Genes and Gene Technology

Green Gene

1. On the planet Dyejob, green hair is a recessive trait. Great Grandma and Great Grandpa Berg both have green hair. So do their three children. They were surprised to find that three of their grandchildren have green hair too, even though all of their grandchildren have black hair. The Bergs concluded that their grandson Bobby must be a carrier of the green hair gene. Shown below is the pedigree of the Berg family. The solid shapes represent the family members with green hair. The pedigree does not show who is a carrier of the gene. Using the pedigree, answer the following questions.

The Bergs

Great Grandma

Great Grandpa

Bunny

Betty

Buffy

Becky

Bilbo

Babs

Bianca

Bess

Bubba

Brooke

Barnie

Bobby

Beth

Buddy

Berta

Beatrice

Basil

Bonnie

Blaire

Belle

a. Which, if any, of Bobby’s three sisters are carriers of the gene for green hair as well?

b. Beth does not have green hair. Is Beth a carrier? Explain.

c. Bunny, who has blond hair, is a carrier of the green hair gene. She claims to be the long lost child of Great Grandma and Great Grandpa Berg. Should they include her as a daughter in their will? Explain.
Genes and Gene Technology, continued

Mutations

2. The original DNA sequence below has undergone 16 substitution mutations. In the spaces below, write the letters of the original bases that have been replaced. Write the letters in the order in which they occur from left to right. Your work will reveal the answer to the question below.

original sequence: ACTTATTCACTGTCACTCTATATGCGAAGTG
sequence with mutations: ACCTCGTGTCACGGTGTCGCCGTAAAATGTGCAGAG

What did Ian's mother say when she saw the rat running past Whiskers?

___ H ___  ___ ___  ___ N ___  ___ ___ H ___
R ___ ___

Word Connections

3. Each of the following sentences contains a hidden word from the chapter. These words can be found by looking at the end of one word somewhere in the sentence and connecting it to the beginning of the next word. Circle the hidden words in each sentence.

Example: "Undo" is hidden between the words Run, dog.

a. Lulu drinks lemonade nineteen times a week.

b. Her version was lengthy; mine was short.

c. Sheila buys nothing but brand name clothing.

d. My mother hoped I greeted the visiting scholar properly.

Crack the Code

4. Use the clues to help you decode the secret message. By substituting the correct word for the coded word in each clue, you will find what each code letter stands for in the secret message. Each letter represents a different letter in the code. Each coded letter represents the same letter throughout the message. You may want to write each word below the code to help you break the code.

a. YTDLWE and HKQH discovered the PWROGZ helix.

b. TPZEQEZ always pairs with DSUAEQZ.

Secret message: PET QL DSZ HWPZ WM OQMZ

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