

X'S AND Y'S DO MAKE A DIFFERENCE

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

Students will apply the process of scientific inquiry to explain new biological technologies in terms of societal and technological effects accordingly:

- *Knowledge:* explain briefly the past, current and projected biological technologies associated with prenatal diagnoses.
- *Application:* explain how a specific birth defect can be detected currently through new technologies (genetic testing, etc.)
- *Communication:* report capabilities of new technologies and the possible societal impact for access to this information at the personal and family levels.

Procedures

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

- Formulate issue hypothesis foundation about the societal impact of new biological technologies associated with prenatal identification of birth defects and abnormalities.
- Review current (and historical) resources that explain the technologies and the genetic basis for birth defects and abnormalities.
- Access genetic counseling resources and research that are used to help parents understand the diagnosis and treatment of various birth defects and abnormalities.
- Analyze how beliefs and attitudes influence or are influenced by 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 the societal implications of this scientific research addresses Performance Descriptors in Standard 13B. This activity could be a culmination project for an applied genetics curricular unit. Family and Consumer Sciences (FCS) students will enhance their knowledge of conducting an issue investigation that will be beneficial in their careers and the understanding of how defects and traits are acquired by babies. This assessment addresses the National FCS Standards #4.0 (Early Childhood, Education and Services) and #15.0 (Parenting). It also addresses the Illinois Workplace Skills in the areas of Solving Problems and Critical Thinking and Communicating on the Job. Students may use their findings in the following Family, Career and Community Leaders of America (FCCLA) STAR events: Community Service, Families First, Leaders at Work, Student Body, Illustrated Talk and Focus on Children.

2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Prepare students for this study by explaining the basis of genetic defects and the new technologies that are available to parents and medical personnel to identify birth defects. It may be more effective to invite a genetics counselor or other medical resource or technology experts to present an overview of the topic. From the initial presentation, students can suggest or be assigned various defects or abnormalities that can now be detected or treated before birth. The diseases or 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 cystic fibrosis, Down's syndrome, muscular dystrophy, PKU, Tay-Sachs disease, spina bifida, diabetes, sickle-cell anemia, glaucoma, etc. Assign or allow students to choose a trait or disease to research and present to the class. The following parameters may be expanded or reduced.
 - The student should research the effect, treatments, cost and any other relevant problems associated with their traits.
 - The student can make predictions of the potential for "cure," and the possible effects this situation would have on family integrity and societal decision making and attitudes, based on their research and genetics counseling resources.

- The student can discuss the options related to his/her disease and discover options as to testing and the ethical issues/decisions associated with finding the answers.
4. Evaluate each student's work using the Science Rubric as follows, and add the scores to determine the performance level:
- *Knowledge:* The basic genetic technology and trait/disease explanations are 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 and well detailed with the explanation of the genetic impact and its diagnostic technology or treatment and contain implications for future research and societal attitudes.

Examples of Student Work

- [Meets](#)
- [Exceeds](#)

Time requirements

- One-to-three class periods to orient students to prenatal genetic foundations and technologies and assign traits
- At least one week of class time to research and prepare the report (could be one week of out-of-class time)
- One-to-three days for class presentations and discussions

Resources

- Books, journals, internet and magazines related to genetics
- Child care textbook
- Internet access
- Possible interviews of doctor, research scientist, genetic counselor or support group for assigned traits
- Science Rubric

SCIENCE RUBRIC

Exceeds - must receive no more than one 3 and the rest 4s in the other areas of the rubric.

Meets - may receive no more than one 2 and a combination of 3s and 4s in the other areas of the rubric.

Approaches - may receive no more than one 1 and a combination of 2s, 3s or 4s, in the other areas of the rubric.

Begins - must receive at least a 1 in all 3 areas of the rubric.

	KNOWLEDGE	APPLICATION	COMMUNICATION
	Knows and understands scientific terms, facts, concepts, principles, theories and methods.	Applies scientific knowledge, skills and methods to manipulate, analyze, synthesize, create and evaluate.	Communicates scientific knowledge and applications through writing, speech and visual displays.
4	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are complete and correct. 	<ul style="list-style-type: none"> • Applications are thorough, appropriate and accurate. 	<ul style="list-style-type: none"> • Written, oral and/or visual communication is well organized and effective.
3	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are mostly complete and correct. 	<ul style="list-style-type: none"> • Applications are mostly thorough, appropriate and accurate. 	<ul style="list-style-type: none"> • Most of the written, oral and/or visual communication is well organized and effective.
2	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are somewhat complete and correct. 	<ul style="list-style-type: none"> • Applications are somewhat appropriate and accurate. 	<ul style="list-style-type: none"> • Some of the written, oral and/or visual communication is organized and effective.
1	<ul style="list-style-type: none"> • Descriptions of scientific terms, facts, concepts, principles, theories and methods are minimally present or correct. 	<ul style="list-style-type: none"> • Applications are minimally appropriate and accurate. 	<ul style="list-style-type: none"> • Little of the written, oral and/or visual communication is organized and effective.
0	<ul style="list-style-type: none"> • All descriptions of scientific terms, facts, concepts, principles, theories and methods are missing and/or incorrect. 	<ul style="list-style-type: none"> • All applications are missing and/or incorrect. 	<ul style="list-style-type: none"> • All of the written, oral or visual communication is missing and/or lacks organization.
Score			