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The Great American Fan Car Race Lab Activity

Aligned with All Published National Standards

ward's science

IMGN 250-8064

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* The Dimension I practices listed below are called out as **bold** words throughout the activity.

DIMENSION 1 Science and Engineering Practices

×	Asking questions (for science) and defining problems (for engineering)	×	Use mathematics and computational thinking
×	Developing and using models	×	Constructing explanations (for science) and designing solutions (for engineering)
×	Planning and carrying out investigations	×	Engaging in argument from evidence
×	Analyzing and interpreting data	×	Obtaining, evaluating, and communicating information

DIMENSION 2 Cross Cutting Concepts

	Patterns	×	Energy and matter: Flows, cycles, and conservation
	Cause and effect: Mechanism and explanation	×	Structure and function
	Scale, proportion, and quantity	×	Stability and change
×	Systems and system models		

DIMENSION 3 Core Concepts

Discipline	Core Idea Focus
Physical Science	PS1: Matter and its interactions
	PS2: Motion and Stability: Forces and Interactions
	PS3: Energy

× Indicates standards covered in activity

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NGSS STANDARDS

Middle School Standards Covered	High School Standards Covered
MS.PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	HS.PS1-3: Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
MS.PS2-3: Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	HS.PS3-1: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
MS.PS3-1: Construct and interpret graphical displays of data to describe the relationship of kinetic energy to the mass of an object and to the speed of an object.	HS.PS3-3: Design, build, and refine a device that works with given constraints to convert one form of energy into another form of energy.
MS.PS3-4: Plan an investigation to determine the relationship among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	

(continued on next page)

standards and learning objectives

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Content Standards (K-12)			
	Systems, order, and organization		Evolution and equilibrium
X	Evidence, models, and explanation	X	Form and Function
X	Constancy, change, and measurement		

Physical Science Standards Middle School		Physical Science Standards High School	
X	Motions and Forces	X	Chemical Reactions
X	Transfer of Energy	X	Motions and Forces
		X	Interactions of Energy and Matter

X Indicates standards covered in activity

benchmarks for science literacy (AAAS, © 1993)

1. The Nature of Science	1B: Scientific Inquiry
2. The Nature of Mathematics	2B: Mathematics, Science, and Technology
4. The Physical Setting	4E: Energy Transformations
	4F: Motion
9. The Mathematical World	9A: Numbers
11. Common Themes	11A: Systems
	11B: Models

activity objectives:

- Design and build a fan race car.
- Explore and test different race car designs.
- Race the fan cars on a racecourse.
- Evaluate the performance of the race car.

time requirement:

This activity can generally be completed in three 45-minute class periods or over several class periods.

First Class Period: Building fan race car.

Second Class Period: Testing fan race car and making edits to design.

Third Class Period: Racing fan race car.