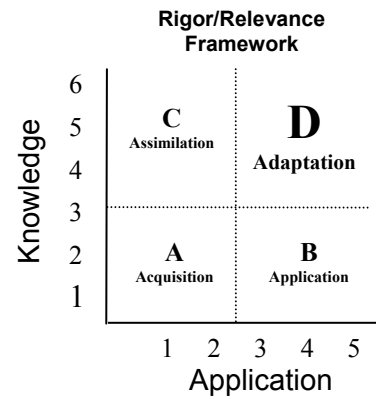




Gold Seal Lesson

GENETIC COUNSELOR



Subject

SCIENCE

Grades 9-12

Instructional Focus

Biological systems: Develop an understanding of the interactions and interdependence of components of biological systems.

Genetics: Develop an understanding of the genetic basis for the transfer of biological characteristics from one generation to another.

Performance Task

Students apply conceptual understanding of genetics to a real-world task by creating a Punnett Square for a couple concerned about having a baby with a genetic defect.

Instructions to students:

You are a genetic counselor working for a major health facility. A young couple, Robert and Maria Barone, have made an appointment with you to determine their risk of having a child with Sickle Cell Anemia. Robert and Maria, who are both negative for Sickle Cell Anemia, give you the following information about their respective families during your interview with them.

Robert:

- Robert's maternal grandmother, Allisa, died suddenly at age 27 of kidney failure as a complication of Sickle Cell Anemia. She had three children.
- Robert's mother, Mary, was the oldest child with two younger brothers. Mary was diagnosed with Sickle Cell Anemia and has been ill on and off all of her life.
- Robert's two maternal uncles had no sickle cell symptoms.
- Robert stated that his paternal grandparents and his father, the younger of two children (the sibling was a sister), showed no symptoms, although one female paternal cousin had Sickle Cell Anemia diagnosed at age 3.

Maria:

- Maria said her grandparents on both sides showed no symptoms.
- Her mother has Sickle Cell Anemia. Her mother is the oldest of three children (two girls and a boy), and no one else in her family has the disease.

Use the given information to produce a family pedigree and a Punnett Square which will help you respond to Robert and Maria's concern. Make a written report of your findings and explain how you will respond to Robert and Maria, including the percent chances of their having a child with Sickle Cell Anemia. Also tell them about possible prenatal tests that are available and list the symptoms and possible treatments for Sickle Cell Anemia.

Scoring Guide

Score each of the following characteristics of the task:

3 = Student gives complete and correct response with little or no help from the teacher.

2 = Student gives a nearly complete and correct response with some help from the teacher.

1 = Student response has some inaccuracies. He/she needs considerable help from the teacher.

0 = Student makes meaningless response or no response at all.

Characteristics:

Pedigree drawn with proper symbols

Has correct genotypes recorded/shaded

Contains all generations and individuals listed in the interview _____

Punnett Square labeled with couple's names over the genotype

Contains accurate genotypes

Has a key to the symbols _____

Written report includes percent chances of having an offspring with Sickle Cell Anemia

Includes symptoms and possible treatments for Sickle Cell Anemia

States possible prenatal tests that are available

Clear, concise, and well constructed _____

Neatness in all submitted materials _____

Essential Skills

- Examine the foundations of genetics involving heredity and inherited traits passed on through generations, understand the gene-chromosome concept, and apply classical genetic studies (Mendelian genetics). (s12)
- Know the features of genetic patterns such as sex inheritance and sex linkage and how dominant and recessive traits explain variations that are hidden in one generation can be expressed in the next. (s54)
- Use expository writing skills in subjects other than English Language Arts. (ela58)

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