Lesson Plan Title
Crash Test Theater

Grade Level
6th Grade

Subject Area
Science

MSCCRS
P.6.6.1 Use an engineering design process to create or improve safety devices (e.g., seat belts, car seats, helmets) by applying Newton's Laws of Motion. Use an engineering design process to define the problem, design, construct, evaluate, and improve the safety device.

P.6.6.3 Investigate and communicate ways to manipulate applied/frictional forces to improve movement on various surfaces.

P.6.6.5 Conduct investigations to predict and explain the motion of an object according to its position, direction, speed, and acceleration.

Art Form
Theatre

MSCCR Creative Arts Standards
TH:CR1.1.6 Generate and conceptualize artistic ideas and work.
a. Identify possible solutions to staging challenges in a drama/theatre work.
c.Explore a scripted or improvised character by imagining the given circumstances in a drama/theatre work.

TH:CR2.1.6 Organize and develop artistic ideas and work.
a. Use critical analysis to improve, refine, and evolve original ideas and artistic choices in a devised or scripted drama/theatre work.
b. Contribute ideas and accept and incorporate the ideas of others in preparing or devising drama/theatre work.

TH:Pr4.1.6 Select, analyze, and interpret artistic work for presentation.
b. Experiment with various physical choices to communicate character in a drama/theatre work.

TH:Re9.1.6 Apply criteria to evaluate artistic work.
a. Use supporting evidence and criteria to evaluate drama/theatre work.

Duration
2-3 hours Can be broken down over several days

Materials
Student computers with internet access
Equipment for showing student presentations (if you choose to do so)
Open space for performing skits

Objectives
Students will research safety devices, such as helmets and seatbelts.
Students will explain the laws of motion that govern safety devices.
Students will collaborate, create, and perform slow-motion skits that show the proper and improper use of safety equipment.

Vocabulary
Newton's First Law
Newton's Second Law
Newton's Third Law
Inertia
Applied force
Balanced force
Unbalanced force

Lesson Description

1. Begin this lesson after teaching Newton's Laws. Students need to have already an understanding of these laws and the terms inertia, applied force, balanced force, and unbalanced force. They should use any applicable terms when explaining their skits.
2. **If students are not already familiar with creating and performing skits, before beginning the lesson, introduce students to this concept with a mini-lesson. The mini-lesson can be found below the lesson description.***
3. Divide students into groups of 3-4. Each group will be tasked with creating multiple slow-motion skit presentations showing the use, misuse, and lack of use of safety equipment and give scientific reasoning why the proper use of these devices could save lives.
    a. Group 1: Bicycle helmet
    b. Group 2: Motorcycle helmet
    c. Group 3: Seatbelt
    d. Group 4: Carseat
    e. Group 5: Airbags
    (More than one group can be assigned to the same device, depending on the size of your class.)
4. First, groups must spend time researching their assigned safety device. Links are provided in the resources section below. If time permits, have them prepare a presentation to accompany their skit on how their device works and its proper/improper usage. They can present these to the class before performing their skits.
5. After groups are familiar with their assigned safety device and why it works, they will create multiple skits. These skits are imaginative and can be prop-free. Students can create characters, dialogue, and a brief storyline that ends in a slow-motion

crash/accident. (Only the “crash section” of the skits need to be slow-motion.) One - two skits should show the lack of use and/or misuse of the equipment. For example: no seatbelt and/or a seatbelt that is not being worn properly in a car crash. The last skit should show how the proper use of the equipment could save lives. For example: a seatbelt that is fastened and worn correctly in a car crash.

6. After rehearsing the skits, students will perform them for the class. While some students in the group are acting, other students in the group should explain how the laws of motion are affecting the actors and their safety equipment during the slow-motion crashes.
7. Before and during performances, emphasize to the audience (non-performing classmates) the importance of being good audience members (sit quietly, pay attention, clap appropriately, and possibly ask questions of “performers” when given the opportunity to do so). Have audience members discuss the skits and the choices that were made by asking things such as, “What are some things they did really well in this presentation?” and “What are some things that could be improved?” Focus specifically on how the performers showed the improper and proper use of the safety equipment through their dialogue and movements.
8. To wrap up the lesson, ask students to recall and retell how the laws of motion apply to the safety devices that were demonstrated in this lesson.

***Mini-Lesson - for classes that are not already familiar with creating and performing skits**

1. Have students stand and become aware of their personal space by stretching, bending, etc.
2. Explain that when we perform skits, especially without props, our bodies have to tell the story just as much as our words.
3. Conduct a facial expression exercise by asking students to show different emotions without making a sound (anger, sadness, joy, pain, excitement, etc.). Do any of these emotions look similar? What would be the difference in sadness and pain?
4. Conduct a movement exercise by asking students to act out different scenes/actions without props (driving a car, dribbling a basketball, riding a skateboard, etc.). How can we show our audience that we are doing these things with our bodies alone?
5. For this specific lesson, allow students to experiment with slow-motion movements. Give them a movement (such as riding and falling off a bike) that begins in real-time and then gradually gets slower and slower. Are we changing just the speed of our bodies or also the speed of our facial expressions and voices?
6. Once you feel like students have a grasp on these skit concepts, resume the lesson at step 3.

Recommended Resources

For student research:

1. Helmets: https://www.aboutkidshealth.ca/Article?contentid=1982&language=English
2. Seat belts: https://www.cdc.gov/motorvehiclesafety/seatbelts/facts.html
3. Car seats: https://www.cdc.gov/motorvehiclesafety/child_passenger_safety/index.html
4. Airbags: https://www.iihs.org/topics/airbags
   These are resources to get students started. You may choose for them to expand on their research by watching videos or visiting additional credible websites.

Extended Learning Activities
As a follow-up lesson, use performance objective P.6.6.1 to allow students to explore possible improvements to safety devices. Have students create a mock-up drawing of how they would improve these devices.

Sources
N/A

Tips
While students are creating and performing the skits, emphasize that there should be a solemn tone to the room because the proper use of safety equipment is not a subject to be taken lightly. The general assumption of 6th graders is that the slow motion skits might be a time to goof off and act silly, so preface the lesson with a tone of seriousness so that they know what the expectations of the performances will be.

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