

WIND POWER CAR

CAT#80-50-W056



Principle of Action and Reaction: When object A exerts an action force on object B, object B must also exert a reaction force on object A. The forces of action and reaction are equal and opposite, acting along the same line. According to this principle, the electric wind-powered car can run farther and faster because it uses air reaction force to provide energy, and the vehicle frame is light. When the power is switched on, the battery provides electricity to the motor. The motor rotates and drives the fan blade to rotate, blowing wind backward. The reaction force of the wind makes the car move forward.

PRIMARY DIVISION: GRADES 1-3

Overall Expectation: STEM, Matter and Energy Focus

Explore structures and mechanisms, including the roles of materials in supporting structures and making devices work.

Specific Expectation:

Identify and describe the purpose of simple machines such as levers and pulleys.

Activity:

Students use the Scale Model Wind Powered Car to understand how action and reaction forces work. They explore how the fan blades create wind that pushes against the air, causing the car to move forward. This helps them grasp basic concepts of forces and motion in a fun and engaging way.

JUNIOR DIVISION: GRADES 4-6

Overall Expectation: STEM, Matter and Energy Focus

Investigate the principles of forces, energy, and control in simple machines and structures.

Specific Expectation

Explore the relationships between the components of simple machines and the forces acting on them.

Activity

With the Scale Model Wind Powered Car, students investigate the concept of action and reaction forces and how they contribute to the car's motion. They experiment with different fan speeds and observe the changes in the car's speed and distance traveled, enhancing their understanding of force and energy.

INTERMEDIATE DIVISION: GRADES 7-8

Overall Expectation: STEM, Matter and Energy Focus

Investigate how technological problem-solving meets human needs and leads to innovation.

Specific Expectation:

Analyze the impact of friction and lubrication on the efficiency of mechanisms.

Activity

Students use the Scale Model Wind Powered Car to explore factors affecting its performance, such as air resistance and friction. They experiment with different materials for the car's body and wheels to reduce friction and improve efficiency. This helps them learn about optimizing design for better performance.

SECONDARY DIVISION: GRADES 9-12

Overall Expectation: Physics Focus

Apply principles of physics to understand the operation and efficiency of mechanical systems.

Specific Expectation

Analyze mechanical advantage and efficiency in simple and compound machines.

Activity

Using the Scale Model Wind Powered Car, students delve into concepts of action and reaction forces, as well as mechanical efficiency. They calculate the power output of the motor and the reaction force produced by the fan. They also discuss how effectively this force is converted into the car's forward motion, relating it to real-world applications like wind-powered vehicles.

CROSS-CURRICULAR CONNECTIONS

Mathematics

Students can calculate the forces involved and the efficiency of energy conversion using mathematical formulas.

Technology

They explore different designs and materials for optimizing the wind-powered car's performance.

Language Arts

Students can write reports or presentations on the principles of action and reaction forces and their applications in various engineering fields.

Summary

By experimenting with the Scale Model Wind Powered Car, students engage in hands-on learning experiences that deepen their understanding of mechanical principles and action-reaction forces while meeting curriculum expectations. This project promotes critical thinking and curiosity in STEM disciplines, encouraging students to explore the world of physics and engineering and understand the importance of designing efficient and practical solutions.