

888509

# Detection of Hereditary Breast Cancer Lab Activity

Aligned With All Published National Standards

**ward's**  
**science+**

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# standards alignment

## framework for K-12 science education © 2012

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

<b>DIMENSION 1</b> Science and Engineering Practices	<b>X</b>	Asking questions (for science) and defining problems (for engineering)	<b>X</b>	Use mathematics and computational thinking
	<b>X</b>	Developing and using models	<b>X</b>	Constructing explanations (for science) and designing solutions (for engineering)
	<b>X</b>	Planning and carrying out investigations	<b>X</b>	Engaging in argument from evidence
	<b>X</b>	Analyzing and interpreting data	<b>X</b>	Obtaining, evaluating, and communicating information
<b>DIMENSION 2</b> Cross Cutting Concepts	<b>X</b>	Patterns		Energy and matter: Flows, cycles, and conservation
	<b>X</b>	Cause and effect: Mechanism and explanation	<b>X</b>	Structure and function
		Scale, proportion, and quantity		Stability and change
	<b>X</b>	Systems and system models		<b>x</b> Indicates standards covered in activity
<b>DIMENSION 3</b> Core Concepts	<b>Discipline</b>		<b>Core Idea Focus</b>	
	Life Science	LS1: From Molecules to Organisms: Structures and Processes		
		LS3: Heredity: Inheritance and Variations of Traits		

## next generation science standards © 2013

Middle School Standards Covered	High School Standards Covered
MS.LS1-1: Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	HS.LS1-1: Construct an explanation based on evidence on how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
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.LS3-1: Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
	HS.LS3-2: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
	HS.LS3-3: Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

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# standards/learning objectives

## national science education standards © 1996

Content Standards (K-12)			
X	Systems, order, and organization		Evolution and equilibrium
X	Evidence, models, and explanation	X	Form and Function
X	Constancy, change, and measurement		
Life Science Standards Middle School		Life Science Standards High School	
X	Structure and Function in Living System	X	The Cell
X	Reproduction and Heredity	X	Molecular Basis of Heredity
Science and Technology Standards Middle School		Science and Technology Standards High School	
X	Understanding About Science and Technology	X	Understanding About Science and Technology

x Indicates standards covered in activity

## benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
3. The Nature of Technology	3A: Technology and Science
	3B: Design and System
5. The Living Environment	5B: Heredity
	5C: Cells
11. Common Themes	11A. Systems
	11B. Models

### activity objectives:

- Perform agarose gel electrophoresis with DNA specimens in a simulation of haplotyping.
- Understand the application of genetic testing to prediction of risk.
- Construct a family pedigree to understand the patterns of heredity tendencies of certain diseases.

### time requirement:

This activity can be completed in approximately 80 minutes.