

Subject: Biology

Grade level: high school biology (Science)- 9th grade

Topic: Punnett Squares/Genetics

Lesson: How to do Monohybrid and Dihybrid Crosses

Content Standard:

2. Mutation and sexual reproduction lead to genetic variation in a population. As a basis for understanding this concept:
 - c. Students know how random chromosome segregation explains the probability that a particular allele will be in a gamete.
 - d. Students know new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization).
 - e. Students know why approximately half of an individual's DNA sequence comes from each parent.
 - f. Students know the role of chromosomes in determining an individual's

Lesson:

The goal of this lesson is to teach students how to complete a monohybrid cross and a dihybrid cross. This is a very difficult genetic concept to master in biology. Students will have to complete the two punnett square worksheets that are included.

1. [2 min]Ask students if they know what color the offspring would be if you crossed a black fur rabbit with a white fur rabbit? [Answer: black]
 - a. Explain the concept of dominant and recessive genes
 - b. Use the document camera to explain that capital letters are dominant alleles and lowercase letters are recessive alleles.
2. [2 min]Review with students who Gregor Mendel was. Ask them:
 - a. What plants did Mendel use to study genetics? [Answer: pea plants]
 - b. What were the different traits that Mendel studied? [Answer: height, pod shape, pea color, pea pod shape, flower color, and flower position]
 - c. How did he know what plants to breed? [answers will vary]
3. [5-10 min]Introduce a monohybrid cross with the document camera.
 - a. Draw out a box with 4 squares (monohybrid cross) and have students take out a sheet of paper to follow along with you.
 - b. After doing so have students take out their textbook and turn to page 271. Place a copy of the text book under the document camera and show students the section titled "problem solving" Have students define the problem, create a solution, and present their plan. Walk through this process with them using the document camera so they can follow your steps and see how to outline and present a topic.
4. [15 min] Place the worksheet titled "Punnett Square Practice: Monohybrid Crosses" under the document camera. Go over the x and y axis with students.
 - a. Model how to set up a genetic word problem using the document camera. Highlight at the top the dominant and recessive genes.
 - b. Write notes in the margin reviewing the difference between dominant and recessive alleles.