

Subject: Science

Grade: 10 PT 1

Hallsville R-IV High School

PT 1

[Rationale](#) | [Course Description](#)

Curriculum Strands

- [Matter and Energy](#)
- [Force and Motion](#)
- Living Organisms
- Ecology/Environments
- Earth Systems
- Universe
- Scientific Inquiry
- [Impact of Science, Technology and Human Activity](#)

Rationale:

Students need to learn to ask and answer questions about the physical world in which they live. Physics provides the opportunity to ask those questions and the tools needed to answer them. Technology allows students to talk those answers and use them to make their lives easier and more productive.

Course Description:

Grade 10-12, 1 unit

In this course, students will be introduced to a broad base of the fundamental concepts of physics. The use of technology will be emphasized in the laboratory. Topics of study include dynamics, mechanics, waves, optics, electricity, and magnetism. Physical Science and Math I are prerequisites for this course.

Concept: Work

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Topic Objective:
Strand 1: 1 Properties and Principles of Matter and Energy - All students will demonstrate proficiency in the ability to solve work problems using work = force - like quantity x displacement and to measure work in mechanical, fluid, electrical and thermal systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
1A. Describe what's meant by work in a mechanical, fluid, electrical and thermal system. 1B. Identify the correct SI and English Units for work.	1.3 2.7 3.2	SC 1			1A, B Given any two of the quantities (work, force or distance), calculate the third quantity. 1A, B Measure the work done by a pulley in lifting a weight. 1A, B Measure the work done by a water pump in emptying a bucket of water. 1A, B Measure the work done by an electric power supply.	1A, B Solve problems involving work, force, and displacement. 1A, B Identify proper formulas and units needed to solve work problems.

Resources:

Principles of Technology: Unit 2 booklet and video
 ECI labs for Unit 2
 Physics text: Chapter 6

Instructional Methods:

Subject: Science

Grade: 10 PT 1

Enrichment/ Special Needs:

+Key to Integrated Skills

DS = Disability Equity
C = Character Education
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Subject: Science

Grade: 10 PT 1

Concept: Kinetic/Potential Energy

Topic Objective:
Strand 1: 2 Principles and Properties of Matter and Energy - All students will demonstrate proficiency in the ability to solve problems involving kinetic and potential energy and to measure energy in mechanical, fluid, electrical and thermal systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
2A. Define energy as the ability to do work.	1.3	SC 1			2A - D Use the formula $E = .5mv^2$ to find the kinetic energy of a moving object.	2A - D Solve problems using formulas for kinetic and potential energy.
2B. Describe what's meant by kinetic and potential energy.	2.7				2A - D Use any of the formulas $E = mgh$, $E = .5CV^2$, $E = .5kD^2$, or $E = .5IL^2$ to solve problems.	2A - D Identify proper formulas and units needed to solve energy problems.
2C. Recognize the Conservation of Energy Law.	3.1				2A - D Measure the work kinetic energy in a flowing stream of water.	
2D. Identify correct SI and English Units for energy.					2A - D Measure the potential energy in a stretched spring.	

Resources:
 Principles of Technology: Unit 5 booklet and video
 ECI labs for Unit 5
 Physics text: Chapter 6

Instructional Methods:

Enrichment/ Special Needs:

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Grade: 10 PT 1

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Subject: Science

Grade: 10 PT 1

Concept: Power

Topic Objective:

Strand 1: 3 Properties and Principles of Matter and Energy - All students will demonstrate proficiency in the ability to solve power problems using $\text{power} = \text{work}/\text{time}$ and $\text{power} = \text{force} \times \text{rate}$ and to measure power in mechanical, fluid and electrical systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
3A. Describe what's meant by power in a mechanical, fluid and electrical system.	1.3 2.7	SC 1			3A, B Given any two of the quantities (power, work or time), find the third quantity.	3A, B Solve problems involving power, work, and time.
3B. Identify correct SI and English Units for power.	3.2				3A, B given any two of the quantities (power, rate or force), find the third quantity. 3A, B Measure the power expended by an electric motor. 3A, B Measure the power expended in a pulley system as it raises a weight.	3A, B Identify proper formulas and units for solving power problems.

Resources:

Principles of Technology: Unit 6 booklet and video
 ECI labs for Unit 6
 Physics text: Chapter 6

Instructional Methods:

Enrichment/ Special Needs:

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Grade: 10 PT 1

Concept: Kinetic Theory of Matter

Topic Objective:
Strand 1: 4 Properties and Principles of Matter and Energy - All students will demonstrate proficiency in the ability to use the kinetic theory of matter to explain phenomenon observed about matter.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
4A. Describe the basic assumptions of the kinetic theory of matter.	3.1	SC 1			4A - D Draw pictures of the various models of the atom.	
4B. Recognize properties of solids, liquids and gases.	3.2				4A - D Calculate the binding energy of an atomic nucleus.	
4C. Describe the Bohr model of the atom.						
4D. Identify mass, charge, and size of protons, neutrons and electrons.						

Resources:

Physics text: Chapter 7

Instructional Methods:

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Concept: Principles of Force and Motion

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Topic Objective:
Strand 2:1 Properties and Principles of Force and Motion - All students will demonstrate proficiency in the ability to solve force problems using graphic and trigonometric techniques and to measure force in mechanical, fluid, electrical, and thermal systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
1A. Describe what a force is.	1.3	SC 2			1A, B, C Given two forces, construct a scale drawing to find the resultant force.	1A, B, C Problem Solving: Involving distance, rate, and time (Scoring Guide)
1B. Describe what force, pressure, voltage and temperature differences have in common.	3.1 3.2				1A, B, C Given two forces, use Law of Sines and Cosines to find resultant force,	1A, B, C Formulas: Identify proper formulas and units needed to work with rate problems (Scoring Guide)
1C. Identify the correct SI and English Units for force.					1A, B, C Measure voltage of various batteries using VOM and DMN (Lab 1E1)	

Resources:

Principles of Technology: Unit 1 booklet and video
 ECI labs for Unit 1
 Physics text: Chapter 3, 4

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Concept: Rate

Topic Objective:
Strand 2:2 Properties and Principles of Force and Motion - All students will demonstrate proficiency in their ability to solve rate problems using rate = displacement/time and to measure rate in mechanical, fluid, electrical, and thermal systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
2A. Describe what's meant by rate in mechanical, fluid, electrical and thermal systems.	1.3 3.1	SC 2			2A, B Given any two of the quantities: displacement, rate or time, find the third quantity.	
2B. Identify the correct SI and English Units for rate.	3.2				2A, B Solve problems involving uniformly accelerated motion. 2A, B Use a paper tape timer to calculate acceleration motion. 2A, B Push a car using bathroom scales. Drop markers at fixed time intervals. Measure distance between markers and calculate average acceleration. Use this value and the weight of the car to verify Newton's Second Law.	

Resources:

 Principles of Technology: Unit 2 booklet and video
 ECI labs for Unit 2
 Physics text: Chapter 3, 5

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Concept: Resistance

Topic Objective:

Strand 2:3 Properties and Principles of Force and Motion - All students will demonstrate proficiency in their ability to solve resistance problems using resistance = force/rate and to measure resistance in mechanical, fluid, electrical, and thermal systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
3A. Describe what's meant by resistance in mechanical, fluid, electrical and thermal systems.	1.3 3.2	SC 2			3A, B, C Given any two of the quantities, (force, resistance, or rate), find the third quantity. 3A, B, C Calculate coefficients of friction for various surfaces. 3A, B, C Calculate equivalent resistance for series and parallel circuits.	

Resources:

Principles of Technology: Unit 4 booklet and video
ECI labs for Unit 4
Physics text: Chapter 4

Instructional Methods:

Enrichment/ Special Needs:

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Concept: Force Transformers

Topic Objective:

Strand 2:4 Properties and Principles of Force and Motion - All students will demonstrate proficiency in the ability to calculate IMA and AMA for various force transformers and to measure the efficiency of force transformers in mechanical, fluid and electrical systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
4A. Identify force transformers in mechanical, fluid and electrical systems. 4B. Recognize that no transformer is 100% efficient.	1.3 2.7	SC 2			4A, B Solve problems using the formula $IMA = \frac{\text{input distance}}{\text{output distance}}$. 4A, B Solve problems using $AMA = \frac{\text{force out}}{\text{force in}}$. 4A, B Solve problems using $\text{efficiency} = \frac{IMA}{AMA}$. 4A, B Design a machine using more than one transformer and find its efficiency.	

Resources:

Principles of Technology: Unit 7 booklet and video
ECI labs for Unit 7
Physics text: Chapter 6

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Concept: Momentum

Topic Objective:

Strand 2:5 Properties and Principles of Force and Motion - All students will demonstrate proficiency in the ability to solve momentum problems using momentum = mass x velocity and impulse = force x time and to measure momentum in mechanical and fluid systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
5A. Identify force transformers in mechanical, fluid and electrical systems.	1.3 2.7	SC 2			5A, B Solve problems using the formula $IMA = \frac{\text{input distance}}{\text{output distance}}$.	
5B. Recognize that no transformer is 100% efficient.	3.2				5A, B Solve problems using $AMA = \frac{\text{force out}}{\text{force in}}$. 5A, B Solve problems using $\text{efficiency} = \frac{IMA}{AMA}$. 5A, B Design a machine using more than one force transformer and find its efficiency.	

Resources:

Instructional Methods:

Subject: Science

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Enrichment/ Special Needs:

Principles of Technology: Unit 7 booklet and video

ECI labs for Unit 7

Physics text: Chapter 6

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Concept: Energy Consumption

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Topic Objective:
Strand 8: 1 Impact of Science, Technology and Human Activity - All students will demonstrate proficiency in the ability to explore solutions to the problems associated with energy consumption in modern society.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
1A. Recognize the importance of energy in our modern way of life.	2.3	SC 8			1A - C Investigate the amount of energy consumed by various segments of society.	
1B. Realize the necessity of conserving energy.	3.8					
1C. Appreciate the role of science in developing new sources of energy.	4.1				1A - C Debate the role of government in regulating energy consumption.	

Resources:
Principles of Technology: Unit 5 and 6 workbooks
STS materials

Instructional Methods:

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