Invisible Ink
A School for Unusual Girls

1. Program Title

Secret Code: The science of invisible ink

2. Introduction/Purpose of Program

Students will test a variety of methods for making invisible ink using household items.

3. TEKS (for school program)

1A demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards

2B design and implement comparative and experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology

2C collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers

2D construct tables and graphs, using repeated trials and means, to organize data and identify patterns

2E analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends

4A use appropriate tools to collect, record, and analyze information

4B use preventative safety equipment

8.5E – Investigate how evidence of chemical reactions indicate that new substances with different properties are formed

4. Detailed Description of the Program

Students will compare the quality of a variety of homemade invisible ink formulas.

3 types of invisible ink will be made and tested during this experiment. Directions for making each of the inks can be found here: http://www.wikihow.com/Make-an-Invisible-Ink-Message

Lemon Juice Ink

Baking Soda Ink

Aspirin Ink

5. Program Related Books to Display or Book Talk

Colson, Mary. *Destroy after Reading: The World of Secret Codes*. Chicago, IL: Raintree, 2011. Print.

Gregory, Jillian. *Breaking Secret Codes*. Mankato, MN: Edge, 2011. Print.

Gregory, Jillian. *Making Secret Codes*. Mankato, MN: Capstone, 2011. Print.

Huckle, Helen. *The Secret Code Book*. New York: Dial, 1995. Print.

Mitchell, Susan K. *Spy Codes and Ciphers*. Berkeley Heights, NJ: Enslow, 2012. Print.

Pincock, Stephen. *Codebreaker: The History of Codes and Ciphers, from the Ancient Pharaohs to Quantum Cryptography*. New York: Walker, 2006. Print.

6. List of Supplies

White Paper
Small Bowls
Lemons (or Lemon Juice)
Q-tips
Baking Soda
Milk
Grape Juice
Lamp with bulb (not halogen) – to use as a heat source
Spoons or stirrers

Ferrous Sulfate (Iron Sulfate)
Rubbing Alcohol
Cotton Balls/Pads

7. Resources (print and electronic)

http://www.wikihow.com/Make-an-Invisible-Ink-Message

http://chemistry.about.com/od/chemistryhowtoguide/a/invisibleinks.htm

http://www.scientificamerican.com/article/bring-science-home-invisible-ink/

http://www.kidzworld.com/article/3844-making-invisible-ink-appear

http://www.flinnsci.com/store/Scripts/prodView.asp?idproduct=18192

http://www.flinnsci.com/store/Scripts/prodView.asp?idproduct=17295

http://mentalfloss.com/article/55195/11-historical-uses-invisible-ink

http://www.mountvernon.org/george-washington/the-revolutionary-war/spying-and-espionage/spy-techniques-of-the-revolutionary-war/

Gardner, Martin. *Codes, Ciphers, and Secret Writing*. New York: Simon and Schuster, 1972. 71-77. Print.

Huckle, Helen. *The Secret Code Book*. New York: Dial, 1995. Print.

Lamb, Geoffrey Frederick. *Secret Writing Tricks*. Nashville: T. Nelson, 1975. Print.

Pincock, Stephen. *Codebreaker: The History of Codes and Ciphers, from the Ancient Pharaohs to Quantum Cryptography*. New York: Walker, 2006. Print.

Zim, Herbert S. *Codes and Secret Writing*. New York: William Morrow, 1975. 113-34. Print

8. Program Flyers, Posters, Advertisements, Bulletin Board Ideas, Templates, Rubrics, etc.

Teachers may choose to grade student's lab reports, and teamwork when making the various invisible ink types; however, the activity is intended as a creative way to link science and

literature, not necessarily for a graded activity though it does fulfill several TEKS requirements.