

SBI4U MOLECULAR GENETICS Unit Checklist

Name: _____



Mastery Checks may be attempted more than once and are not considered complete until $\geq 70\%$ is achieved.

Topic	Objective(s)	Key Concepts	Approx. # Hours	Video Lessons & Notes	Activities Check answers & Uploaded to OneNote	Mastery Checks Thatquiz.org Min 70%
1	Ethics in Genetics: <i>Explain social, ethical, and legal implications of genetics & biotechnology</i>	- Stem cells - GMOs - DNA fingerprinting - Gene patenting - Cloning	1 hr online			
2	DNA Structure & History: Describe historical scientific contributions that have advanced molecular genetics Explain the basic structure and components of DNA	- base pairing, A,C,G,T, hydrogen bonds, - Chargaff's rule - purines & pyrimidines - sugar-phosphate backbone, phosphodiester bonds, - Anti-parallel, 3', 5' ends	1.5 hrs online	<input type="checkbox"/> 1 video	<input type="checkbox"/>	<input type="checkbox"/> Got It!
3	DNA Replication: <i>Explain how DNA replication occurs in cells and why it is important</i> <i>Describe the different repair mechanisms that can correct mistakes in DNA sequencing</i>	- Leading Strand, Lagging strand, Okazaki Fragments, Replication fork/bubble - Enzymes: DNA Helicase, DNA Polymerases, Gyrase, - 3', 5', RNA Primers, ESSBP's,	2.5 hrs online	<input type="checkbox"/> 1 video	<input type="checkbox"/>	
4	Transcription: <i>Explain the process of transcription and its importance to living organisms</i> <i>Compare the structures and functions of RNA and DNA, and explain their roles in the process of protein synthesis</i>	-Central Dogma: DNA \rightarrow RNA \rightarrow Protein - DNA \rightarrow mRNA, 5' to 3' -Genomes: Genes & Non-Coding DNA, Introns, Exons - Nucleus, Promoters (TATA box), Template strand, RNA Polymerase, 5' cap, Poly-A tail, mRNA, Terminators, Processing	2.5 hrs online	<input type="checkbox"/> 1 video	<input type="checkbox"/>	
5	Translation: <i>Explain the steps of translation as involved in the process of protein synthesis</i>	- Cytoplasm - tRNA, rRNA, - Ribosome A-P-E sites, codons, start codon, amino acids, stop codon - Amino Acid interactions & shape - Wobble hypothesis	2.5 hrs online	<input type="checkbox"/> 1 video	<input type="checkbox"/>	<input type="checkbox"/> Got It!
6	Mutations: <i>Explain how mutations can occur by changing the genetic material in cells and the effects of these changes</i>	-Causes: Physical/Chemical, Spontaneous errors, Germ/Somatic -Types: Point (Substitution & Insert/Delete), Inversion, Duplication, Translocation, Transposon -Effects: Silent, Missense/nonsense, Wobble Effect, Role of Introns, Non-Coding Sections -Significance: Loss of function, Enhanced Function, Advantage	2.5 hrs online	<input type="checkbox"/> 1 video	<input type="checkbox"/>	<input type="checkbox"/> Got It!
7	Control Mechanisms: <i>Explain how genetic expression is controlled in prokaryotes and eukaryotes by regulatory proteins</i>	- Lac Operon & Trp Operon - Regulators	2.5 hrs online	<input type="checkbox"/> <input type="checkbox"/> 2 videos	<input type="checkbox"/>	<input type="checkbox"/> Got It!
8	Biotechnology <i>Describe examples of genetic modification, and explain how it is applied in industry and agriculture</i>	- PCR - RFLP - CRISPR	1.5 hrs online	<input type="checkbox"/> 1 video		



Quizzes & Tests	DATE
Topics 1-3 Quiz	Friday May 28 th
Unit Test	Friday June 4 th

Molecular Genetics Terms to Know

- 3'
- 5'
- Adenine
- Aminoacyl-tRNA
- Anticodon
- Antiparallel
- BRCA Gene
- Central Dogma
- Chargaff's Rule
- Codon
- Complimentary Base-Pairing
- Cytosine
- Daughter Strand
- Deletion
- Deoxyribose Sugar
- DNA Fingerprinting
- DNA Gyrase
- DNA Helicase
- DNA Ligase
- DNA Polymerase I
- DNA Polymerase III
- DNA Template
- Double Helix
- Double Helix
- Downstream
- Elongation
-
- Exonuclease A site
- Expression
- Frame shift
- Franklin
- Gene Patenting
- Gene Regulation
- Genes
- Genetically Modified Organisms
- Glycosyl Bond
- Guanine
- Housekeeping genes
- Induced mutation
- Induction
- Initiation
- Insertion
- Inversion
- lac Operon
- Lagging Strand
- Large Subunit
- Leading Strand
- Missense mutation
- mRNA
- Mutagenic agent
- Mutation
- Nitrogenous Base
- Nonsense mutation
- Nucleotide
- Okazaki Fragments
- Operator
- Operon
- Origin of Replication
- P site
- Parental Strand
- Peptide Bond
- Phosphate Group
- Phosphodiester Bond
- Pluripotent
- Point Mutation
- Polypeptide
- Posttranscriptional
- Posttranslational
- Primase
- Promoter
- Promoter Region
- Purine
- Pyrimidine
- Reading Frame
- Release Factor
- Replication
- Replication Bubble
- Replication Fork
- Repression
- Reproductive Cloning
- Ribosome
- RNA Polymerase II
- RNA Primer
- Semiconservative
- Silent mutation
- Single-Stranded Binding Proteins
- Small Subunit
- Spontaneous
- Stem Cell
- Substitution
- TATA Box
- Termination
- Termination Sequence
- Therapeutic Cloning
- Thymine
- Totipotent
- Transcription
- Transcription Factor
- Transcription factors
- Transcription Unit
- Transcriptional
- Translation
- Translational
- Translocation
- Transposable
- tRNA
- trp Operon
- Upstream
- Watson & Crick