SBI4U MOLECULAR GENETICS Unit Checklist

Name: _____

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Mastery Checks may be attempted more than once and are not considered complete until **≥ 70%** is achieved.
Notes and activities will be checked for completion & corrections.

Topic	Objective(s)	Key Concepts	Approx. # classes	Notes	Mastery Check Inc. *# of attempts*
1	**Ethics in Genetics:** *Explain social, ethical, and legal implications of genetics & biotechnology*	*- Stem cells* *- GMOs* *- DNA fingerprinting* *- Gene patenting* *- Cloning*	2		
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*	2		❑❑❑❑
3	**DNA Replication:** *Explain how DNA replication occurs in cells and why it is important* *Describe the different repair mechanisms that can correct mistakes in DNA sequencing*	- Leading Strand, Lagging strand, Okazaki Fragments, Replication fork/bubble - Enzymes: DNA Helicase, DNA Polymerases, Gyrase, - 3', 5', RNA Primers, SSBP's,	2		
4	**Transcription:** *Explain the process of transcription and its importance to living organisms* *Compare the structures and functions of RNA and DNA, and explain their roles in the process of protein synthesis*	*-Central Dogma: DNA →RNA →Protein* *- DNA → 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	**Translation:** *Explain the steps of translation as involved in the process of protein synthesis*	*- Cytoplasm* *- tRNA, rRNA,* *- Ribosome A-P-E sites, codons, start codon, amino acids, stop codon* *- Amino Acid interactions & shape* *- Wobble hypothesis*	2		
6	**Mutations:** *Explain how mutations can occur by changing the genetic material in cells and the effects of these changes*	*-**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		❑❑❑❑
7	**Control Mechanisms:** *Explain how genetic expression is controlled in prokaryotes and eukaryotes by regulatory proteins*	*- Lac Operon & Trp Operon* *- Regulators*	2		❑❑❑❑
8	**Biotechnology** *Describe examples of genetic modification, and explain how it is applied in industry and agriculture*	*- PCR* *- RFLP* *- CRISPR*	2		

Assessments

All **assessments & labs** must be completed in class and are
due at the end of the in-class work period(s) unless otherwise indicated.

Assignments	DUE DATE	Quizzes & Tests	DATE
Ethics Mini-Summary		**Topics 2-5 Quiz**	Friday Nov. 29th
Central Dogma Project		**Unit Test**	Monday Dec. 9th
Mutation Mini-Project			

Molecular Genetics Terms to Know

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- 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

Mastery Checks:

- Mastery Checks may be attempted more than once and are not considered complete until **≥ 70%** is achieved.
- **≥ 70%** or a minimum of **two** attempts on **all** mastery checks is required **before** a unit test
- Must be written during class or after school during supervised extra help times.
- Must be attempted as you progress through the topics – **DO NOT** let them accumulate until the end of the unit. You may run out of

Edsby Gradebook Symbols

- ✓ Not yet **≥ 70%** but 2 attempts completed
- ! Overdue / Late
- ✗ Not Done
- ◐ Incomplete (one attempt **< 70%**)