

Lesson 4: Genetic Disorders

Purpose: The purpose of this lesson is to familiarize students with various genetic disorders. Students will research a genetic disorder of their choosing, and present their research in both verbal and visual mediums.

Objectives:

The Students Will Be Able To:

- ~Research, in detail, a genetic disorder.
- ~Identify key facts about the disease.
- ~Present their disease to the in a clear, creative manner.
- ~Explain how genetic diseases are passed on to new generations.

Related Standards:

SOLs: BIO.1 The student will plan and conduct investigations in which

j) research utilizes scientific literature

BIO.5 The student will investigate and understand life functions of archaebacteria, monerans (eubacteria), protists, fungi, plants, and animals including humans. Key concepts include:

e) human health issues, human anatomy, body systems, and life functions.

BIO.6 The student will investigate and understand common mechanisms of inheritance and protein synthesis. Key concepts will include:

d) Prediction of inheritance of traits based on the Mendelian laws of heredity.

NSES Content Standard A: Science as Inquiry

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NSES: Life Science Content Standard C

- Molecular basis of heredity

NSES Content Standard F: Science in Personal and Social Perspectives

- Personal and community health

Materials and Resources:

Computer lab with internet access; Books, Articles, and other material pertaining to Genetic Diseases; Genetic Disease Project Description sheet

Class Management and Safety:

For the introduction to this project, students will use the school's computer lab to access the internet. Students should be instructed of the Acceptable Use Policy for the internet and computer equipment. In addition, students should be monitored at all times while they are using computers and accessing the internet to ensure that they are using these resources appropriately.

Procedures: This Lesson Plan will consist of 1 In Class Research Day, as well as 2-3 Days for Presentations.

Research Day:

Engage (5 min)

1. Opening question (posted on board)
What is a genetic disorder?
List the genetic disorders you are familiar with.
2. Discussion of student's responses

Explore (40 min)

1. Students will be presented with project.
2. At the computer lab they will explore various genetic disorders, and select one to research.
3. After selecting the disorder they will research, the students will use the internet to learn about the disorder. Several prompt questions will be provided, but students are expected to investigate beyond these questions.
4. Ticket out of class: Students will identify the genetic disorder they have selected for this project, to be approved by teacher

To be done outside of class; students will be given about 2 weeks to complete their projects:

Explain

Students will continue to investigate their genetic disorders outside of class. Students will be expected to describe their disorder, explain the symptoms, identify how the genetic disorder is caused (dominant, recessive, chromosomal abnormality), identify populations most affected by the disease, determine whether it is lethal, explain treatments for the disorder, etc.

Elaborate

Students will be expected to choose a method in which they will organize and present the information about their genetic disorder (their Product). Examples include but are not limited to: a pamphlet, a poster, a paper, a PowerPoint presentation, etc. Students will need to get their Product idea approved prior to beginning this portion of the project.

Students will prepare a presentation to inform the class about their genetic disorder. Presentations will be a minimum of 3 minutes and a maximum of 5 minutes in length. During this presentation, students are expected to highlight key facts about their disease and present their project in a clear, flowing manner.

Evaluate

Students will be evaluated on both their product and presentation. A rubric will be used to assess students. Students will be provided with a copy of the rubric at the time the project is introduced. See the Project Information Sheet and Rubric on the pages that follow.

Students will be performing a self-evaluation of their project and presentation. This self assessment will be turned in along with their projects, and it will count towards their grade in addition to the teacher assessment.

Genetic Disorders: Project Information Sheet

For this project you will be investigating a genetic disorder. You will be able to choose which genetic disorder you will research. Your choice should be submitted to the teacher by the end of the class period.

Examples of genetic disorders to investigate include, but are not limited to:

Hemophilia	Cystic Fibrosis	Phenylketonuria (PKU)
Huntington's Disease	Sickle Cell Anemia	Tay-Sachs Disease
Cri du Chat	Down Syndrome	Turner Syndrome
Marfan Syndrome	Klinefelter's Syndrome	Patau's Syndrome
Edward's Syndrome	Achondroplasia	

Part I: The Project You will research your genetic disorder. You will present this information in the format of your choice. For example, you may choose to create an informational brochure, write a paper, construct a poster, put together a PowerPoint presentation, write a magazine article, etc. You must submit your project idea for teacher approval prior to completing it.

The DUE DATE for your project idea is _____

The DUE DATE for your project is _____

Part II: Presentation To present your project, you will be expected to prepare a presentation for your class. The presentation must be at least 3 minutes, and no longer than 5 minutes in length.

Your PRESENTATION date is _____

Questions to consider in your research:

What is the disease?

How is it inherited? Is it a chromosomal disorder, or Is it sex-linked, or is it dominant/recessive?

What causes it?

What are the symptoms? Is it lethal?

How is it treated?

Is there a population that is most greatly effected?

What is the history of the disease?

How does this disease affect society?

Are there any new scientific advances used to fight the disease?

Interesting facts: Famous people who have the disease, etc.

Some helpful websites:

http://kidshealth.org/teen/your_body/health_basics/genes_genetic_disorders.html

<http://gslc.genetics.utah.edu/units/disorders/whataregd/>

<http://www.ygyh.org/>

Genetic Disorders: Evaluation Rubric

	Criteria	Points Possible	Points Earned		
			Student Self Assessment	Teacher's Assessment	
Project		60 points			
Presentation of Information	Information is clearly presented.	4			
	Information is organized in an easy-to-follow manner	6			
	The project is creative and pleasing to the eye	6			
	Illustrations, graphics, pictures, and/or figures are included	4			
Quality of Information	Overall, the information included in the project is of high quality (accurate and well explained)	6			
	The disease and its symptoms are explained.	6			
	Method of inheritance is identified	4			
	The cause of the disease (what the genetic abnormality causes) is explained	4			
	Treatment for the disease is discussed	4			
	Brief history of disease is provided	4			
	Current developments are discussed	4			
	Technical Details	Topic, Project idea, and Project are turned in on time	4		
		Grammar is correct	4		
	Presentation		40 points		
Presentation of Information	Student presents disease information and project in a clear and interesting manner	5			
	Presentation is organized, and information is smoothly transmitted.	5			
Quality of information	Student highlights key components of their disease, including: cause, method of inheritance, symptoms, treatment, and current developments.	15			
	Project is displayed and explained for class	5			
Technical Details	Presentation is within the 3-5 minute timeframe	5			
	Student comes prepared to present on the day indicated	5			

Student Comments: _____

Teacher Comments: _____

