

Title of the STEPAM Unit: Forces Game

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RELATED SUBJECTS	AGE GROUP OF THE STUDENTS	TOTAL ACTIVITY TIME	LEARNING OBJECTIVES DURING THE LESSON SUBJECT-SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON
Science, Physical Education, Art, Mathematics	3rd-6th grade (8-12 years old)	60 minutes	• Understand what a force is and its components: magnitude, sense, and direction. • Learn about different types of forces such as gravity, friction, electromagnetic forces, and electrostatic forces. • Experience the effects of forces through interactive activities.	• Reflect on the magnitude and direction of forces. • Understand how different surfaces affect friction and movement. • Apply knowledge of forces to real-life situations and other subjects.



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elements of physical education, art, and mathematics to create a multidisciplinary learning experience.

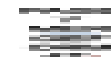
OVERVIEW: TOPIC & PURPOSE

The topic of this lesson is "Forces," focusing on understanding what a force is, its components (magnitude, sense, and direction), and the different types of forces such as gravity, friction, electromagnetic forces, and electrostatic forces.

The purpose of this lesson is to provide students with a hands-on, interactive experience to understand the concept of forces. Through engaging activities and discussions, students will learn how forces affect the movement and direction of objects. The lesson aims to help students grasp the fundamental principles of forces, including Newton's second law of motion

- $F=ma$

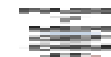
and apply this knowledge to real-life situations. Additionally, the lesson incorporates



ACTIVITY PREREQUISITES -STEAM ELEMENTS

ELEMENT 1: context presentation	Introduce the concept of forces and their components (magnitude, sense, and direction). Explain Newton's second law of motion ($F=ma$). Discuss different types of forces such as gravity, friction, electromagnetic forces, and electrostatic forces. Provide real-life examples to help students understand the application of forces.
ELEMENT 2: creative design	Students design and create arrows of different sizes and colors to visually represent forces. Encourage creativity in the design process, allowing students to personalize their arrows. Use the arrows during activities to demonstrate the direction and magnitude of forces.
ELEMENT 3: emotional and social learning	Promote teamwork and collaboration through paired activities. Encourage students to reflect on their experiences and share their observations with classmates. Foster a supportive environment where students can learn from each other and appreciate different perspectives. Discuss the importance of understanding forces in everyday life and how it relates to their interactions with the world around them.





STEAM SUBJECT ELEMENTS

STEAM SUBJECTS	SCIENCE	TECHNOLOGY	ENGINEERING	Physical Education	ARTS	MATHEMATICS
SHORT INTRODUCTION TO RELATED SUBJECT ELEMENTS	Understanding the concept of forces, including their components (magnitude, sense, and direction). Learn about Newton's second law of motion ($F=ma$)	Technology can be integrated by using digital tools or simulations to visualize forces and their effects. Students can use apps or software to model forces and predict outcomes in various scenarios.	Students can explore how forces are used in building and construction of structures with their bodies, and how engineers solve problems related to force and motion.	Students will participate in interactive games that require them to apply forces to move their classmates, helping them understand the practical application	Designing and making arrows to visually represent forces, using different colors and sizes to indicate the direction and magnitude of forces.	Students will recognize the mathematical formula to represent Newton's second law of motion.



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				of force in movement and exercise.		
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SYLLABUS

LESSONS	SUBJECTS	TOPIC OF THE UNIT	LEARNING OBJECTIVES DURING THE LESSON: SUBJECT SPECIFIC COMPETENCIES	LEARNING OBJECTIVES AFTER THE LESSON: STEAM COMPETENCIES
1	Science, Physical Education, Art, Mathematics	Understanding Forces	Science: Understand what a force is and its components: magnitude, sense, and direction. Learn about different types of forces such as gravity, friction, electromagnetic forces, and	Science: Reflect on the magnitude and direction of forces and understand how different surfaces affect friction and movement. Physical Education: Apply knowledge of forces to real-life physical activities and understand the practical application of force in movement and exercise. Art: Use creative design to express



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			electrostatic forces. Physical Education: Engage in physical activities that demonstrate push and pull forces. Art: Design and create arrows to visually represent forces. Mathematics: Apply Newton's second law of motion $(F=ma)$ to understand the relationship between force, mass, and acceleration.	understanding of forces and visualize their effects. Mathematics: Use mathematical formulas to calculate forces and analyze the effects of different variables on motion.
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INSTRUCTIONAL PLAN BY LESSON

LESSON Grade 3-4 Science, Engineering, Physical Education, Art (Language) and Mathematics

TIME PLAN	TEACHING & LEARNING ACTIVITIES	MATERIALS	LEARNING OBJECTIVES
INTRODUCTION (10 minutes)	- Introduce the concept of forces and their components (magnitude, sense, and direction). - Explain Newton's second law of motion ($F=ma$). - Discuss different types of forces such as gravity, friction, electromagnetic	- Board - pictures - chalk	- Understand what a force is and its components: magnitude, sense, and direction. - Learn about different types of forces such as gravity, friction, electromagnetic forces, and electrostatic force





	forces, and electrostatic forces. • Provide real-life examples to help students understand the application of forces.		
LEARNING ACTIVITIES (40 minutes)	• Set up the activity space with three imaginary lines (starting line and two finishing lines). • Form pairs of students and explain the push and pull game. • Conduct the game, allowing students to push their classmates to the finishing line. • Use arrows to visually represent the applied	• Arrows of different sizes and colors (made previously by the students). • Big space and chalk • Flour	• Experience the effects of forces through interactive activities. • Reflect on the magnitude and direction of forces and understand how different surfaces affect friction and movement. • Apply knowledge of forces to real-life situations and other subjects.





	forces during the games. • Repeat the game with different pairs and variations (sitting down, pulling each other, barefoot, using flour). • Encourage students to observe and reflect on their experiences.		
WRAP-UP & EVALUATION (10 minutes)	• Discuss the results of the activities and ask students reflective questions. • Summarize the key points about forces, magnitude, direction, and friction. • Evaluate students' understanding through discussion and observation.		Students summarize key ideas.





EVALUATION PLAN BY LESSON

LESSON/ACTIVITY	EVALUATION CRITERIA	EVALUATION METHOD
Understanding of Forces	Can the students explain what a force is and identify its components?	Discussion: Conduct a group discussion to evaluate students' understanding and reflections on the activities. Questioning: Ask specific questions related to the activities to assess students' comprehension of forces and their effects. Visual Representation: Evaluate students' use of arrows to represent forces and their ability to explain the visual representations. Peer Feedback: Encourage students to provide feedback to each other on their performance and understanding during the activities.
Application of Newton's Second Law	Can the students know where $F=ma$ applies in practical scenarios?	
Identification of Different Types of Forces	Can the students recognize and describe different types of forces such as gravity, friction, electromagnetic forces, and electrostatic forces?	

NOTES -

ACTIVITY SHEETS TO BE LINKED -



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EVALUATION MATERIALS TO BE LINKED - REFERENCES / SUPPORTING MATERIALS TO BE LINKED

PDF / PPT slides:



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