

KIT 470213-176

Biochemical Evidence For Evolution

Lab Activity

Aligned With All Published National Standards

Teacher's Guide

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Biochemical Evidence For Evolution

Overview

In the following experiment, the students will perform a variation of the Nuttall Precipitation technique using simulated blood sera of various animals - a chimpanzee, a frog, a cow, and a monkey. Students will determine which is more closely related to humans.

Materials

Included:

- 1 Vial of Simulated Human Serum, 30 mL
- 1 Vial of Simulated Cow Serum, 30 mL
- 1 Vial of Simulated Chimpanzee Serum, 30 mL
- 1 Vial of Simulated Frog Serum, 30 mL
- 1 Vial of Simulated Monkey Serum, 30 mL
- 1 Vial of Simulated Human Antiserum (sensitized rabbit serum), 250 mL
- 50 Testing well trays
- 1 Pack of stirring picks
- 30 Plastic dropping pipettes
- 10 Glass Vials
- 1 Wax marking pen
- Teacher's Guide (this booklet) and Student Guide

Number of Uses:

This lab activity comes with enough materials for ten setups.

Visit **wardsci.com** for replacement materials.

Standards Alignment

Framework for K-12 Science Education © 2012

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

DIMENSION 1 Science and Engineering Practices	X	Asking questions (for science) and defining problems (for engineering)		Use mathematics and computational thinking
	X	Developing and using models	X	Constructing explanations (for science) and designing solutions (for engineering)
	X	Planning and carrying out investigations	X	Engaging in argument from evidence
	X	Analyzing and interpreting data	X	Obtaining, evaluating, and communicating information
DIMENSION 2 Cross Cutting Concepts	X	Patterns		Energy and matter: Flows, cycles, and conservation
		Cause and effect: Mechanism and explanation	X	Structure and function
		Scale, proportion, and quantity		Stability and change
	X	Systems and system models		
DIMENSION 3 Core Concepts	Discipline		Core Idea Focus	
	Life Science		LS4: Biological Evolution: Unity and Diversity	

x Indicates standards covered in activity

Next Generation Science Standards © 2013

Middle School Standards Covered	High School Standards Covered
MS.LS4-2: Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	HS.LS4-1: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
MS.LS4-3: Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	

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Standards *continued*

National Science Education Standards © 1996

Content Standards (K-12)			
	Systems, order, and organization	X	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	Biological Evolution
X	Diversity and Adaptations of Organisms		

x 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
	5C: Cells
	5F: Evolution of Life
11. Common Themes	11B. Models

Objectives

- Perform a variation of the Nutall Precipitation technique.
- Determine whether a chimpanzee, a frog, a cow, or a monkey is more closely related to humans.

Time Requirement

35 minutes