

ENERGY TRANSFER: Interdisciplinary STEM Unit

Prepared by The American Precision Museum & SparkShop

CURRICULUM OUTLINE

1. History: Manufacturing in Vermont
2. STEM 1: Energy Transfer
3. STEM 2: Water Wheels
4. Writing: Science Fiction
5. PE: Simple Machines Dance
6. Art: Wind Chimes
7. Careers: Jesse Trinqué – Applications Engineer

STUDENT KIT CONTENTS

- Pencil
- 7 paper sauce cups
- Mini stapler
- 2 6-inch cardboard circles
- 4-inch wooden hoop
- 8 metal washers
- 6-inch ruler
- White plastic wheel
- Red LED
- Yellow DC Motor
- AAA battery
- Ball of twine



CURRICULUM DETAILS

HISTORY	Title	MANUFACTURING IN VERMONT
	Summary	Students will read about the history of manufacturing in Windsor, VT.
	Key Activities	<ol style="list-style-type: none"> 1. Read about the history of the Robbins and Lawrence Armory. 2. Understand the American System of Manufacturing. 3. Answer comprehension and reflection questions.
	Materials	None
	Standards	<p>Common Core:</p> <ul style="list-style-type: none"> • CCSS.ELA-LITERACY.W.4.9 & CCSS.ELA-LITERACY.W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

STEM 1	Title	ENERGY TRANSFER
	Summary	Students will build two circuits to experiment with energy transfer.
	Key Activities	<ol style="list-style-type: none"> 1. Explore examples of energy transfer. 2. Learn the vocabulary for the parts of their circuit. 3. Connect the battery to the motor to make the wheel spin. 4. Connect the LED to the dynamo and power the light by spinning the wheel.
	Materials	<ul style="list-style-type: none"> • Yellow motor/dynamo • White wheel with black tire • AAA battery • Red LED with red and black wires
	Standards	<p>NGSS</p> <ul style="list-style-type: none"> • 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. • 4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

STEM 2		WATER WHEELS
	Summary	Students will build and test a water wheel to experiment with energy transfer.
	Key Activities	<ol style="list-style-type: none"> 1. Watch a video showing a waterwheel powered factory. 2. Assemble a model water wheel 3. Test and record observations
	Materials	<ul style="list-style-type: none"> • 2 cardboard circles • 7 paper sauce cups • Stapler • Sharpened pencil
	Standards	<p>NGSS</p> <ul style="list-style-type: none"> • 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. • 4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

WRITING	Title	SCIENCE FICTION
	Summary	Students will write a short science fiction story involving futuristic technology.
	Key Activities	<ol style="list-style-type: none"> 1. Identify technology in science fiction cover art. 2. Make predictions about technology in 100 years. 3. Outline and write a science fiction short story. 4. Optional: Get feedback and edit the story.
	Materials	None
	Standards	<p>Common Core:</p> <ul style="list-style-type: none"> • CCSS.ELA-LITERACY.W.4.3 and CCSS.ELA-LITERACY.W.5.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. • CCSS.ELA-LITERACY.W.4.5 & CCSS.ELA-LITERACY.W.5.5 With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1-3 up to and including grade 4 here.)

P.E.	Title	SIMPLE MACHINES DANCE
	Summary	Students will learn some dance moves from an engineer and choreograph their own
	Key Activities	<ol style="list-style-type: none"> 1. Dance-along with a video to learn machine-inspired moves. 2. Choreograph original dance moves inspired by something mechanical.
	Materials	N/A
	Standards	N/A

ART	Title	WIND CHIMES
	Summary	Students will design and build a wind chime.
	Key Activities	<ol style="list-style-type: none"> 1. Learn about wind chimes by reading and looking at examples. 2. Design and build an original wind chime using washers and other found objects. 3. Observe evidence of energy transfer in a wind chime.
	Materials	<ul style="list-style-type: none"> • 4-inch wooden hoop • Ball of twine • 8 washers • Miscellaneous household materials
	Standards	N/A

CAREERS	Title	JESSE TRINQUE – APPLICATIONS ENGINEER
	Summary	Students will learn about Jesse’s career in manufacturing.
	Key Activities	<ol style="list-style-type: none"> 1. Watch a video where Jesse describes his job. 2. Summarize information from the video 3. Reflect on personal experience, strengths, and preferences to answer open-ended questions.
	Materials	N/A
	Standards	<p>Common Core:</p> <ul style="list-style-type: none"> • CCSS.ELA-LITERACY.SL.4.2 Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.