

Concept Storyline: Motion and Design

Unifying Concept	Unit Concept	Grade-Level Concept
The success of technological products depends on the scientific characteristics of their design and their value in application.	Successful vehicle design requires an understanding of energy, force, and friction, as well as of the properties of materials and cost considerations.	Models may be used to test and adapt the variables and components that affect the efficiency of a design.

Subconcept 1

The products of technological design must meet certain specifications, which are set forth in technical drawings.

Lesson 1: Pre-Unit Assessment: Designing Vehicles: Getting Started
Students build vehicles to meet design requirements.

Lesson 2: Using Drawings to Record and Build

Students draw the vehicles they designed in Lesson 1 and learn about technical drawing.

Subconcept 2

The position and motion of an object may be changed by a force, such as pushing or pulling.

Lesson 3: Pulling a Vehicle: Looking at Force

Students study the principle that force applied to an object changes its motion.

Lesson 4: Testing the Motion of Vehicles Carrying a Load

Students test how adding weight (load) to their vehicles affects their motion.

Lesson 5: Designing Vehicles to Meet Requirements

Students build vehicles to meet design specifications.

Subconcept 3

The forces acting on a vehicle include different forms of energy that act as driving and resisting forces.

Lesson 6: Evaluating Vehicle Design: Looking at Rubber Band Energy

Students examine different energy sources to drive their vehicles.

Lesson 7: Testing the Effects of Rubber Band Energy

Students investigate how variable amounts of energy affect the motion of their vehicles.

Lesson 8: Evaluating Vehicle Design: Looking at Friction

Students examine how their design variables reduce or increase the force of friction on their vehicles.

Lesson 9: Designing and Building a Vehicle With a Sail

Students adapt their vehicles to hold a sail and discuss how it might affect their motion.

Lesson 10: Testing the Effects of Air Resistance on a Vehicle's Motion

Students explore air resistance.

Lesson 11: Building a Propeller-Driven Vehicle

Students design and build propeller-driven vehicles and compare them with their axle-driven vehicles.

Lesson 12: Analyzing the Motion and Design of a Propeller-Driven Vehicle

Students evaluate the design of their propeller-driven vehicles.

Subconcept 4

Technological designs and products may be evaluated in terms of their cost, as well as their scientific and technological efficiency.

Lesson 13: Looking at Cost

Students determine the cost of their vehicles and modify the design to reduce cost.

Lesson 14: Planning Our Final Design Challenge

Student teams brainstorm how they will solve a design challenge.

Lesson 15: Refining Our Design

The teams build and test their vehicles and refine their design plans.

Lesson 16: Presenting Our Final Design Challenge

The teams present their solutions to their classmates.

Lesson 17: Post-Unit Assessment: Sharing What We Know About Motion and Design

Students reflect on and discuss what they have learned.



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