

DESIGN A FOOTBALL HELMET

OBJECTIVES:

Students will plan, design, construct, and test a model of a football helmet that will keep a small balloon from bursting.

Students will analyze the results of their test and develop ways to improve their model.

PREPARATION:

- 1 air-filled water balloon per group (for design and construction)
- 1 water-filled water balloon per group (for testing)
- 1 planning/recording sheet per student
- Miscellaneous materials for helmet construction (chosen at the teacher's discretion): bubble wrap, plastic wrap, cotton balls, egg cartons, masking tape, plastic straws

CHALLENGE

Lead students in a discussion about football gear and why it is needed.

Watch a [5-minute video of how helmets](#) are made:

- Discuss why helmets are needed and other observations from the video.

Today's Challenge: You have been asked to design a new football helmet that will protect the players of your favorite team.

Ask Students: What do we need to know in order to solve this problem?

Introduce the Engineering and Design Process.

Ask Students: What are engineers? What do they do? Why do they need to work together?

Teacher: Provide time for the students to ask questions about the challenge. Share the following recommended criteria and constraints as questions are answered:

Criteria: The helmet must protect a small water-filled balloon from bursting when it is dropped from a minimum height of 6 feet.

Constraints: Students may only use the materials provided.



Video QR Code



IMAGINE, CREATE & TEST

The students will record the results from the model that their group designed.

The teacher and students will discuss why their model was/wasn't successful. They will compare the success or failure to how animals and things in nature are protected by bark, coverings, fur, shells, etc.

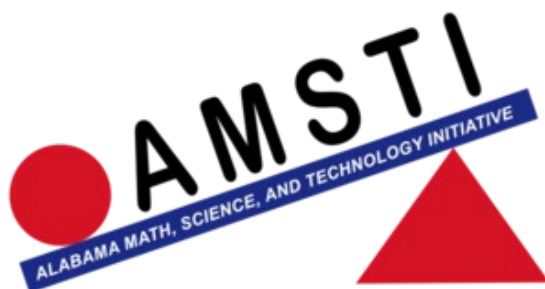
IMPROVE

Each group will collaborate to discuss ways they can improve their model. If it worked, they can think about how they could make it work even better. If the test did not work, the group will evaluate the design and develop another plan.

COMMUNICATE

On the recording sheet, students will draw a diagram of their final model.

Using the writing frame on the recording sheet, students will write to describe their model. They will also explain if the model succeeded or failed and give a reason why.



DESIGN A FOOTBALL HELMET



OUR PLAN



OUR FINAL DESIGN

Materials we will use:

- | | |
|---|---|
| <input type="checkbox"/> bubble wrap | <input type="checkbox"/> cotton balls |
| <input type="checkbox"/> plastic wrap | <input type="checkbox"/> masking tape |
| <input type="checkbox"/> foil | <input type="checkbox"/> plastic straws |
| <input type="checkbox"/> egg cartons: how many? | |

How we improved our plan:
