

HOT AIR BALLOONS, (AND OTHER FORMS OF FLIGHT), NOT FOR THOSE THAT ARE TOO DENSE

Master Teacher: Jeff Duffy

Grade Level: 6-8

Time Allotment: Two 50-minute class sessions

Overview: Students will read about one of the earliest "manned" flights as well as a brief glimpse at the history of lighter than air aircraft. They will witness how a hot air balloon is sent aloft and will join a celebrity when he goes up. They will also follow plans to make a paper airplane and watch some aviation pioneers who did not get airborne. They will take a test about hot air balloons using an online, self-scoring exam.

Subject Matter: Science, Social Studies, and Math

Learning Objectives:

The learner will be able to:

Describe early attempts at flight and explain how hot air balloons work.

Calculate the volume of a given space and compare that to the volume of a hot air balloon

Describe why some early aircraft did not, and could not, work.

Follow instructions on paper plane construction and fly their creations.

Standards:

From Texas Essential Knowledge and Skills (TEKS)

Plan and implement an investigative procedure.

Review, analyze, and critique scientific explanations.

Demonstrate the basic relationship between force and motion

Use models and identify their limitations.

Identify a design problem and propose a solution.

Evaluate the impact of research on scientific thought, society, and the environment.

Give examples of scientific discoveries and technological innovations that have

shaped the world.

Use formulas to solve application problems involving surface area and volume.

Media Components:

Video Reading Rainbow #201 *Hot-Air Henry*

World Wide Web

Web Sites:

The History of Island Ikaria

<http://www.island-ikaria.com/myth.htm>

The Story of Icarus

The History of Hot Air Balloon

<http://messel.emse.fr/~tdaurat/montgolf/haballoon.html#1h1>

Balloon history

TrackStar

<http://trackstar.4teachers.org/>

Track Star Home Page

Quizstar

<http://quiz.4teachers.org/index.php3>

Online Test, Duffy, J. Hot Air Balloons

Balloon Zone

<http://www.balloonzone.com/history.html>

Hot Air Balloons

Trackstar

http://trackstar.hprtec.org/main/display.php3?track_id=4048

Hot Air Balloons

Alex's Paper Airplanes

<http://www.paperairplanes.co.uk/planes.html>

Paper Airplane Instructions

Materials:

Ping-Pong ball (Or any small object less dense than water)

Glass of water

Unruled paper

Calculators

Tape measure

Prep for Teachers:

Teachers should read the story of Icarus (#1). Have a small glass of water available into which to drop a ping pong ball. Teachers should visit the Quizstar site and prepare a pre- or post-test or use the ready-made test is at this site. (Quiz Star was being renovated at press time. Reference Duffy, Hot Air Balloons.)

Cue the video.

Introductory Activity:

Step 1 Ask students, "When did man first begin dreaming about flying?" Visit the Icarus site (#1) and read the story.

Step 2 Discuss the story line and apply current student knowledge to explain why Icarus was not likely to be successful, even had his wax not melted. (His body mass is much too great for the strength available).

Step 3 Drop the ping-pong ball to the floor, then drop it into the glass of water. Ask the students why it falls through the air, but floats in the water, and does the demonstration have anything to do with flight. (Relative density of the objects)

Step 4 **Focus for Media Interaction:** "We are going to see a video tape about how man has been able to fly. You will need to be able to describe why hot air balloons can fly and how they get airborne."

Learning activities:

Step 1 Begin at a view of the countryside through the window of a helicopter.

Step 2 Pause: Lavar says, "Let's go down and see what's happening." Ask students if they know how hot air balloons work and when they were invented. Some may know about density, most will not know the history. Visit site of balloon history. (#'s 2 & 6) Point out that balloonists were very careful when they were developing lighter than air craft.

Step 3 Fast forward to "The End" of *Hot Air Henry*. Play: Lavar helps/watches as the Reading Rainbow Balloon is readied for flight.

Step 4 Pause: Lavar says, "It is a lot of hot air." A fan begins to inflate the balloon. Ask students why the balloon must be so large. It holds 70,000cf of air. Measure and calculate the size of the room the students are in and determine what percent of that room volume is contained in the balloon. Say, "A hot air is balloon is very simple in design and construction. What kind of problems may arise?" Answers may vary. Say, "Problems may occur with other types of aircraft as well. Here are some scenes from man's early attempts to fly. Look for reasons why

these attempts did not work." Play: Scenes from different ill-fated aircraft are depicted.

Step 5 Pause: Lavar says, "Better luck next time. Ask, "Would scenes like this make you nervous about flying?" Discuss some reasons why these attempts did not work. Responses will vary. Say, "Let's see how simple Lavar's flight is and why." Play: Lavar admits to being anxious. He becomes airborne.

Step 6 Pause: "I feel like a bird or a plane, or superman." Scene fades to Lavar. Fast Forward: "LEM" passes by the US flag. Play: Lavar drifts above the treetops.

Step 7 Pause: Boy says, "Watch galactic glider take off." He throws the glider toward the camera. Say, "Like birds, man often uses wings to fly. Let's make some paper models and see how well they fly."

Step 8 Visit site #7. Pass out paper. Have students select a plane, fold and fly it.

Step 9 (While planes are being folded, fast forward to scene where a blue balloon is lifting off.) Play this last segment if time permits at the end of the model making section. Lavar invites everyone to try to take a hot air balloon ride.

Culminating Activity:

Use the paper planes to have a flight contest. Let students determine whether time or distance, etc. should determine winners.

Cross-Curricular Extensions:

Art:

Balloons or model planes can be designed and decorated.

Social studies:

The impact of flight on civilization can be explored

Math:

Mass/distance ratios can be calculated

Language:

Flight poems or short stories can be written

Community Connections:

Visit an area airport

Invite a balloonist into the classroom

Have a city official describe the importance of air traffic on the community.

Student Materials

No student materials are needed for this lesson