

Title: Fun with Genetics!

Grade Ranges:

 K-4

 5-8

 X 9-12

Subject Tag:

Science: Biology

Science: Human Body

Synopsis:

This lesson allows students to become “experts” on a particular type of genetics problem commonly found in your textbook. After you have discussed Mendelian genetics and students have a firm grasp on the simple monohybrid crosses, break the class into groups and have them learn the ins and outs of incomplete dominance, codominance, sex-linked, and dihybrid crosses. Each of the experts will then teach a small group how to solve their type of genetics problem. This activity allows students to learn by themselves and from each other rather than from a teacher lecturing about yet another genetics problem on the board.

Keywords:

genetics, Punnett square, Gregor Mendel, traits, alleles, inheritance, heredity, multiple alleles, dominant, recessive, genes, monohybrid crosses, dihybrid crosses, incomplete dominance, codominance, sex-linked traits

Body:

1. Gather a collection of various genetics problems that cover incomplete dominance, codominance, sex-linked, and dihybrid crosses. You can find these problems in your textbook and other genetics resources.
2. Break the class into small groups of four to five students. Each group will meet together briefly to divide up the genetics problems.
3. Assign each member of each group a letter, A-E. Each letter corresponds to a type of genetics problem. For example, all A’s will become experts on incomplete dominance and all of the B’s will become experts on codominance. If you have extra students, you may allow two students from the group to study the same type of problem.
 - A = incomplete dominance
 - B = codominance
 - C = sex-linked
 - D = dihybrid
4. Have all of the A’s, B’s, etc. get together in research groups. Allow the students to spend 20-30 minutes using their textbook and any other resources on hand to study their assigned genetics problem type.
5. They should design a short lesson to take back to their original group. The lesson should include all of the following:
 - brief description of the genetics problem type
 - directions of how to set up the problem
 - sample problem from a source
 - sample problem that they have created (students really enjoy this part)

6. Once they have completed their mini-lesson plans, students should return back to their original group and teach their group members how to solve their type of genetic problem.
7. As an assessment activity, have ALL students create a genetics worksheet that includes each type of genetic problem discussed in their groups. They should provide solution keys for their worksheets.

Objectives:

1. Students will be able to work in groups to solve genetics problems.
2. Students will be able to organize information and present it to other students.
3. Students will be able to solve incomplete dominance, codominance, sex-linked, and dihybrid genetics crosses individually.
4. Students will be able to create their own genetics problems.

Standards:

NY: The Living Environment 4.2 Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring. **The Living Environment 4.4** The continuity of life is sustained through reproduction and development.

NYC: A1c. Plan and Organize an Event or an Activity: Take responsibility for all aspects of planning and organizing an event or an activity from concept to completion, making good use of the resources of people, time, money, and materials and facilities. **A5a.** Participate in the establishment and operation of self-directed work teams. **S2b.** Molecular basis of heredity, such as, DNA, genes, chromosomes, and mutations. **S4a.** Big ideas and unifying concepts, such as order and organization; models, form, and function; change and constancy; and cause and effect. **S5f.** Works individually and in teams to collect and share information and ideas.

CT: 1. The Nature of Science. Students will experience an inquiry-based learning environment in which they are free to ask questions, seek information and validate explanations in thoughtful and creative ways. Students will also understand that the processes, ways of knowing and conceptual foundations of science are interdependent and inextricably bound. **6. Cycles of Life.** Students will recognize patterns and products of genetics and evolution.

NJ: Cross-Content Workplace Readiness: 4: All students will demonstrate self-management skills. **Science: 5.2:** All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses. **5.7:** All students will investigate the diversity of life.

Time Required:

Two 50-minute class periods

Assessment Criteria:

Rather than give a test or quiz, assess the students on the genetics problem worksheet that they design. Assess them on creativity, difficulty level, and accuracy.

Recommended Lesson Plan Review Date:

Review Comments: