

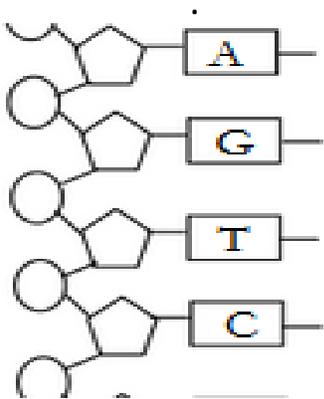


The Central Dogma of Molecular Genetics

Table #1

Vocab Term	Definition
RNA	Define
ID missing Word	Base pairing rules of A=T and C≡G are used for this process... DNA duplicates, or makes a copy of, itself.
ID missing Word	Synthesis of an RNA molecule from DNA template. Base pairing rules of A=U and C≡G are used.
DNA	Define
ID missing Word	Synthesis of proteins by using instructions in RNA. Codon to Anti-codon pairing rules (triplets) are used.

ALL About DNA!

DNA	Table #2	RNA
http://crescentok.com/staff/jaskew/isr/biology/comic/dna1.htm	VersusComparing Nucleic Acids.... https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104066/video.mp4	http://crescentok.com/staff/jaskew/isr/biology/comic/rna1.htm
Overall Shape / Structure: Type HERE		Overall Shape / Structure: Type HERE
Nitrogenous Bases Present: Type HERE		Nitrogenous Bases Present: Type HERE
Commentary Base Pairing Rules Type HERE		Commentary Base Pairing Rules Type HERE
Parts of Backbone: Circle = Type HERE Pentagon = Type HERE		Parts of Backbone: Circle = Pentagon =
Location in cell: Type HERE		Location in cell: Type HERE
Name the process that is used to make more DNA: Type HERE		Name the process that is used to make more RNA: Type HERE

Name: _____

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ALL About DNA!

	Table #2 Continued...	
Describe Primary Functions for DNA: https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/107575/video.mp4 Type HERE		Describe Primary Functions for the three kinds of RNA: https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104067/video.mp4 Type HERE
Word Bank of Choices: deoxyribose sugar, adenine, double helix, stores genetic information, nucleus, transcription, thymine, uracil, cytoplasm, guanine, ribose sugar, single strand, cytosine, double, phosphate, instructions for building proteins, replication		

Question A

How is genetic code preserved by DNA?

Question B

Scientists analyze the genome of a lab mouse and discover 35% of it genome is made of adenine. What are the percentages of the other nucleotide bases? Please write the answers as whole number percentages.

% guanine

% thymine

% cytosine

For help, watch the short tutorial below:

<https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104063/video.mp4>

Question C

For a DNA molecule with 123,456 guanine bases, how many total bases should be present for each bases that is listed.

adenines

cytosines

uracils

Name: _____

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DNA Replication

<https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104064/video.mp4>

Question D

Number the following statements in the order that they occur for replication.

#1 = first step and #7 = final step

- ___ **Type HERE** ___ DNA polymerase binds to one of the single strands.
- ___ **Type HERE** ___ Two new molecules of DNA are created.
- ___ **Type HERE** ___ DNA polymerase attaches free-floating nucleotides to exposed bases.
- ___ **Type HERE** ___ A cell enters the S phase of mitosis.
- ___ **Type HERE** ___ DNA polymerase uses the single strand of DNA as a template to build the
complementary strand.

- ___ **Type HERE** ___ Helicase unwinds the DNA.
- ___ **Type HERE** ___ The DNA of the daughter strands winds with together with its parent strand

DNA => RNA

• Transcription

<https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104068/video.mp4>

Question E

Number the following statements in the order that they occur for transcription.

#1 = first step and #6 = final step

- ___ **Type HERE** ___ RNA polymerase binds to one of the single strands.
- ___ **Type HERE** ___ The ribosome clamps onto the mRNA, forming the mRNA-ribosome complex.
- ___ **Type HERE** ___ RNA polymerase uses the DNA as a template to build the mRNA molecule.
- ___ **Type HERE** ___ Helicase unwinds the DNA.
- ___ **Type HERE** ___ The mRNA molecule leaves the nucleus.
- ___ **Type HERE** ___ The mRNA detaches from the DNA and the DNA winds back up.

RNA => Protein

• Translation

<https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104069/video.mp4>

Question F

Number the following statements in the order that they occur for translation.

#1 = first step and #5 = final step

- ___ **Type HERE** ___ The tRNA picks up its corresponding amino acid as directed by the mRNA strand.
- ___ **Type HERE** ___ The mRNA-ribosomal complex forms in the cytoplasm.
- ___ **Type HERE** ___ The stop codon is reached. The protein is complete!
- ___ **Type HERE** ___ The mRNA-ribosomal complex separates.
- ___ **Type HERE** ___ The tRNA molecules deliver their amino acids to the mRNA-ribosomal complex and occupy the spaces inside of it, two at a time.

Table #3

Which part of central dogma is shown by the picture below.

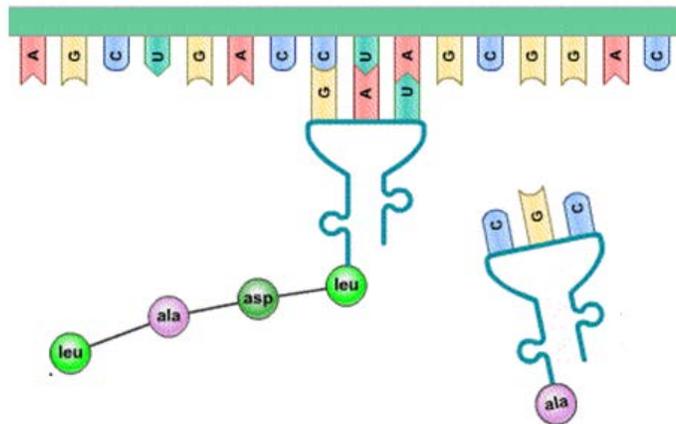
Type Answer HERE

What is wrong with this illustration?

Hint: Several structures are missing...

1.) **Type Answer HERE**

2.) **Type Answer HERE**



<https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104070/video.mp4>

Name: _____

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Case of Mistaken Identities...

Three types of RNA and their roles

<https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104067/video.mp4>

Table #4: By changing as few words as possible, make each false claim into a true statement!		
False Claim	Select one: replication, transcription or translation	Corrected Statement
The rRNA helps the tRNA make a copy of the DNA gene.		Type Corrected Statement HERE
The mRNA carries the code of rRNA to the nucleus.		Type Corrected Statement HERE
The mRNA bonds with the rRNA, which delivers amino acids.		Type Corrected Statement HERE
mRNA leaves the cytoplasm through the cell membrane.		Type Corrected Statement HERE
Protein transcription takes place in the nucleus of a cell.		Type Corrected Statement HERE

Name: _____

Table #5

Use the table (below) to determine which codon matches up with which amino acid

Amino acid		Second Base											
		U			C			A			G		
		code	amino acid	code	amino acid	code	amino acid	code	amino acid	code	amino acid	code	amino acid
U	UUU	phe	UCU	ser	UAU	tyr	UGU	cys	U				
	UUC		UCC		UAC		UGC		C				
	UUA	leu	UCA		UAA	STOP	UGA	STOP	A				
	UUG		UCG		UAG	STOP	UGG	trp	G				
C	CUU	leu	CCU	pro	CAU	his	CGU	arg	U				
	CUC		CCC		CAC		CGC			C			
	CUA		CCA		CAA	gln	CGA			A			
	CUG		CCG		CAG		CGG			G			
A	AUU	ile	ACU	thr	AAU	asn	AGU	ser	U				
	AUC		ACC		AAC		AGC		C				
	AUA		ACA		AAA	lys	AGA	arg	A				
	AUG		ACG		AAG		AGG		G				
G	GUU	val	GCU	ala	GAU	asp	GGU	gly	U				
	GUC		GCC		GAC		GGC			C			
	GUA		GCA		GAA	glu	GGA			A			
	GUG		GCG		GAG		GGG			G			

Need a refresher on how to use the chart shown above? See:

<https://s3.amazonaws.com/ck12bg.ck12.org/curriculum/104071/video.mp4>

mRNA strand:

AUGUCAGUGAAACAAGCCUGA

- Codon #1 = : Type Amino Acid HERE
- Codon #2 = : Type Amino Acid HERE
- Codon #3 = : Type Amino Acid HERE
- Codon #4 = : Type Amino Acid HERE
- Codon #5 = : Type Amino Acid HERE
- Codon #6 = : Type Amino Acid HERE
- Codon #7 = : Type Amino Acid HERE

Name: _____

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Test your knowledge by using thatquiz!

U1 Vocab Terms	Definitions
DNA	Nucleic acid with deoxyribose that stores genetic info.
RNA	Nucleic acid with ribose that directs building of proteins.
Gene	DNA segment directs development of inherited traits.
Transcription	Synthesis of an RNA molecule from DNA template.
Translation	Synthesis of proteins by using instructions in RNA.
Enzyme	Protein acts a catalyst for chemical reactions.
ATP	molecule that delivers usable chemical energy
Fibroin	Structural protein used for building spider webs.
Keratin	Structural protein found in horns and hair.
Serotonin	Regulatory protein that functions as a hormone.
Backbone of a DNA Strand	Alternating between a sugar and a phosphate.
Nitrogenous Base	Purine or pyrimidine with carbon, nitrogen, oxygen, hydrogen
Nucleotide	Made up of: a phosphate, a sugar and nitrogenous base.
Purines	Adenine and Guanine.
Pyrimidines	Thymine, Uracil and Cytosine.
Adenine's Complementary Base	Thymine or Uracil.
Guanine's Complementary Base	Cytosine.

Name: _____

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Hydrogen Bonds	Form between nitrogenous bases in complementary DNA strands.
Genetic Differences	Inherent with number of bases and their sequence.
Erwin Chargaff	Shared occurrence of certain nitrogenous bases.
DNA	Contains information an organism needs to live & reproduce.
Sugar in Nucleic Acids	Monosaccharides- either ribose or deoxyribose
messenger RNA (mRNA)	Single-stranded molecule made by transcription with codons.
transfer RNA (tRNA)	Cross-shaped molecule that identifies & collects amino acids
ribosomal RNA (rRNA)	Molecule made of two subunits (large and small).
Replication	Process in which DNA duplicates, or makes a copy of, itself.
Codon	Three base sequence in mRNA that codes for one amino acid.
Anti-codon	Triplet code on a tRNA molecule.
Polypeptide	A chain of hundreds or thousands of amino acids.
Genetic Code	One codon determines one amino acid to build a protein

Test your knowledge by using thatquiz!

U2 Vocab Terms	Definitions
Gene Pool	All the genes for all members of a population.
Adaptation	Traits influencing the survival & reproduction of organisms.
Migration	Seasonal movement of animals from one place to another.
Evolution	Change of living things over time.

Name: _____

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Population	One species living in shared area that reproduce together.
Structural Adaptations	Size, shape, color of organism & its parts. Ex. body mimicry
Allele Frequencies	Ratio of all gene versions for a given trait in a gene pool.
Variation	Genetic diversity of a population.
Mutations	Spontaneous change in DNA structure of sequence.
Physiological Adaptations	Ability to make venom, regulate body temp & conserve water.
Behavioral Adaptations	Social interaction, feeding habits & reproductive strategy.
Natural Selection	Process of survival by individuals with favorable traits.
Gene Flow	Allele changes with organisms moving into/out of population
Genetic Recombination	Movement of genes due to crossing over during meiosis (sex).
Genetic Drift	Random change in allele frequency usually reducing variation
Directional Natural Selection	Survival of individuals with one extreme trait favored.
Disruptive Natural Selection	Survival of individuals with one of 2 extreme traits favored
Stabilizing Natural Selection	Survival of individuals with average form of trait favored.
Comparative Embryology	Developmental similarities suggesting genetic heritage.
Comparative Anatomy	Structural similarities suggesting shared ancestry.
Vestigial Structures	Features with no apparent function now hint common ancestor
Homologous Structures	Similar features that appear in different species.
DNA Comparisons	Similar genetic sequences suggest common ancestor.

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Amino Acids	Organic Molecules that serve as building blocks to proteins.
Molecular Clock	Genetic differences increase as more time passes.
Phylogenetic Tree	Diagram displays evolutionary relationships for organisms.
Anaerobic	Organisms that do not require oxygen to survive.
Cyanobacteria	Left behind solid structures called stromatolites.
Fossils	Remains of ancient living things.
Prokaryote	Single-celled organism that lacks membrane bound organelles.
Eukaryotes	Organisms with cells that have membrane-bound organelles.
Fossil Record	Shows life changes over time & offers relative age estimate
Radiometric Dating	Use of isotopes to determine absolute age of geologic sample
Hardy-Weinberg Principle	Mathematical model for alleles remaining constant over time
Carolus Linnaeus	Modern classification system of binomial nomenclature.
Specific Epithet	Descriptor portion of an organism's two-part name or species
Taxonomy	Study of classifying organisms by similarities & differences
Phylogeny	Study of evolutionary relationships by using molecular data.
Archaea	Live in extreme habitats due to unique membrane structures
Bacteria	Single-celled prokaryotes that may cause disease
Eukarya	Domain containing all organisms with eukaryotic cells.