Molecular Genetics

Section 4 Gene Regulation and Mutation

⟨Main Idea⟩	⟨Details⟩

Scan *the illustrations and tables in Section 4. Predict the effect of mutations on organisms.*

_____

_____

_____

Review Vocabulary

Use your book or dictionary to define prokaryote.

prokaryote

_____

_____

New Vocabulary

Use your book or dictionary to define the following terms.

gene regulation

_____

_____

operon

_____

_____

mutation

_____

mutagen

_____

Academic Vocabulary

Define substitution *and write a sentence to show its scientific meaning.*

substitution

_____

_____

_____

Section 4 Gene Regulation and Mutation (continued)

| ⌐Main Idea⌐ _____ | ⌐Details⌐ _____ |

Prokaryote Gene Regulation

I found this information on page _____.

Describe *gene regulation in prokaryotes by using the terms below to complete the paragraph.*

- *E. coli*
- environment
- genes
- metabolic pathway
- operator
- promoter
- proteins
- repressor
- RNA polymerase

An operon is a cluster of genes in _____. These genes make _____ that work together in one _____. An operon is able to respond to changes in the _____. The _____ is a segment of DNA that acts as a switch for transcription, turning the operon on or off. When the operon is on, [RNA polymerase] binds to the _____ and transcribes the DNA. When the operon is off, a _____ blocks transcription.

Compare and contrast *the* trp *operon and the* lac *operon.*

	Trp **Operon**	*Lac* **Operon**
Responds to the presence of		
Transcription is turned on when		
The repressor is active when		
When the operon is turned on, the cell can		

Eukaryote Gene Regulation

I found this information on page _____.

Analyze *the ways eukaryotes control gene expression.*

Molecule	Effect on Gene Expression
Hox genes	
Nucleosomes	
Small interfering RNA	
Transcription factors	

Section 4 Gene Regulation and Mutation (continued)

Main Idea	Details

Mutations

I found this information on page _____.

Compare and contrast *a point mutation and a frameshift mutation by defining each mutation and stating its consequence.*

Point mutation happens when	consequence:
Frameshift mutation occurs when	consequence:

Analyze *each type of DNA mutation and its result. Sketch what each change might look like.*

Mutation	Result	Sketch
Missense mutation		
Nonsense mutation		
Chromosome rearrangement		
Chromosome deletion		

SUMMARIZE

Discuss why a mutagen can have longer-lasting effects in a sex cell than in a body cell.

_____

_____

_____

_____

Tie It Together

SUMMARY

*Create a concept web to tie together what you learned
in this chapter about molecular genetics. Hint: You might find it easier to first list the facts or
topics you want to include, then decide how to connect them in the web.*