

REAL FAMILY GENETICS

Performance Standard 12A/11A/13B.J.

Students will apply the process of scientific inquiry to synthesize the principles of genetic studies accordingly:

- *Knowledge:* Identify genotypic and phenotypic displays of the assigned traits with the predictable and probable dominance outcomes and the connections to current research.
- *Application:* Research the current treatment procedures, possible problems, including side effects, effects on family integrity, and possible transmission of genetic traits.
- *Communication:* Explain the pedigree of specific genetic traits and offer possibilities for future research.

Procedures

1. ***In order to know and apply the concepts that explain how living things function, adapt and change (12A), and the concepts, principles and processes of scientific inquiry (11A) and the concepts that describe the interaction between science, technology and society (13B)***, students should have sufficient learning opportunities to develop the following:

- Formulate hypothesis foundation for applying phenotypic and genotypic displays in real-world families.
- Review early and current research literature as primary reading sources to validate the context of hypothesis.
- Research applicable models of predictable dominance outcomes and probabilities and determining investigation design.
- Tracing citations from research studies for validity and reliability.
- Analyze how beliefs and attitudes influence scientific advances and technological innovations in the field of genetics.
- Report and display process and findings of investigation.
- Generate further questions or issues for consideration.

Note to teacher: This activity relates to knowledge associated with standard 12A, while addressing performance descriptors for stage J within standard 11A. Applying scientific habits of mind in standard 13A are foundational. Applying the societal implications of this scientific research addresses performance descriptions in 13B. This activity could be a culmination project for an applied genetics curricular unit.

2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Students will be divided into groups of male and female. Each student will be assigned a genetic trait. These traits may be sex-linked or not. The traits should be disease or mutation causing traits, not necessarily fatal or common. The listing of these traits may be compiled from genetics research resources and may include diabetes mellitus, Human Growth Hormone deficiency, sickle-cell anemia, Parkinson's disease, etc.
4. The premise of this issue investigation is the prognosis of family pedigrees resulting from "random marriage". Students will "marry" by random matching and begin a combined research project with their "spouses"; random "marriages" may be added for second generation offspring. Parameters for the research for group presentation are:
 - Each couple will research the traits they have been assigned.
 - They will determine the possibility and probability of the "traits" dominance or appearance.
 - They will research the effect, treatments, cost and any other relevant problems associated with their traits.
 - They will create a pedigree for their generation, their "children" and their "grandchildren."
 - They will make predictions, based on their research, of the potential for "cure," and the possible effects this situation would have on family integrity and societal decision-making and attitudes.
5. Students will present an oral report with applicable media graphic display. The pedigree should be a "large" chart incorporated into the report.
6. Evaluate each student's work using the Science Rubric as follows and add the scores to determine the performance level:

- *Knowledge:* The foundations of the genotypic and phenotypic displays of the assigned traits, the predictable and probable dominance outcomes, the connections to current research is complete and accurate.
- *Application:* The research shows the current treatment procedures, possible problems, including side effects, effects on family integrity, and possible transmission of the traits accurately and completely.
- *Communication:* The report should be well-organized, well-detailed with the explanation of the pedigree, and the implications for future research and societal attitudes.

Examples of Student Work not available

Time requirements

One class period to orient students to assessment and assign traits at least one week of class time to research and prepare the report, or one week of out-of-class time.

Resources

- Books, journals and magazines related to genetics
- Internet access
- Possible interviews of doctor, research scientist, or support group for assigned traits