470213-824

Sealed with a Kiss Lab Activity

Aligned With All Published National Standards

ward's science+

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+Us

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overview

Someone has been mailing anonymous love letters to the captain of the football team and sealing each one with a kiss. He wants his fellow classmates to help him get to the bottom of this mystery. In this lab activity, students will use paper chromatography to compare the lipstick worn by each female suspect to that of the lipstick found on the envelopes. Students will then analyze the lip prints of each suspect in order to positively identify the "guilty" party.

materials included:

- 1 Package of 12 chromatography paper discs **
- 8 Metric rulers
- 8 Glass jars with caps
- 8 Hand magnifiers
- 20 Envelopes
- 1 Bottle of Chromatography solvent, 150 mL **
  (n-propyl alcohol & ammonium hydroxide)
- 1 Mirror
- 20 Sterile applicator swabs **

** Material included in refill kit 36 6235

materials not provided:

- Three tubes of lipstick (all from the same brand and similar in color)

note **Previous testing has shown that the best color-banding results are achieved by using brown shades of Almay™ brand lipsticks. Other lipstick brands and shades have not performed as well with the type of chromatography solvent provided with this activity.**

- Fume hood (recommended) or well-ventilated area
- UV light (longwave) or "black" light
- UV safety glasses
- Stereomicroscope (optional)

number of uses:

This lab activity is designed for eight groups of students.

Visit wardsci.com for replacement materials.

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)	X	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
X	Scale, proportion, and quantity	X	Stability and change
	Systems and system models		

DIMENSION 3 Core Concepts

Discipline	Core Idea Focus
Physical Science	PS1: Matter and Its Interactions

X Indicates standards covered in activity

next generation science standards © 2013

Middle School Standards Covered	High School Standards Covered
MS.PS1-1: Develop models to describe the atomic composition of simple molecules and extended structures.	HS.PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

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standards/learning objectives

national science education standards © 1996

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

Physical Science Standards Middle School		Physical Science Standards High School	
X	Properties and Changes of Properties in Matter	X	Structure and Properties of Matter

X Indicates standards covered in activity

benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
4. The Physical Setting	4D: Structure of Matter
9. The Mathematical World	9A: Numbers
11.Common Themes	11B. Models

activity objectives:

- Utilize paper chromatography to obtain a lipstick chromatogram.
- Compare the varying color separation results of three similar shades of lipstick.
- Measure the visible bands on the chromatogram and obtain an R_f value for each band.
- Examine and become familiar with lip print pattern types and then use those patterns as a means to identify an individual.
- Use quantitative and qualitative evidence to identify the "guilty" suspect.

time requirement:

Part I: Lipstick Chromatography - 50 minutes

Part II: Calculating R_f Values - 20 minutes

Part III: Examining Lip Prints - 45 minutes

note

Part I and Part III can be run concurrently.

lab specific safety:

- The chromatography solvent used in this lab produces a harmful vapor and should be used under a fume hood or in a well-ventilated area.
- The chromatography solvent is flammable and should be kept away from flames or direct heat and stored in a flame cabinet.

general safety:

- The teacher should 1) be familiar with safety practices and regulations in his/her school (district and state) and 2) know what needs to be treated as hazardous waste and how to properly dispose of non-hazardous chemicals or biological material.
- Consider establishing a safety contract that students and their parents must read and sign. This is a good way to identify students with allergies (e.g., latex) so that you (and they) will be reminded of specific lab materials that may pose risks to individuals.
- Students should know where all emergency equipment (safety shower, eyewash station, fire extinguisher, fire blanket, first aid kit etc.) is located.
- Require students to remove all dangling jewelry and tie back long hair before they begin.
- Remind students to read all instructions and Safety Data Sheets (SDSs) before starting the lab activities, and to ask questions about safety and safe laboratory procedures.
- As general laboratory practice, it is recommended that students wear proper protective equipment, such as gloves, safety goggles, and a lab apron.

at the end of the lab:

- Remind students to wash their hands thoroughly with soap and water before leaving the laboratory.

note

teacher notes

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