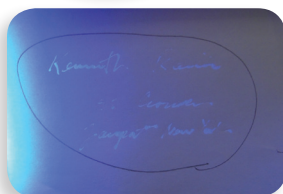
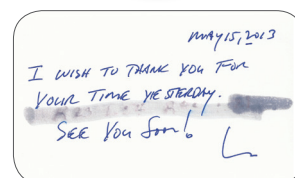


NEW

The Chemistry of Invisible Inks STEM Kit



**Includes
Activity
Guide**



This kit is a unique teaching tool for introducing your students to the fascinating chemistry and physics behind invisible inks, i.e. colorless substances usable for writing that can be made to run color using a chemical or physical process. Students investigate how organic fluids and chemical reagents can be used as invisible inks. Relying on historical example, students create various invisible inks and security documents for other student groups to analyze and decode! Includes materials for two detailed activities (each with a 'model' and 'inquiry' investigation paths - a total of four investigational activities), which can accommodate up to 40 students. Also contains a DVD with PDF Teacher and Student Guides and other digital content.

Covered concepts include: data analysis, chemical & physical processes, elements, mixtures & compounds, pH indicators, transmitted vs. reflected light, the periodic table, fluorescent compounds, types of chemical reactions, and hypothesis testing.

Item No.	Description
AISINKIT	The Chemistry of Invisible Inks STEM Kit

Activity Summaries

Activity 1 - Investigating Organic Fluids as Invisible Inks

(GUIDED - MODEL EXPERIMENT)

(INTERMEDIATE)

OVERVIEW: In this STRUCTURED INVESTIGATION, students develop an understanding of how a natural material (lemon juice / organic acids and sugars) can be employed as an invisible ink and how the application of heat sets up a chemical reaction [oxidation (caramelization)] of organic materials (organic acids and sugars).

OBJECTIVES: Students will...

- ✓ Learn the major chemical constituents of lemon juice.
- ✓ Understand how the application of heat (ironing) initiates a chemical reaction (caramelization) that 'develops' the invisible ink.
- ✓ Evaluate various 'secret messages' that have been developed by heating.

INDEPENDENT INQUIRY

Design an investigation that evaluates various natural, organic materials as effective invisible inks using heating as a developer.

Activity 2 - Investigating Chemical Reagents as Invisible Inks

(GUIDED - MODEL EXPERIMENT)

(INTERMEDIATE - ADVANCED)

OVERVIEW: In this STRUCTURED INVESTIGATION, students develop an understanding of how various chemical reagents (acids, bases, fluorescent compounds, inorganic salts, organic compounds) can be employed as invisible inks and developers to create 'secret messages' and security documents.

OBJECTIVES: Students will...

- ✓ Evaluate various chemical reagents as effective inks and developers for creating 'secret messages'.
- ✓ Understand how various 'developer systems' (pH indicator, pH precipitation, indicator reaction, and light-emitting radiation) can be employed to image an invisible ink material.

INDEPENDENT INQUIRY

Design an effective and secure invisible ink system (ink / developer). Design an effective, secure security document using invisible inks and developers.