



BOOKS & BALLOONS: A Multi-Disciplinary Approach to Literature, Science and Math

After reading aloud the book, *The Twenty-one Balloons* by William Pene du Bois, students will design their own balloons, complete experiments with balloons and create math problems using factual information about balloons.

LESSON PLAN

Lesson Objectives

Students will:

- Read aloud the book, *The Twenty-One Balloons*, by William Pene du Bois
- Design their own balloons and baskets
- Complete experiments with balloons filled with helium
- Create math problems using factual information about balloons
- Identify geographic locations mentioned in the book on a world map

Goal

This literature-based lesson plan will allow students to practice knowledge and skills from different curriculum areas to include English Language Arts, Science, Mathematics, Social Studies, and Fine Arts.

Background

The Twenty-one Balloons, a novel by William Pene du Bois, was first published in 1947 and was awarded the Newbery Medal for excellence in American children's literature in 1948. It is a classic fantasy-adventure tale that tells the story of retired school teacher Professor William Waterman Sherman's attempt to travel around the world via a huge hydrogen-filled balloon. The chapters tell what happened to him after he was discovered floating in the Atlantic Ocean with a raft and, not one large balloon, but twenty-one balloons.

After his big rescue, a hero's welcome and some time to recover, the professor recounts the tale of his journey to a fascinated world audience.

Grade Level: 5

[Ohio Learning Standards/Science \(2018\)](#)

Expectations for Learning

[Nature of Science](#)

Physical Science

5.PS.1: Change in movement of an object

[Ohio Learning Standards/Mathematics \(2017\)](#)

Standards for Mathematical Practices

4: Model with Mathematics

[Ohio Learning Standards/Social Studies \(2018\)](#)

History Topics:

[Historical Thinking and Skills](#)

Geography Topics:

[Spatial Thinking & Skills](#)

[Place and Regions](#)

[Human Systems](#)

[Ohio Learning Standards/Fine Arts \(2012\)](#)

Grade 5

4.PR: Use art to communicate understanding of an interdisciplinary concept.

[Ohio Learning Standards/English Language Arts \(2017\)](#)

Reading Standards for Literature

[RL.5.1](#), [RL.5.2](#), [RL.5.5](#) and [RL.5.6](#)

Reading Standards for Informational Text

[RI.5.1](#), [RI.5.2](#), [RI.5.4](#), [RI.5.7](#), [RI.5.8](#), and [RI.5.9](#)

Speaking and Listening Standards

[SL.5.1](#), [SL.5.2](#), [SL.5.4](#) and [SL.5.5](#)

Materials Required:

- The book, *The Twenty-One Balloons*, by William Pene du Bois
- Access to the Internet (computers, tablets)
- Drawing paper or poster board, 12" by 18" or larger
- Crayons, colored pencils or markers
- Balloons filled with helium
- Objects to tie to the balloons: paper clips, weights, erasers, blocks, etc.

Sherman's initial flight, which began in 1883, ended a week later when a seagull punctured his balloon, forcing him to crash land on the volcanic island of Krakatoa. The island is inhabited by twenty very eccentric families sharing the extreme wealth of a secret diamond mine. The families maintain a well-hidden and very sophisticated civilization on the island, including each family owning a restaurant with a theme (including one in which the furniture acts as bumper cars!) and children-invented games and amusements. Not long after his arrival, the volcano erupted and they fled the island, again via ballooning. Eventually, Sherman ends up in the Atlantic Ocean where he is rescued by a steamship.

Procedure:

1. Introduce the book to the students. Encourage them to predict what it might be about and how it might fit into a discussion of flight. Read the first paragraph of the introduction. Discuss the two different attitudes toward travel that are mentioned. Ask students to list all the real or imagined ways to travel by the shortest route or using the fastest method. Then do the same for the longest route or more leisurely method. Discuss how descriptions of these two trips might differ (amount of details and number of things seen, length, etc.). Have students share which way they would like to travel if they had the chance.
2. After reading chapters 1-3, ask how the author describes Professor Sherman's balloon and living quarters. Include details of what the basket and balloon look like, the functions of the different spaces, and how the Professor used the small space he had. Have students design their own balloons. Sketch it with pencil and paper, then use 12 x 18" drawing paper or poster board to complete a colored design. Make a detailed drawing of the inside of the basket on the back of the paper. Have students write what they would take on a trip like the professor's.
3. Using some of the websites listed in the resources section below, have students determine fact from fiction in the novel.
4. Have students investigate how much weight can be carried by a regular balloon filled with helium by designing and carrying out a series of experiments with objects of different weights and sizes tied to a balloon. Students can create charts summarizing their results and compare their conclusions to the information about hydrogen in the book.
5. Have students create math problems about the various things that can or cannot be lifted by a balloon or set of balloons. Use the factual information about balloons in the book and/or use other nonfiction books about them. Some of the information in the book that can be used to write problems are: various display balloons in San Francisco lift 6, 60, and 75 pounds; balloons on the escape raft are either 16,200 or 32,400 cubic feet each; hydrogen's lifting power is 70 lbs. per 1000 cubic feet.
6. Use a world map to trace Professor Sherman's two balloon voyages. Identify each country and ocean he crossed.
7. Have students list the three different types of lifting balloons mentioned in this lesson. Compare/contrast.

Extensions:

1. Have students create skits, summaries or retellings of specific parts of the story. These should include the actual story line as well as the factual information about balloons that is included in the story.
2. Invite students to write an imaginative scene that shows how people might have reacted when they saw the huge balloon pass over them.

Resources:

The Twenty-One Balloons:

du Bois, William Pene. **The Twenty-One Balloons**. New York: Puffin Books, 2005 (many versions available)

<http://blogs.slj.com/afuse8production/2012/05/22/top-100-childrens-novels-64-the-twenty-one-balloons-by-william-pene-du-bois/>

<https://www.scholastic.com/teachers/books/the-twenty-one-balloons-by-william-pene-du-bois/>

<https://www.npr.org/books/titles/138079025/the-twenty-one-balloons>

Websites on balloons and ballooning:

<https://science.howstuffworks.com/transport/flight/modern/hot-air-balloon.htm>

<http://www.eballoon.org/history/history-of-ballooning.html>

<https://www.nationalballoonmuseum.com/about/history-of-ballooning/>

<https://www.pbs.org/wgbh/nova/article/short-history-of-ballooning/>

<https://www.kirtland.af.mil/About-Us/Fact-Sheets/Display/Article/825982/air-force-high-altitude-balloon-program/>

<https://www.nationalmuseum.af.mil/Visit/Museum-Exhibits/Fact-Sheets/Display/Article/195681/excelsior-gondola/>

<https://balloonfiesta.com/Gas-Balloons-History>

<https://www.britannica.com/technology/balloon>

Websites on Krakatoa:

<https://www.livescience.com/28186-krakatoa.html>

<https://www.theatlantic.com/magazine/archive/1884/09/the-volcanic-eruption-of-krakatoa/376174/>

<https://www.britannica.com/place/Krakatoa>

<https://www.history.com/this-day-in-history/krakatau-explodes>