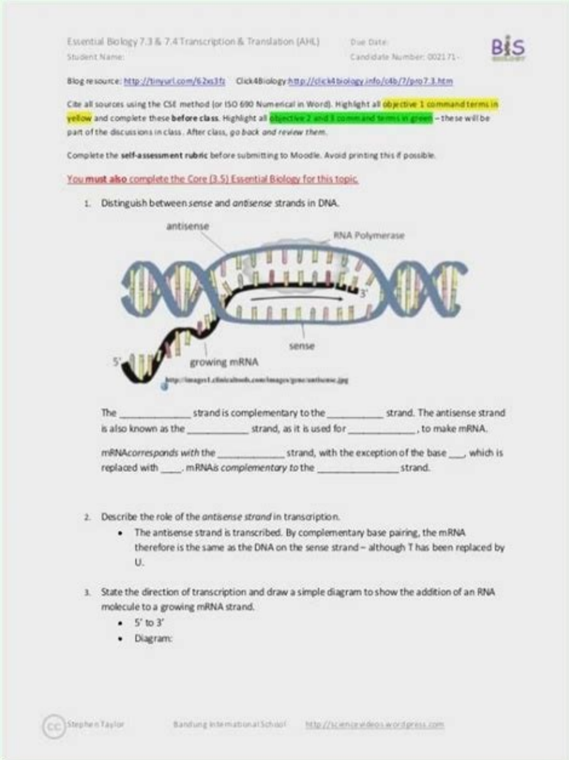
Transcription vs translation worksheet



Essential Biology 7.3 & 7.4 Transcription & Translation (AHL) Due Date:
Student Name: Candidate Number: 002171-

Blog resource: http://tinyurl.com/62xs3fz Click4Biology http://click4biology.info/c4b/7/pro7.3.htm

Cite all sources using the CSE method (or ISO 690 Numerical in Word). Highlight all objective 1 command terms in yellow and complete these **before class**. Highlight all objective 2 and 3 command terms in green – these will be part of the discussions in class. After class, *go back and review them.*

Complete the **self-assessment rubric** before submitting to Moodle. Avoid printing this if possible.

You **must also** complete the Core (3.5) Essential Biology for this topic.

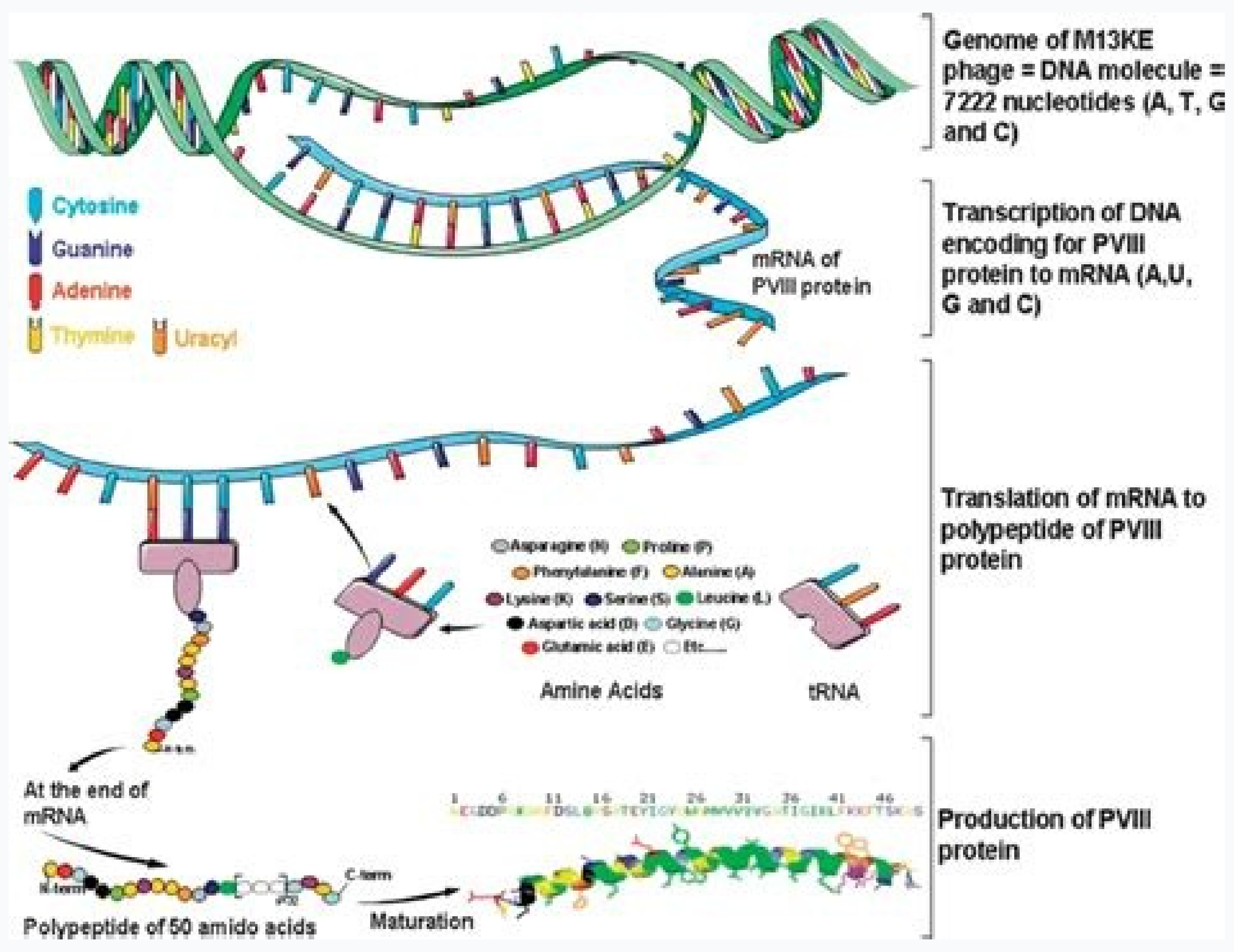
1. Distinguish between *sense* and *antisense* strands in DNA.

The __________ strand is complementary to the __________ strand. The antisense strand is also known as the __________ strand, as it is used for __________, to make mRNA.

mRNA*corresponds with the* __________ strand, with the exception of the base ___, which is replaced with ____. mRNA*is complementary to* the __________ strand.

2. Describe the role of the *antisense strand* in transcription.
   - The antisense strand is transcribed. By complementary base pairing, the mRNA therefore is the same as the DNA on the sense strand – although T has been replaced by U.
3. State the direction of transcription and draw a simple diagram to show the addition of an RNA molecule to a growing mRNA strand.
   - 5' to 3'
   - Diagram:

Stephen Taylor Bandung International School http://sciencevideos.wordpress.com



Universal Genetic Code Chart

Messenger RNA Codons and Amino Acids for Which They Code

First base	Second base: U	Second base: C	Second base: A	Second base: G	Third base
U	UUU, UUC — PHE UUA, UUG — LEU	UCU, UCC, UCA, UCG — SER	UAU, UAC — TYR UAA, UAG — STOP	UGU, UGC — CYS UGA — STOP UGG — TRP	U C A G
C	CUU, CUC, CUA, CUG — LEU	CCU, CCC, CCA, CCG — PRO	CAU, CAC — HIS CAA, CAG — GLN	CGU, CGC, CGA, CGG — ARG	U C A G
A	AUU, AUC, AUA — ILE AUG — MET or START	ACU, ACC, ACA, ACG — THR	AAU, AAC — ASN AAA, AAG — LYS	AGU, AGC — SER AGA, AGG — ARG	U C A G
G	GUU, GUC, GUA, GUG — VAL	GCU, GCC, GCA, GCG — ALA	GAU, GAC — ASP GAA, GAG — GLU	GGU, GGC, GGA, GGG — GLY	U C A G

Name ____ D__________ P___

Distance and Displacement

Directions: Read and highlight the information below answering each of the questions.

Distance and displacement are two quantities that may seem to mean the same thing yet have distinctly different definitions and meanings.

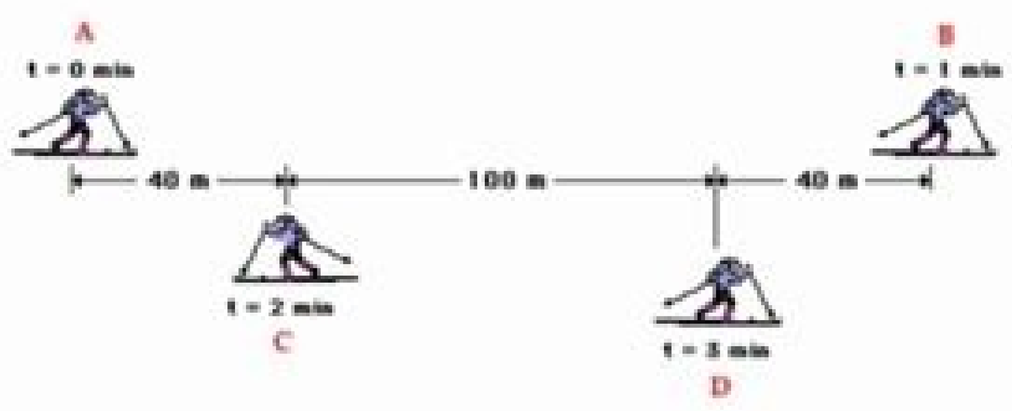
- **Distance** is a scalar quantity that refers to "how much ground an object has covered" during its motion.
- **Displacement** is a vector quantity that refers to "how far out of place an object is"; it is the object's overall change in position.

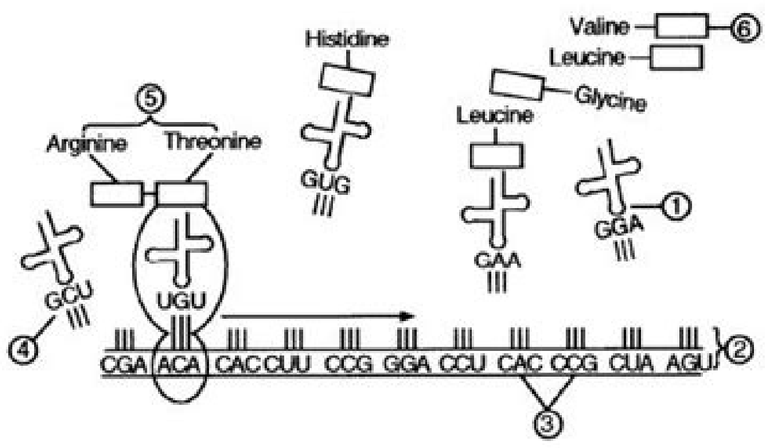
Let's test your understanding of this distinction, consider the motion in the diagram below. A physics teacher walks 4 meters East, 2 meters South, 4 meters West, and finally 2 meters North.

Even though the physics teacher has walked a total distance of 12 meters, her displacement is 0 meters. During the course of her motion, she has "covered 12 meters of ground" (distance = 12 m). Yet when she is finished walking, she is not "out of place" - i.e., there is no displacement for her motion (displacement = 0 m). Displacement, being a vector quantity, must give attention to direction. The 4 meters east *cancels* the 4 meters west; and the 2 meters south *cancels* the 2 meters north. Vector quantities such as displacement are *direction aware*. Scalar quantities such as distance are ignorant of direction. In determining the overall distance traveled by the physics teachers, the various directions of motion can be ignored.

Now consider another example. The diagram below shows the position of a cross-country skier at various times. At each of the indicated times, the skier turns around and reverses the direction of travel. In other words, the skier moves from A to B to C to D.

1. Use the diagram to determine the resulting displacement and the distance traveled by the skier during these three minutes. Show your work and write your final answer below on the diagram.





Transcription vs. translation worksheet answer key. How does transcription and translation work. What is the main difference between transcription and translation. Transcription translation review. Is transcription and translation the same thing.

In this product you will have access to sort cards representing the following concepts:gene, DNA, RNA, DNA Replication, Base Pairs, DNA Polymerase, RNA Polymerase, Central Dogma, mRNA, rRNA, tRNA, Transcription, Translation, Anticodon, Mutation, Codon, Intron, Exon, Chromosome, Chromatin, Nitrogenous Base, Epigenetics, Nucleotide, and SplicingFor each concept there are 3 associated sort cards:An illustration, definition, and a hint (with more specific details about the concept).Sort Cards are exPage 2Review DNA vocabulary using a Bingo game! Includes printable materials and teaching instructions. Vocabulary terms are related to basic DNA structure, DNA replication, and protein synthesis:adenine, amino acids, anticodon, backbone, codon, cytosine, deoxyribose, DNA polymerase, DNA replication, double helix, exon, frameshift mutation, genome, guanine, helicase, human genome project, intron, mRNA, nitrogenous bases, nucleotide, point mutation, protein synthesis, purines, pyrimidines, ribose, RNAPage 3This is a 200 slide, 20 question review game with answers that concludes Part 5 of my DNA and Genetics Unit that I offer on TpT. Also included is a template sheet to record answers and DNA and Genetics Unit preview. Please read the information below about this unit Answers in this review game. Gregor Mendel, Heredity, Purebreds, Mendels F1 Results, Phenotype, Genotype, DNA, RNA, Proteins, Genes, Dominant Allele, Recessive Allele, Punnett Square, Probability, Homozygous, Heterozygous, Reproduc Differential gene expressionBelieve it or not, all of the cells within a multicellular organism (excluding red blood cells and gametes) contain exactly the same DNA. In which case, why is a heart composed of cardiomyocytes? Or the liver hepatocytes? How can cells containing the same DNA be so physiologically different?The answer lies in differential gene expression – the combination of genes that are turned on (expressed) or turned off (repressed) in particular cells – this is what makes each cell unique.Gene expression is regulated by both internal and external factors – a perfect interplay between the genome and the environment.1The journey from gene to protein is complex and tightly controlled within each cell. It consists of two major steps: transcription and translation. These steps differ in prokaryotic and eukaryotic cells. Here, we will focus on eukaryotic cells.DNA vs RNATo understand fully the different processes involved in gene expression, it is key that you can know the differences between DNA and RNA.Need to recap? What is transcription?Transcription is the synthesis of any type of complimentary RNA from a DNA template: note, several types of RNA can be encoded by a DNA strand. Here, we focus specifically on transcription that leads to pre-mRNA, mRNA and eventually proteins. In the process of gene expression, transcription involves the production of messenger RNA (mRNA) from a DNA template. It takes place in the nucleus of a cell and is catalyzed by the enzyme RNA polymerase II.All eukaryotes have three different types of RNA polymerase:RNA polymerase I transcribes rRNA genesRNA polymerase II transcribes mRNA, miRNA, snRNA, and snRNA genesRNA polymerase III transcribes an array of RNA genes, including but not limited to tRNA and 5S rRNA genes.2The steps of transcriptionThe process of transcription entails several steps: The first step of transcription to form mRNA involves RNA polymerase II binding to a promoter region just upstream of the gene that is to be transcribed. Promoters are often classified as strong or weak based on their effects on transcription rates and thus gene expression. Transcription factors are proteins that help to position RNA polymerase II and assist in the breaking of the hydrogen bonds in the DNA helix. 3RNA polymerase II breaks the hydrogen bonds connecting two strands of DNA in the double helix. The enzyme then uses the single DNA strand as a template to build an RNA strand in the 5' to 3' direction, adding each complementary nucleotide to the 3' end of the strand. In RNA, the nucleotide thymine is replaced by the nucleotide uracil.3 What do we mean by 5' and 3'?This refers to the carbon numbers in DNA and RNA's backbone. The 5' carbon ribose ring frequently has a phosphate group attached, and the 3' carbon end has a hydroxyl (-OH) group attached. The asymmetry gives the DNA and RNA strands a "direction". The DNA strand moves through the RNA polymerase II enzyme. In the region behind where the nucleotides are being added to form the pre-mRNA strand, the DNA helix re-forms. This means that the pre-mRNA produced is eventually released from the DNA template a single strand. 3. TerminationTermination marks the end of RNA polymerase II adding nucleotides to the pre-mRNA strand and the release of the pre-mRNA. Despite extensive research, there is still ambiguity surrounding the precise physiological cause of termination - several mechanisms are outlined in this review paper.From pre-mRNA to mRNAEukaryotic pre-mRNAs must go through several additional processing steps before translation can occur. Firstly, they have a 5' cap added and a 3' poly-A-tail added to protect against transcript degradation.4 The mRNA that is created in the process of transcription comprises a sequence of nucleotides. A set of three-letter combinations of nucleotides is called a codon. Codons can either encode a specific amino acid, a start signal for translation, or a stop signal to mark the end of translation. A tRNA molecule consists of anticodons. Anticodons are a sequence of three nucleotides that are complimentary to specific codons in mRNA. The process of translation occurs in three main stages:1. InitiationThe small unit of the ribosome binds to the start of the mRNA sequence, at the location of the start codon. In all mRNA molecules, the start codon has a sequence of AUG, which codes for the amino acid methionine. The tRNA carrying the anticodon recognizes this sequence and caries the amino acid methionine to the mRNA. Then, the large subunit of the ribosome binds to form the initiation complex. 2. Elongation In this stage of translation, the ribosome continues down the mRNA strand translating each codon in turn. The corresponding amino acids are added by tRNA in a growing chain, linked together by peptide bonds. This continues until the entire sequence of codons is read, and the ribosome reaches a "stop" codon. 3. Termination Stop codons include UAA, UAG, UGA. There are no tRNA's that can read and recognize these codons to recruit an amino acid, and therefore the ribosome recognizes that at this point the translation process is finished. The protein is released, and the components of the translation complex disperse. Summary of comparisons chartNucleus.Cytoplasm.To use genes as a template to create several forms of RNA (such as mRNA as discussed in this article).To synthesize proteins from an RNA template.RNA polymerase protein binds to the promoter region in the DNA and forms the transcription initiation complex.Takes place when ribosome recognizes AUG start codon and binds the mRNA.RNA polymerase travels in the 5' to 3' direction and builds an RNA strand.tRNA with complimentary anticodons to the codons within mRNA binds to mRNA and builds a chain of amino acids joined by peptide bonds.The RNA transcript is released. RNA polymerase detaches from DNA and the DNA rewinds back into a double helix.Ribosome encounters stop codon. No tRNAs are able to recognize stop codons and the ribosome thus dissembles tRNA and releases the polypeptide that has been built.References: Senior Science Writer

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