



POWER POINT GUIDE: BALLOON CHALLENGE

SLIDE 1



TEACHER SLIDE

Show videos of student launching balloons.

Example videos:

<https://www.youtube.com/watch?v=SRsSd6pXtMY>

<https://www.youtube.com/watch?v=Pr9FIdSHDIA>



TEACHER SLIDE

Choose one of the following two slides for your design challenge.

Lifting Force of Helium OR Hot Air

AMAZON ORIGINAL
THE
AERONAUTS



sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

AMAZON
STUDIOS

BALLOON CHALLENGE

HELIUM

- You are going to be working in teams to build a balloon
 - a. Design a tissue paper balloon
 - b. Lifting force will be a 6 inch balloon with helium
 - Helium balloon will be inserted into the tissue paper balloon
- Requirements
 - a. Lift a as much mass as possible
 - b. Ascend to a minimum height (TBD by teacher)

AMAZON ORIGINAL
THE
AERONAUTS



sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

AMAZON
STUDIOS

BALLOON CHALLENGE

HOT AIR

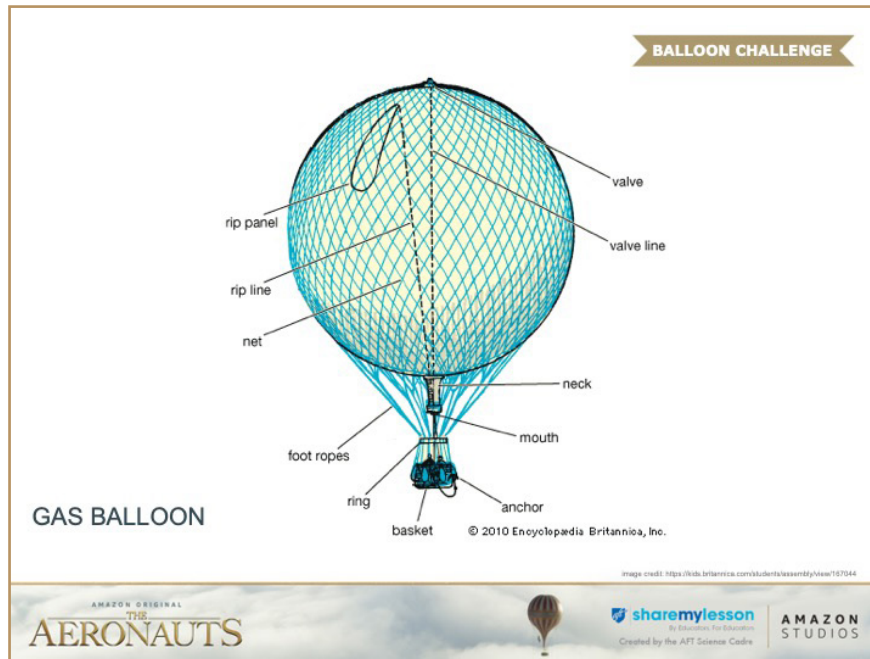
- You are going to be working in teams to build a balloon
 - a. Design a tissue paper balloon
 - b. Lifting force will be a hair dryer
 - Hair dryer will fill the balloon will be inserted into the tissue paper balloon
- Requirements
 - a. Lift a as much mass as possible
 - b. Ascend to a minimum height (TBD by teacher)

AMAZON ORIGINAL
THE
AERONAUTS



sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

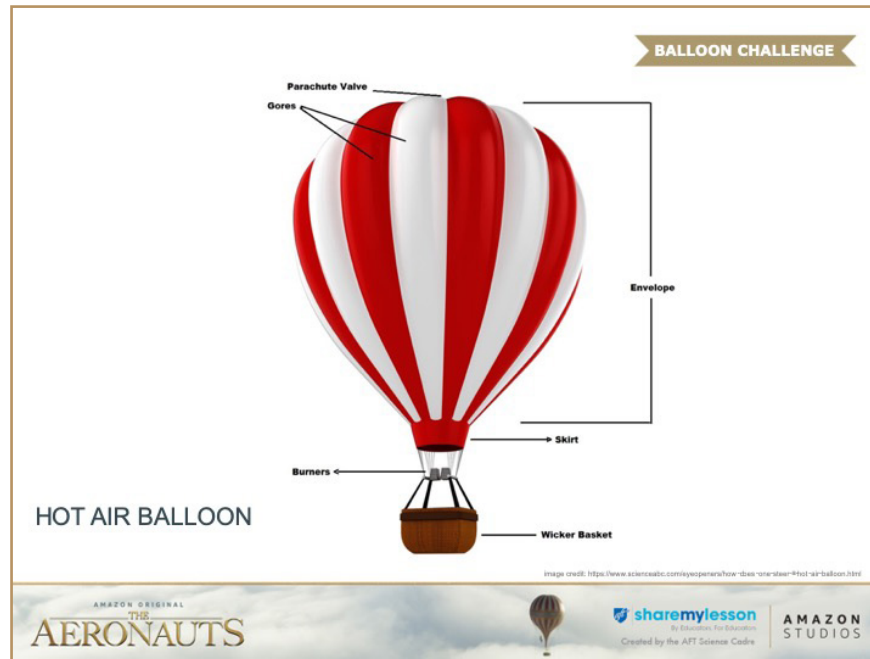
AMAZON
STUDIOS



Use this slide to introduce students to the parts of a balloon. This is a gas balloon. We will not need a valve line or a rip line because there will not be a pilot to operate the valve.

The rip panel and rip line were used by the balloon pilot when the balloon landed to rapidly release the air.¹




<http://www.madehow.com/Volume-3/Hot-Air-Balloon.html>



Use this slide to introduce students to the parts of a balloon. This is a hot air balloon.

BALLOON CHALLENGE

- Get into your groups.
- Plan your balloon.
- Draw a diagram.
- Diagram must include
 - a. Name of balloon
 - b. Shape of the balloon
 - c. How you will connect the tissue paper sections (gores) of the balloon together.
 - d. How you will attach the “basket” to the balloon
 - e. A force diagram showing the forces acting on the balloon as it is ascending.



Assign or allow students to form cooperative learning groups of 3–4 students.

Students should draw their design and force diagram on poster paper or white boards. Each group will present their ideas to the class.



As each group presents their designs the classmates should ask questions, make constructive suggestions and give compliments.

| BUILD BALLOONS |

- Minimum three days
- Students keep a journal
 - a. At the end of every day they record
 - Problems encountered & solutions
 - Design changes and why
 - Observations



Teachers should edit the time frame to meet their needs.

Students should be given time at the end of each period to make an entry in their science journal.

SAMPLE JOURNAL ENTRY

Balloon Challenge - Hot Air Balloon
11/15/2019

Problem
The balloon will not fully inflate because air is leaking from where the tissue paper sections (gaps) of the balloon envelope are connected.

Reason
We used staples to attach the gaps together. We used as few staples as possible to keep the mass of the balloon low. There are gaps between the staples on the seam and as the balloon expands, these spaces open forming gaps that allow air to escape from the inflated balloon.

Solution
Fold the tissue paper sections together twice before stapling.

Reason
As the balloon inflates, the folds will keep the gaps locked together. Air will not leak because there will not be gaps.

AMAZON ORIGINAL
THE
AERONAUTS



sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

AMAZON
STUDIOS

BALLOON FESTIVAL

- Each group presents their balloon design
- Tell the name of the balloon
- Tell the features, including the mass your balloon will be able to lift.
- Science behind the balloon
 - a. Explain why balloon will float
 - b. Explain the forces acting on the balloon using a force diagram.
- Answer questions
- Launch balloon
- Record (if possible).

AMAZON ORIGINAL
THE
AERONAUTS



sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

AMAZON
STUDIOS

BALLOON FESTIVAL

What design features allowed the balloons to lift the additional mass to the designated height?

- Shape of the envelope
- Method of attaching basket
- Materials used
- Other observations

AMAZON ORIGINAL
THE
AERONAUTS

sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

AMAZON
STUDIOS

After all the balloons have been launched, have a class discussion about what features were incorporated into the most successful designs.

ASSESSMENT

- Use rubrics
- Original design
- Journal
- Team work and productivity (can be self and peer assessed)
- Balloon performance

AMAZON ORIGINAL
THE
AERONAUTS



sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

AMAZON
STUDIOS

ASSESSMENT

- Class choice – Which balloon they would most want to ride?
- Lifted the greatest mass
- Most ambitious design
- Smoothest ride

AMAZON ORIGINAL
THE
AERONAUTS



sharemylesson
By Educators, For Educators
Created by the AFT Science Cadre

AMAZON
STUDIOS

At the balloon festival, present awards to the following groups of students.