Hot Air Balloons Lesson Plan

Summary:

In this episode, Blade began the stream with camera issues that forced him to shift angles and joke about pants. The Random Object Randomogrifier produced a toy hot air balloon that looked like a soccer ball or rumba shakers. As he sketched the balloon in his "essence of" style, he described how embers rise from a fire, connecting that observation to the history of Chinese lanterns, Gusmão's demonstrations in Portugal, and the Montgolfier brothers launching animals in the 1700s. He reflected on how different people in different places reached the same idea by watching fire and sky, a pattern he called convergent discovery.
Full episode: https://www.youtube.com/live/d-iC77HCd20?si=jLFyau_rFfIFjsrM

Objective

Students will understand the history and development of hot air balloons, the scientific principle of heated air rising, and the concept of convergent discovery in human invention.

Standards

- NGSS MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of forces acting on the object.
- CCSS.ELA-LITERACY.RH.6-8.2: Determine the central ideas of a primary or secondary source and provide an accurate summary.
- C3 Framework D2.His.2.6-8: Classify series of historical events and developments as examples of change and/or continuity.

Materials

- Copies of the 9 Fun Facts on Hot Air Balloons (provided below)
- Worksheet (provided at the end)
- Optional: images of hot air balloons or Chinese lanterns

Activity

1. Read the 9 Fun Facts as a class.
2. In small groups, assign students one or two Fun Facts to discuss.
3. Ask groups to connect their assigned facts to science (principles of flight), history (who and when), or culture (literary or festival connections).
4. Bring the class together to create a shared timeline of balloon development.
5. End with a discussion on convergent discovery and how similar ideas can arise in different places at different times.

Introduction

Begin by asking students if they have ever watched embers rise from a campfire. Why do hot particles float upward while cooler ones fall? Lead into how this simple observation sparked ideas in different cultures that eventually led to the first balloons.

Assessment

Students complete the worksheet individually.
Teacher observes group participation and evaluates accuracy in presentations.
Reflection questions measure understanding of convergent discovery.

Rubric

Criteria	Excellent (4)	Good (3)	Fair (2)	Poor (1)
Content Understanding	Demonstrates strong grasp of balloon history and principles	Shows general understanding with minor errors	Limited understanding, some errors	Minimal understanding, frequent errors
Discussion Participation	Actively contributes thoughtful ideas and listens respectfully	Contributes with some prompting	Rarely contributes	Does not participate
Worksheet Completion	All sections complete with clear, accurate answers	Most sections complete, mostly accurate	Some sections incomplete or inaccurate	Worksheet not completed
Technology Connections	Makes clear connections between science, history, and culture	Makes some connections	Few connections	No connections

9 Fun Facts

1. **Sky lanterns are ancient floating lights from China.** For over two thousand years, small paper lanterns heated by flame have been used in China during festivals and ceremonies. These lights drift using hot air, and ancient people saw smoke or candle flames lifting paper and turned that into celebration.
https://epicfireworks.com/blogs/news/a-journey-through-the-history-and-meaning-of-sky-lanterns

2. **Bartolomeu de Gusmão demonstrated small hot-air balloons in Portugal.** In 1709, a Jesuit priest named Bartolomeu de Gusmão launched small paper balloons in front of King João V of Portugal. They rose indoors using hot air from a flame, but the idea was never scaled up to carry passengers.
https://www.laahs.com/brazilian-pioneer/

3. **The Montgolfier brothers built the first hot-air balloons that carried animals.** In 1783 in France, Joseph-Michel and Jacques-Étienne Montgolfier launched a balloon with a sheep, duck, and rooster as passengers to test if living creatures could survive flight. The experiment proved hot air can lift enough weight, paving the way for human flights.
https://www.museumofflight.org/exhibits-and-events/exhibits/montgolfier-brothers-balloon

4. **Navigation was the biggest weakness of early balloons.** Hot air balloons drifted with the wind and pilots had little to no control over direction. This problem inspired inventors to create dirigibles, elongated balloons with rudders and eventually engines, that could finally be steered.
https://balloonrides.com/history-of-ballooning-and-how-hot-air-balloons-work/

5. **Balloon "fuel" and flight time are more limited than people think.** Modern hot air balloons use propane burners to heat the air inside the envelope. Each blast of flame sends a puff of superheated air up, making the balloon lighter than the surrounding air. Most flights last about an hour before fuel and landing space become limiting factors.
https://www.planoballoonfest.org/p/about/anatomy

6. **Balloon flights captured imaginations in real literature.** Authors like Jules Verne used balloons in Five Weeks in a Balloon as a way to explore unknown lands in stories. In The Wizard of Oz, a balloon exit is part of the magical ending. These works helped cement balloons as enduring symbols of adventure and imagination.
https://clarkesworldmagazine.com/sessarego_09_20/

7. **Some famous balloon scenes are myths, not from the originals.** The Count of Monte Cristo never had a balloon entrance in the original novel, that was a later film addition. Around the World in Eighty Days also did not use a balloon in the book, though many editions and adaptations show one. These rewrites show how balloons became cultural shorthand for adventure, even when authors left them out.
https://www.scifipulse.net/phileas-fogg-bursting-the-balloon-myth/

8. **Hot air balloons have set extreme world records.** The furthest distance flown is about 46,759 km, and the heaviest passenger load reached 32 people in a single balloon. Other records include flights to nearly 70,000 feet and staying aloft for more than two weeks.
https://www.guinnessworldrecords.com/search?term=hot%20air%20balloon&page=1&type=record&max=20&partial=_Results&

9. **Balloon festivals remain huge cultural and visual events.** Even now, hundreds of balloons launch at dawn at major festivals, drawing tens or hundreds of thousands of people. The Albuquerque International Balloon Fiesta in New Mexico is America's largest balloon festival, featuring about 500 balloons and attracting well over 800,000 visitors over its run.
https://www.ncsl.org/resources/details/my-district-is-home-to-the-albuquerque-international-balloon-fiesta

Worksheet

Name: _____ Date: _____

Review

1. What are Chinese sky lanterns and how do they work?

2. Who was Bartolomeu de Gusmão and what did he demonstrate?

3. What animals were launched by the Montgolfier brothers?

Discussion

4. Why was navigation a weakness in early balloons?

5. How did dirigibles improve on traditional balloons?

6. Why did authors like Jules Verne and L. Frank Baum use balloons in their stories?

Data Analysis

7. How long do most modern hot air balloon flights last, and why?

8. List two records that hot air balloons have set.

9. How many people were lifted in the record-setting passenger balloon?

Reflection

10. How do modern balloon festivals connect to the early sky-lantern festivals?