artsNOW
Integrated learning solutions

SIMPLE MACHINE HEXATHLON CHALLENGE
Grade Band: 4-5
Content Focus: Theatre & Science

LEARNING DESCRIPTION

In this lesson, students will read how Mazie engineers simple machines in her house when students read the book, *Mazie's Amazing Machines*, by Sheryl Haft. Students will embody six simple machines in their groups by creating tableaux and playing the 3-Second Machine Game. They will then be challenged to create a hexathlon (six-event) competition using pantomime by designing six simple machines using their bodies.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How do simple machines help make tasks in our everyday lives easier? How do the parts of something help make the whole?	I can bring simple machines to life using my body. I can work as a team to design simple machines. I can work as a team to pantomime everyday tasks using simple machines.

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
Grade 4 S4P3. Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces. c. Ask questions to identify and explain the uses of simple machines (lever, pulley, wedge, inclined plane, wheel & axle, and screw) and how forces are changed when simple machines are used to complete tasks.	**Grades 4** TA4.PR.1 Act by communicating and sustaining roles in formal and informal environments. c. Collaborate and perform with an ensemble to present theatre to an audience. d. Create and perform characters based on imagination. e. Identify and explore character choices and relationships in a variety of dramatic forms (e.g. narrated story, pantomime, puppetry, dramatic play).

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
Grade 4 4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. 4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.	**Anchor Standard 3:** I can act in improvised scenes and written scripts. **Anchor Standard 8:** I can relate theatre to other content areas, arts disciplines, and careers.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
• Simple machines - Basic mechanical devices that are used to make work easier by altering the magnitude or direction of a force • Motion - The change in position or orientation of an object with respect to a reference point or frame of reference • Lever - A simple machine consisting of a rigid beam or bar that is free to pivot around a fixed point called a fulcrum	• Body - The physical presence, movements, and expressions of an actor • Gestures - The movements and actions of the body, particularly the hands, arms, and face, that are used by actors to convey emotions, thoughts, intentions, and messages to the audience • Tableau - A static and silent scene or picture created by actors who freeze in specific poses or positions to represent a moment or concept

• Pulley - A simple machine consisting of a grooved wheel (often called a sheave) that is mounted on a fixed or movable axle • Wedge - A simple machine consisting of a triangular-shaped object with a sharp edge or inclined plane on one or both of its sides • Inclined plane - A simple machine consisting of a sloping surface or ramp that reduces the amount of force required to lift or move objects vertically • Wheel and axle - A simple machine consisting of a wheel (a circular object with a central hole) mounted on an axle (a cylindrical shaft) • Screw - A simple machine and a type of fastener that consists of a cylindrical shaft with a helical (spiral) ridge or thread wrapped around it • Fulcrum - A fixed point or pivot around which a lever or other mechanical device rotates or moves • Load - The force or weight that is applied to a structure, device, or system • Force - A push or pull that can cause an object to change its state of motion, accelerate, deform, or experience other effects	• Pantomime - A form of performance where actors use gestures, facial expressions, and body movements to convey a story or narrative without speaking

MATERIALS

- Lanyards with inserted images of the six simple machines (one image per lanyard)
- SIMPLE MACHINE HEXATHLON CHALLENGE TASKS - WORKSHEET (one per group of 3 students)
- Pencils
- Timer

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

- Show the video – Coca-Cola Music Machine: "I'd Like to Buy the World a Coke".
- Ask students to describe what they saw.
    - Ask students what the purpose of the machine was in the video.
    - Discuss what a simple machine is.
- Introduce Rube Goldberg to students.
    - Read the book *Mazie's Amazing Machines by Sheryl Haft.*
    - While reading the book, explore each simple machine with a body movement.
    - After reading the book, ask students which Mazie machine was their favorite and how it made life simpler.

Work Session

SIMPLE MACHINE TABLEAU GAME

- Explain to students that they will be making a tableau demonstrating a simple machine that they learned about in the book.
    - Explain to students that a tableau is a static and silent scene or picture created by actors who freeze in specific poses or positions to represent a moment or concept
- Give each student a lanyard with the name of a simple machine.
- Have students get in groups of three with students who have the same simple machine.
- Have each group create a tableau of their machine using each group member. Then ask students to "bring it life" and demonstrate how the simple machine works with movement.

INTRODUCE PANTOMIME

- Explain to students that pantomime is a form of performance where actors use exaggerated gestures, facial expressions, and body movements to convey a story or narrative without speaking. Actors use acting and reacting in pantomime.
- Show students a video of pantomime such as Le Mime Marceau or Punch & Mimi-Brushing Teeth.

EVERYDAY SIMPLE MACHINE TASKS

- Ask students if they can think of examples of simple machines being used in everyday activities. Some examples are:
    - Inclined plane: Wheelchair ramp, skateboard ramp, slide
    - Wedge: Knife, axle, plow, prop to keep a door open
    - Screw: Lid to a jar, bottle opener, corkscrew
    - Wheel and axle: Steering wheel of a car, bicycle pedal
    - Pulley: Flagpole with flag, raising and lowering blinds
    - Lever: Scissor handle, paperclip, clothespin

CLASS HEXATHLON PHYSICAL CHALLENGE

- Introduce hexathlon events to students. These are Olympic-like events that have six different sports or competitions that athletes must perform.
- Tell students that they will create a Pantomimed Hexathlon Class Competition, with each of the six competitions representing an everyday task for each of the six simple machines.
    - Examples:
        - Prop a door open (wedge)

        - Untwist ten jar lids (screw)
        - Push a box up a ramp (inclined plane)
        - Complete a lap by scooter (wheel and axle)
        - Lift the most weight with a pulley
        - Sweep a ball into a goal using a broom (lever)
- Have each group develop a team name.

DEVELOP GAMES

- Each group will identify one everyday task for each of the six simple machines.
- Hand out the SIMPLE MACHINE HEXATHLON CHALLENGE TASKS - WORKSHEET for students to identify a task for each simple machine.
- Next, have students develop a pantomime for each task.
    - Tell students that it should have a beginning, middle, and end movement. This will help clarify and slow down the movements to avoid an overall general movement that does not show distinct parts.

LET THE GAMES BEGIN

- Set the stage by playing Olympic music.
- Invite each group to perform their tasks and time them.
- Have students in the audience identify which simple machine each task used.

Closing/Reflection

- Facilitate a class discussion that reflects on the following questions:
    - How can you use simple machines in your life to make everyday tasks easier?
    - Can you design a machine in your house or community to help someone in need? Which simple machines would it use?
- Have students draw a diagram of the beginning, middle, and end of each task pantomime with labels of simple machine names as well as any related vocabulary.
- Students should reflect and write about their machines and their process in designing them in their STEAM journal.

ASSESSMENTS

Formative

Teacher will assess students by:

- Circulating the room assessing students' understanding of the simple machine movements. **Adjust and correct students as you encounter movements that do not reflect the simple machine.*
- Asking questions to determine if students' bodies match the simple machine movements.
- Asking specific questions about the fulcrum, load, and force.

Summative

CHECKLIST

- Students can accurately bring simple machines to life with their bodies using pantomime and tableau.
- Students can write about their machines and their processes in their STEAM journal.

- Students can draw a diagram of the beginning, middle, and end of each task pantomime with labels of simple machine names as well as any related vocabulary.

DIFFERENTIATION

Accelerated: Have students videotape their group, introducing and enacting their Hexathlon competition machines on Flip Grid or another recording application.

Remedial: Have students explain one simple machine competition activity using a beginning, middle, and end.

ADDITIONAL RESOURCES

- **Simple Machine Books:**
  - Mazie's Amazing Machines by Sheryl Haft
  - The Most Magnificent Thing by Ashley Spires
  - Just Like Rube Goldberg: The Incredible True Story of the Man Behind the Machines by Sarah Aronson
- **Simple Machine Video:**
  - VIDEO - Coca-Cola Music Machine: "I'd Like to Buy the World a Coke"
- **Pantomime Videos**
  - Le Mime Marceau
  - Punch & Mimi - Brushing Teeth

**This integrated lesson provides differentiated ideas and activities for educators that are aligned to a sampling of standards. Standards referenced at the time of publishing may differ based on each state's adoption of new standards.*

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