

Name _____
Team _____

Date _____
Period _____

Brain Safety Design Challenge - Day 1

NGSS MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells

MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Task

Your team is part of the equipment designing firm, Boogie Down Sporting Goods Company. Your firm has been hired to design a football helmet that can protect players and withstand a maximum impact. The team in the firm that comes up with the most effective design will get the contract for the account.

Your design must:

- a) Stay on the head.
- b) Keep the skull from cracking.

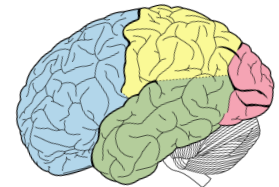
Using an egg as a model for the brain:

You will be using an egg as a model for the brain. The shell represents the skull, the yolk represents the brain and the white of the egg represents the fluid surrounding the brain.

Materials

You may use any of the following materials:

Bubble wrap, Paper cups, Paper clips, String
Cardboard, Straws, Rubber bands, Small balloons
Masking Tape, Netting, Egg carton pieces, cotton balls



Step 1: Brainstorm (10 minutes)

Use chart paper and markers to brainstorm with your partners:

1. What information do you need to know that will help you to be successful with your mission?
2. Write your brainstorming ideas down in on chart paper.

Step 2: Draw (10 mins)

Create a labeled drawing of your solution. Be as detailed as possible in your drawings, including dimensions. (Football Helmet Design)

Brain Safety Design Challenge - Day 2

Step 3: Build and Test

Build your helmet and test. In the space below, describe what you did to build your design:

Step 4: Evaluate

1. What worked well and what didn't?

2. What do you need to change?

Step 5: Revise

Modify your design based on your test.

Brain Safety Design Challenge - Day 3

Step 6: Analyze

Answer the following questions:

1. Was your design a success? What is your evidence?

2. If your design was not a success, what region of the brain was damaged?

3. What functions of the body/mind would be affected by the damage?

4. What were some of the challenges in your design?

5. If you could make additional modifications, what would you change?

Step 7: Summarize

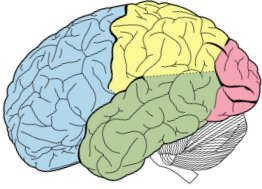
Write a three paragraph report on **loose-leaf paper** about the design challenge experience.

Make sure your report includes:

1. An introductory paragraph describing what the problem was that you had to solve.
2. What steps you took in building your design.
3. What happened in your test.
4. What changes you made.
5. What happened in your final test.
6. What changes you would make if you could make more modifications.
7. What regions of the "brain" were damaged (if any) in your test.
8. What the effects of the damage would be if it were a real person.
9. What you learned from the activity.

Step 8: Present

Brain Safety Design Challenge - Day 4



Step : Present

Present to your peers.

NGSS

MS-ETS
1 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

MS-LS1-
3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells

Instructions:

1. You will have 15 minutes to complete and revise your report.
2. After your complete your revisions, each team member will have five minutes to read their report to the team.
3. Team members will have two minutes to ask clarifying questions.

Rubric

Category	Novice	Apprentice	Practitioner	Expert
Report had an introductory paragraph.				
Explanation of how the design was built was clear and understandable.				
Explanation of how the design was modified after the first test was clear and understandable.				
Analysis of what further modifications they would make made sense.				
The report shows a clear understanding of how impact can damage the brain.				
The report shows a clear understanding of how damage to the brain affects function.				