Vehicle Restraints
Riverside Middle School

Content Area: STEM

Course: Middle School Science and Math

Unit: Science-8.5 (Force, Motion, Slope and Speed)/ ELA- Research and Articles on Crash/ Math- All Operations of Rational Numbers and Measurement/ Technology

Standards:

• Common Core Math Standards- Mathematical Practices 1-8
• Science Standards- 8th Grade(8.5 Forces and Motion)
• ELA Common Core Standards-Research, composition, and Informational text
• Technology- Engineering design, Sketching and Design Processes

“Big Ideas”

• Define Terms: Inertia, force, gravity, and motion
• Research restraint materials and systems
• Sketch restraint system
• Protect EGG from breakage
• Build restraint system
• Maintaining an Engineering Journal
• Engineering Design

Essential Question: Can a vehicle restraint system be designed that will protect a raw egg from breakage?

Scenario: You are a part of the Nascar safety team. Because there have been several severe crashes this season, your team needs to revise the restraint system that better stabilizes the head and neck of the driver.

Denny Hamlin Nascar auto crash- YouTube Video Clip of the crash- http://www.youtube.com/watch?v=3-lul7LIYsA


Materials and Resources: (Per Team of 2 Students)

1. Wooden Block
2. Wheels and Axles
3. Velcro Strip
4. Duct Tape
5. Packing Material
6. Plastic bags
7. Glue gun
8. Hot glue stick
9. Masking tape
10. Straws
11. Pipe cleaner
12. Metal wire-wire hangers
13. Pliers
14. Wire cutters
15. Drill press
16. Miter saw
17. Cotton balls
18. Cardboard
19. Rubber bands
20. Elmer’s glue
21. Nylon
22. Air Compressor
Content Information:

- Force
- Motion
- Speed
- Kinetic and Potential Energy
- Newton’s 3rd Law
- Conservation of Energy

Deliverables: The Nascar Safety board has supplied your team with your vehicle. You are to use only the materials on the supply table to create your safety restraint system that will keep your egg from being broken.

Parameters:

- You are not allowed to spend more than $50.00
- Your vehicle will be powered by compressed air.
- You have a 30 ft. test track
- Operate without direct contact of the builders.

Assessment:

Team Name:____________________________________

Group Members:________________________________

Vehicle Name:__________________________________

Scoring Criteria:

1. ________ (0-20) Engineering Journal- completed restraint system with working drawings and brainstorming sheet.
2. ________ (0-20) Completed restraint system showed evidence of creative use of materials.
3. ________ (0-40) Restraint system functioned properly.
4. ________ (0-10) Team utilized the engineering design loop to solve the problem.
5. ________ (0-10) Cooperation of all Nascar Team members.