Educational Practice

Lesson Plans - 1

Teacher: Bhavani Sridhar
Unit: Genetics
Chapter: Pattern of Inheritance
Title: Mendel's Principle of inheritance using single characteristics (Monohybrid cross) and Test cross – used to determine the unknown genotype.

I. New Jersey Core Curriculum Standards

5.5.8 C. Reproduction and Heredity

1. Describe how the sorting and recombining of genetic material results in the potential for variations among offspring of humans and other species.

5.5.12 C. Reproduction and Heredity

1. Describe how information is encoded and transmitted in genetic material.

II. Learning Objectives

SWBAT determine and predict the genotypes and phenotypes of parents and their offspring.
SWBAT list and discuss the parts of Mendel's Law of Segregation.
SWBAT define homozygous, heterozygous, phenotype, and genotype.
SWBAT use a Punnett Square.
SWBAT describe the importance of test cross.

III. Materials

A. Marker
B. Worksheet

IV. Motivation: (10 mins)

a. Worksheet on monohybrid using several dominant and recessive characters.
b. Activity worksheet on testcross.

V. Instructional Plan/Procedure

1. Hook (5 min) Say, "Last class, we studied the history of Gregor Mendel and his pea plants. Our objective today is to build on what we learned yesterday about the genes, alleles, genotypes, Phenotypes and the Law of Dominance to solve monohybrid cross inheritance problems. What is a monohybrid cross? What is a Punnett square? By the end of today, we will be able to predict the genotypes and phenotypes of offspring resulting from a monohybrid cross. We will also study about the testcross and practice using the Punnett square.
2. Transition to the actual lesson (15-20 min)
   Mendel established three principles (or Laws) from his research
   -The Principle of Dominance and Recessiveness - one trait is masked or covered up by another trait
   - Principle of Segregation - the two factors (alleles) for a trait separate during gamete formation
   -Principle of Independent Assortment - factors of a trait separate independently of one another during gamete formation; another way to look at this is, whether a flower is purple has nothing to do with the length of the plants stems - each trait is independently inherited.
3. Clearly state that the Mendel's factors are now called **ALLELES**. Explain that every person has two alleles that determines single characteristics. We use letters to denote alleles, since every gene has two alleles, all genes are represented by a pair of letters, PP = purple, Pp = purple, pp = white.
4. Introduce the concept of **homozygous alleles**: when the alleles are the same, the individual is said to homozygous or **true breeding**. Letters designating a homozygous individual could be capital or lowercase, as long as they are the same. Ex. AA, bb, EE, dd. And **heterozygous alleles**: when the alleles are different, DOMINANT allele is expressed. Ex. Pp, Aa. **(Refer to fig 9.4 on pg 159)**
5. **Monohybrid cross** = a cross involving one pair of contrasting character. Ex. PP x pp, Pp x Pp.
6. Explain, when an egg is fertilized by a sperm, the genetic traits are inherited by the offspring. The