

4.2 Mutation

- A gene mutation involves a change in the order of bases (A,C,T,G) that make up the gene. There are several types of gene mutation:
 - Deletion (base missing)
 - Addition (extra base added)
 - Substitution (one base substituted for another)

Positive Mutations

- When a gene mutation produces proteins that benefit the individual.
- Example: Some plants have developed resistance to bacterial and fungal infections.



See pages 136 - 138

Effects of Mutations

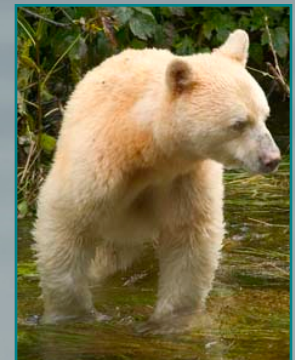
- Negative Mutations

- When a gene mutation produces proteins that harm the individual
- Example: Sick cell genes in affected humans cause blood cells that are abnormally shaped.

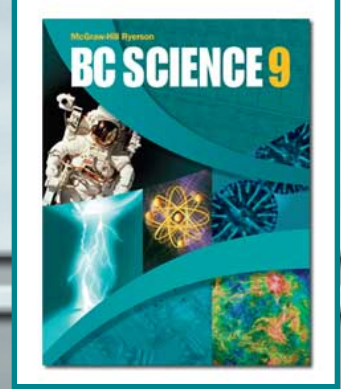


- Neutral Mutations

- When a gene mutation produces proteins that have no effect on the individual
- Example: a particular mutated gene produces white coat Kermode bears (Spirit Bears)



See pages 139 - 140



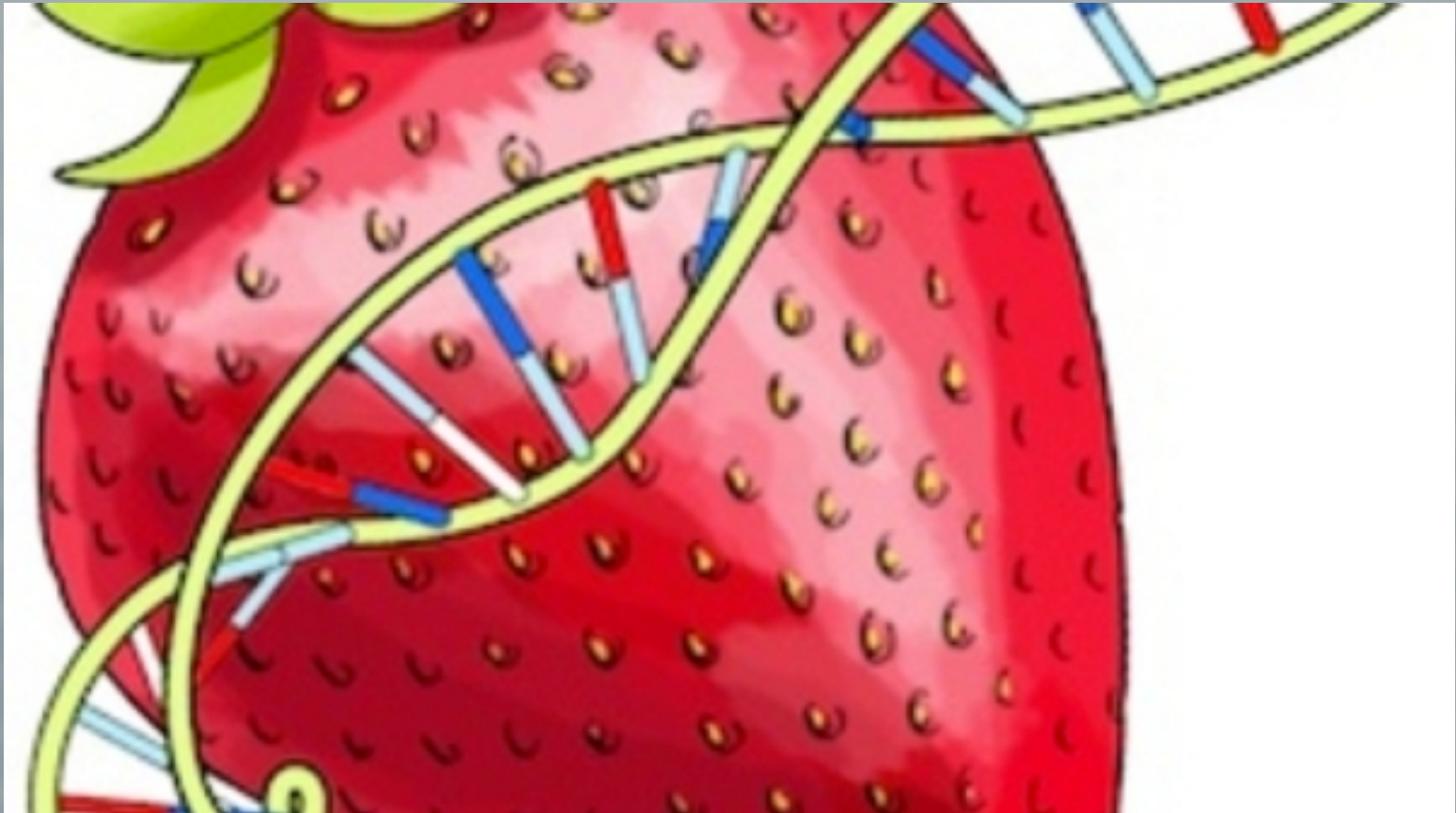
ACTIVITY: Identifying Mutations

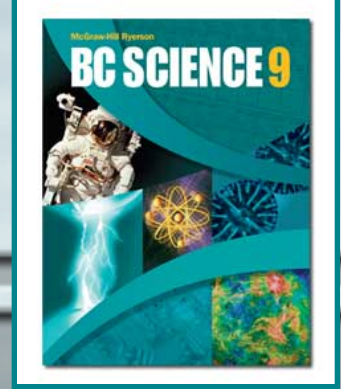
The Spirit Bear is white because of a genetic mutation. The sequence of DNA in a gene is interpreted in groups of three bases. In the Spirit Bear, the sequence of bases for white coat colour is different than that of the black coat colour. Since the DNA sequence is interpreted in groups of three bases, a substitution, loss, or addition of a base will change the meaning of a DNA message. In this activity you will learn how these three types of gene mutations affect the proteins that are made in a cell.

What to do:

- 1) To explain gene mutations, scientists compare the genetic code to that of a sentence.
- 2) Write a sentence below that has only three letter words in it and is 7 words long.

DNA Extraction Lab

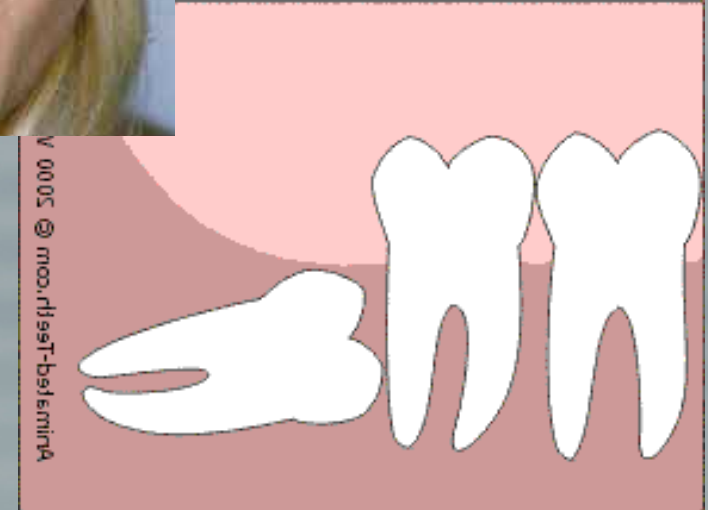




HOMEWORK Qs

- Checking Concepts pg. 145
 - Question 2, 3, 4, 5
- PRE-LAB FLOW CHART! **due next class**
- ◆ ALL of Chapter 4 Questions will be handed in when we finish the Chapter!
 - Keep them together! Keep them safe!

Guess the Effects of Mutations!



See pages 139 - 140

Mutagens



- Mutations can occur when DNA is being made or can be caused by mutagens.
- Mutagens are substances or factors that cause mutations
- Environmental mutagens such as mercury, **cigarette smoke**, X-ray and UV radiation, and certain viruses can cause mutations.

Video: Smoking and Cancer

Mutation Repair

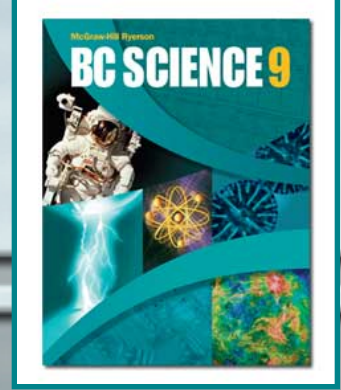


- Correcting mutations is difficult, but new techniques such as **gene therapy** offer hope.
- Gene therapy is complicated and experimental:
 - A virus is engineered to carry a normal gene
 - The virus must somehow be targeted to the cells with the defective gene
 - The normal gene must then replace the defective gene
 - The normal gene must then be “switched on” so that the replacement normal gene produces the proper healthy proteins. It is also important that the normal gene make the correct amount of healthy protein.

Will Gene Therapy Cure Cancer?



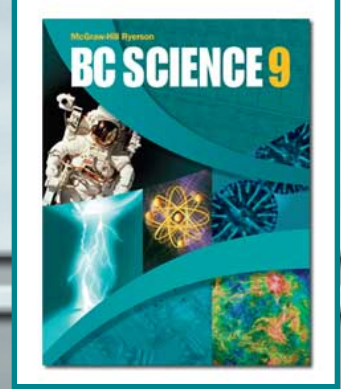
Video: Gene Therapy



Video Reflection: Gene Therapy

Reflection Question #1: If we are able to use gene therapy to cure or fight diseases, should we be able to determine/change what our children's traits are going to be? (E.g. eye colour, gender, etc.)

Reflection Question #2: If you were a gene hacker, what crazy genetic mutation would you give yourself? Why?

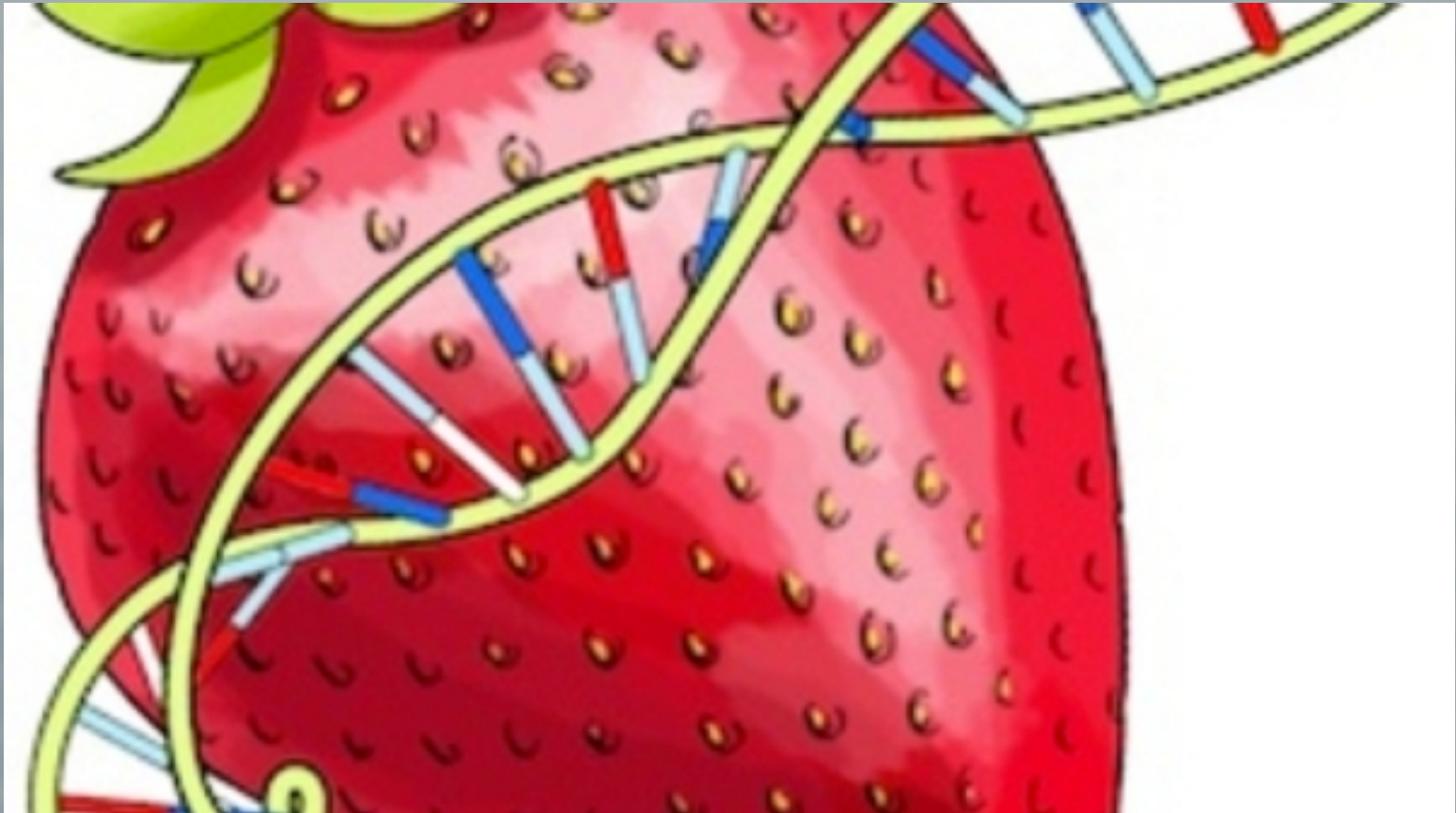


HOMEWORK Qs

- Checking Your Understanding pg. 145
 - Question 8, 9, 13, 14
 - THIS IS THE LAST SET for Chapter 4!
- ◆ ALL of Chapter 4 Questions will be handed in when we finish the Chapter! **DUE THURS April 7**
 - Keep them together! Keep them safe!
 - **4.1:** 1, 3, 4, 5, 6, 7, 8, 9, 13
 - **4.2:** 2, 3, 4, 5, 8, 9, 13, 14

CHAPTER 4 TEST: Tues April 12

DNA Extraction Lab



CHAPTER REVIEW Qs



- Pg. 146/147
 - Question 2-12, 14-16, 18, 19