366815

Heredity of Human Traits Lab Activity

Aligned With All Published National Standards

ward's science

IMGN 250 8021

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* The Dimension I practices listed below are called out as **bold** words throughout the activity.

DIMENSION 1 Science and Engineering Practices

×	Asking questions (for science) and defining problems (for engineering)		Use mathematics and computational thinking
	Developing and using models	×	Constructing explanations (for science) and designing solutions (for engineering)
×	Planning and carrying out investigations	×	Engaging in argument from evidence
×	Analyzing and interpreting data	×	Obtaining, evaluating, and communicating information

DIMENSION 2 Cross Cutting Concepts

	Patterns		Energy and matter: Flows, cycles, and conservation
×	Cause and effect: Mechanism and explanation	×	Structure and function
	Scale, proportion, and quantity		Stability and change
	Systems and system models		

DIMENSION 3 Core Concepts

Discipline	Core Idea Focus
Life Science	LS3: Heredity: Inheritance and Variations of Traits
	LS4: Biological Evolution: Unity and Diversity

× Indicates standards covered in activity

next generation science standards © 2013

Middle School Standards Covered	High School Standards Covered
MS.LS3-1: Develop and use a model to describe why structural changes in genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organisms.	HS.LS3-3: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
MS.LS4-4: Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	HS.LS4-1: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
	HS.LS4-2: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
	HS.LS4-3: Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

(continued on next page)

standards/learning objectives

national science education standards © 1996

Content Standards (K-12)			
×	Systems, order, and organization		Evolution and equilibrium
×	Evidence, models, and explanation	×	Form and Function
×	Constancy, change, and measurement		

Life Science Standards Middle School		Life Science Standards High School	
×	Structure and Function in Living Systems	×	Molecular Basis of Heredity
×	Reproduction and Heredity		
×	Populations and Ecosystems		

× Indicates standards covered in activity

benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
5. The Living Environment	5A: Diversity of Life
	5B: Heredity
	5F: Evolution of Life
11. Common Themes	11A: Systems
	11B: Models

activity objectives:

In this investigation, students will use taste paper with PTC to:

- Form a pedigree of their immediate family's ability to taste PTC.
- Determine from this pedigree, and those of their classmates, whether the gene for tasting PTC is autosomal dominant, or recessive.
- Calculate, using class data, the frequency of the recessive gene, the dominant gene, and the genotypes in a population.
- Predict, using the Hardy Weinberg Theory, the frequency of the genotypes in a large population.

time requirement:

- Pre-lab questions are intended to be given as homework. Approximate class time for class review of completed homework and completion of activity: 30-40 minutes.
- Collection of class data after family survey: approximately 30 minutes.