Our Story: Making the Star-Spangled Banner

Preservation and the Power of Light

Summary
In this activity, you and your child will learn about the power of light by comparing what happens to paper that has been left in the sunlight with paper that has been left in the dark.

Why
The scientific method used here (including a hypothesis, experiment to test the hypothesis, and deciding if the hypothesis was supported by evidence) is used by scientists around the world. Besides its usefulness in a scientific setting, this method can be used to gain information to make sense of and solve everyday problems.

Time
- 10-minute introduction
- 10-minute experiment set-up
- (optional) 5 daily comparisons, 5 minutes each
- 20-minute experiment follow-up

Challenge Words
- Historic site: a place where an actual historic event took place, such as a historic house, a state park, or a national park
- Banner: the flag of a nation, state or army
- Compare: to examine in order to note similarities or differences
- Faded: something which has lost its brilliance and or loudness gradually
- Flag: a piece of cloth of distinctive size, color and design, used as a symbol, standard, signal or emblem
- Hypothesis: a tentative assumption made in order to draw out and test its logical or empirical consequences
- Preserve: to keep safe from injury, to protect from damage
- Preservation: the protection of cultural property through activities that minimize chemical and physical deterioration and damage that prevent loss of informational content. The primary goal of preservation is to prolong the existence of those things belonging to a country or group of people.

Recommended Age Group
This activity will work best with children in kindergarten through fourth grade.
Read the “Directions” sheet for step-by-step instructions.

YOU NEED

- Directions sheets *(attached)*
- Step Back in Time sheet *(attached)*
- Chart the Colors sheet *(attached)*
- Windowsill
- Closet or drawer
- Colored construction paper (2 or 3 pieces of each color, any number of colors)

GET READY

- Read the book *The Flag Maker* together. This book will give your child an idea of what the flag was originally like, how it was made, and why it might be important enough to keep in a museum. For tips on reading this book together, check out the Guided Reading Activity *(http://americanhistory.si.edu/ourstory/pdf/starspangled/reading_the_flag_maker.pdf)*.

- *(optional)* You may want to check the house for ideal places to conduct the experiment. Both places should be out-of-the-way, so the paper isn’t knocked over, covered up (in the sunny spot), or accidentally brightened (in the dark spot).

- *(optional)* If you are working with a young child, you might want to read the Step Back in Time sheet together, out loud. Some of the vocabulary words might be unfamiliar to your child. If your child stumbles over a word, it’s possible that it is a new word, so check to see if she or he understands before continuing.
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For adults and kids to follow together.

1. Read the Step Back in Time sheet to learn more about the Star-Spangled Banner.

2. Think about these questions and talk about what you think the answers might be.
   - The Star-Spangled Banner was made in 1813. Was it made before you were born? Can you figure out how old it is? Is it older than you are?
   - Talk about what happens to things as they get older.
   - Imagine that you have a very old (older than you!) piece of material.
   - How do you think you would have to handle it? Why?
   - Many things can make fabric colors fade. Washing a pair of jeans many times can make the color of the jeans fade. What else can make colors fade?

3. Get together with another person (a classmate, friend, sister, brother, or parent). Each of you should take a piece of construction paper that is the same color.
   - **Tip** As a variation, you can use pieces of fabric, but do not use color-fast fabric. The fabric will also take a MUCH longer time to fade—possibly several weeks—depending on the amount of sun, type of fabric, and color of fabric!

4. In your pair, one of you will put your piece of construction paper in a sunny area (like a windowsill). The other person will put his piece of construction paper in a dark area (like a closet or drawer). You can also have a third piece of paper, which will go in a sunny area, but work together to try to “block” the sunlight from hitting it. Make a guess, or hypothesis, about what will happen to the different pieces of construction paper. Write these ideas down on the back of the pieces of paper and explain your ideas to each other.
5. Now, with your papers ready, place them in their different spots (sunny area, dark area, and sunny area with a block).

6. Compare the pieces of construction paper daily and write down any changes for several days.

   **Tip** You can skip the daily comparisons if you want. But when you are observing the final changes to the paper, explain to your child that the changes were gradual.

7. After a week, do your final comparison, and then talk about these questions:

   - What was your original hypothesis? Was it correct?
   - What effect did light have on your piece of construction paper? In what ways did it change? Stay the same?
   - What else can light do besides fade color?
   - Based on the results of your experiment, what do you think light has to done to the Star-Spangled Banner? Has light affected the different colors of the flag in different ways? Which colors do you think faded the most? Why?
   - Why do you think the Star-Spangled Banner needs to be protected from the light?
   - Many Americans think that the Star-Spangled Banner is an important piece of history because it was the inspiration for the national anthem. Visitors to the National Museum of American History are very excited to see it. How can the Museum protect the Star-Spangled Banner from light, but still allow people to see it?
   - Compare your ideas to the ones that the National Museum of American History is using to preserve the Star-Spangled Banner ([http://amhistory.si.edu/starspangledbanner/preservation-project.aspx](http://amhistory.si.edu/starspangledbanner/preservation-project.aspx)).
## Chart the Colors

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The flag we now call the Star-Spangled Banner was the inspiration for Francis Scott Key to write the national anthem. The National Museum of American History is preserving the Star-Spangled Banner so it will last a long time. The Museum has to be very careful with it because it is so old. The banner is made out of wool. The stars on it are made of cotton. The cotton and the wool have grown weaker because the flag is so old. The colors are not as bright as before.

If you see a picture of the original Star-Spangled Banner on the National Museum of American History’s website (http://www.americanhistory.si.edu/starspangledbanner) you will notice that the red, white, and blue colors are not bright like colors on the flag in your school.

What happened to the colors of the Star-Spangled Banner?

Gather your materials and take a closer look at the power of light!
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Teacher Guide, page 1 of 2

Read the “Directions” and “Parent Guide” sheets for step-by-step instructions.

OBJECTIVES
The students will be better able to:
- explain the effect of light on colored material.
- create and test predictions/hypotheses.
- record scientific observations.
- apply scientific knowledge to a real-world problem.

STUDENT PERFORMANCE CRITERIA
- Includes the appropriate number of observations.
- Clearly stated hypothesis.
- Demonstrates comparison of hypothesis vs. observations.
- Demonstrates application of experiment finding to Star-Spangled Banner problem.

STANDARDS
NCHS History Standards
K-4 Historical Thinking Standards
  4A. Formulate historical questions
  4B. Obtain historical data from a variety of sources

K-4 Historical Content Standards
  4E. The student understands national symbols through which American values and principles are expressed.

ISTE Education Technology Standards for Students (NETS.S)
  3B. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.

21st-Century Skills
Learning and Innovation Skills
  - Critical Thinking and Problem Solving

More information at http://americanhistory.si.edu/ourstory/activities/starspangled/
**AAAS Science Benchmarks for Grades 3–5**

**Benchmark 1: The Nature of Science**

B. Scientific Inquiry

1. Scientific investigations may take many different forms, including observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.

3. Scientists' explanations about what happens in the world come partly from what they observe, and partly from what they think.

B. Scientific Enterprise

1. Science is an adventure that people everywhere can take part in, as they have for many centuries.

**Benchmark 12: Habits of Mind**

A. Values and Attitudes

1. Keep records of their investigations and observations and do not change the records later.