

Elements: Fireworks



Science & Visual Art

Grade
8

Maryland Science Standard(s)

4.8.A.1.b. Investigate and describe what happens to the properties of elements when they react chemically with other elements

Maryland Visual Arts Standards

3.8.2.a. Communicate ideas and concepts by manipulating elements of art and principles of design to achieve specific visual effects.

3.8.2. b. Apply elements of art and principles of design to communicate specific ideas in visual compositions.



CONNECTED OBJECTIVES

Students will research and choose elements from the periodic table to create their own firework artwork. They will create illustrations that will show what the combination of elements they have chosen will look like when fired. They will gain an understanding of the properties of the elements they use to create their fireworks and learn about the techniques for using oil pastels in artistry.

MATERIALS & RESOURCES

KEY CONTENT VOCABULARY

KEY ARTS VOCABULARY

- Large sheet of black paper cut into 3 long strips . One strip for each student
- Oil Pastels
- Wet wipers to clean hands
- Periodic table listing properties of elements used in fireworks
- Internet resources/Discovery Education "Fireworks"
- My Fireworks Recipe organizer
- Power Point with lesson instructions and link to Discovery Education and instructions and techniques for using oil pastels

- Periodic Table
- catalyst
- elements

- oil pastel
- color density
- depth
- texture

A S S E S S M E N T

- The students will list, alongside their fireworks illustration, the elements from the periodic table they used to create their fireworks.
- Student reflection: Students will explain the properties of the elements they used to create their fireworks. Ex. name of element and color, sparkle. etc.



L E S S O N S T E P S

Introduction Engage:

- Engage students by asking them if they have ever seen fireworks. Share with your shoulder partner where you have seen fireworks and the best ones you have ever seen. 1 min.
- Have a student read the learning goal. (Use PowerPoint/SmartBoard)
- Artful Thinking Warm Up

Explore:

- Students watch Discovery documentary on Fireworks (Linked to Smart Board)
- Discuss with class the word catalyst and how it was used to combine the elements to create the firework; and how the properties of each element by itself will not display its properties until combined with the catalyst to create a chemical reaction.
- Have students watch the interactive Periodic Table display the different elements properties in a firework

Explanation and Elaboration

Using Power Point/SmartBoard presentation discuss the different techniques used when working with oil pastels
Handout black paper to students and pastels
Go over Criteria for Success
Champs for Activity

Evaluation

- Have students complete the reflection connecting their artwork to science in their science journals

EXTENSIONS AND OPTIONS

- Time permitting have students share and explain why they used certain elements in the picture.
- Students participate in a gallery walk.

RESOURCES AND SOURCES

- Internet resources such as Discovery Education: "Fireworks"

GET SMART THROUGH THE ARTS

AUTHOR(S): Judy Ferguson, Diana Schlauch, Grade 8, Wiley Bates Middle School

Fireworks are a traditional part of many celebrations, including Independence Day. There is a lot of physics and chemistry involved in making fireworks. Their colors come from the different temperatures of hot, glowing metals and from the light emitted by burning chemical compounds. Chemical reactions propel them and burst them into special shapes. Here's an element-by-element look at what is involved in your average firework:

Aluminum - Aluminum is used to produce silver and white flames and sparks. It is a common component of sparklers.

Antimony - Antimony is used to create firework glitter effects.

Barium - Barium is used to create green colors in fireworks, and it can also help stabilize other volatile elements.

Calcium - Calcium is used to deepen firework colors. Calcium salts produce orange fireworks.

Carbon - Carbon is one of the main components of black powder, which is used as a propellant in fireworks. Carbon provides the fuel for a firework. Common forms include carbon black, sugar, or starch.

Chlorine - Chlorine is an important component of many oxidizers in fireworks. Several of the metal salts that produce colors contain chlorine.

Copper - Copper compounds produce blue colors in fireworks.

Iron - Iron is used to produce sparks. The heat of the metal determines the color of the sparks.

Lithium - Lithium is a metal that is used to impart a red color to fireworks. Lithium carbonate, in particular, is a common colorant.

Magnesium - Magnesium burns a very bright white, so it is used to add white sparks or improve the overall brilliance of a firework.

Oxygen - Fireworks include oxidizers, which are substances that produce oxygen in order for burning to occur. The oxidizers are usually nitrates, chlorates, or perchlorates. Sometimes the same substance is used to provide oxygen and color.

Phosphorus - Phosphorus burns spontaneously in air and is also responsible for some glow-in-the-dark effects. It may be a component of a firework's fuel.

Potassium - Potassium helps to oxidize firework mixtures. Potassium nitrate, potassium chlorate, and potassium perchlorate are all important oxidizers.

Sodium - Sodium imparts a gold or yellow color to fireworks, however, the color may be so bright that it masks less intense colors.

Sulfur - Sulfur is a component of black powder. It is found in a firework's propellant/fuel.

Strontium - Strontium salts impart a red color to fireworks. Strontium compounds are also important for stabilizing fireworks mixtures.

Titanium - Titanium metal can be burned as powder or flakes to produce silver sparks.

Element	Explain the properties (color, sparkle) of the elements used in the fireworks you created.