Perris Union High School District
Course of Study

A. COURSE INFORMATION

Course Title:
(limited to 34 characters with spaces in Infinite Campus)

Physics

- ☐ New
- ☑ Revised

If revised, the previous course name if there was a change

Transcript Course Code/Number:

104521, 104522

(To be assigned by Educational Services if it's a new course)

CREDIT TYPE EARNED:	CALPADS CODE:
Science	9326

Subject Area:

- ☐ Social Science
- ☐ English
- ☐ Mathematics
- ☑ Laboratory Science
- ☐ World Languages
- ☐ Visual or Performing Arts
- ☐ College Prep Elective
- ☐ Other

Is this classified as a Career Technical Education course?

- ☐ Yes
- ☑ No

If yes, which pathway does this course align to?
Pathway Name:

CTE CDE Code:

Grade Level(s)

- ☐ MS
- ☑ HS
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☑ 9
- ☑ 10
- ☑ 11
- ☑ 12

Was this course *previously approved by UC* for PUHSD?

- ☑ Yes
- ☐ No
  (Will be verified by Ed Services)

Which A-G Requirement does/will this course meet?

D	☐ Pending

Credential Required to teach this course:
To be completed by Human Resources only.

Single Subject: Science; physics; specific
Supplementary Auth: Physics
Specific subject Matter Auth: physics

3/15/2024
Signature **Date**

Submitted by: Matthew Thomas
Site: Student Services Center
Date: 3/11/24
Email: matthew.thomas@puhsd.org

Unit Value/Length of Course:

- ☐ 0.5 (half-year or semester equivalent)
- ☑ 1.0 (one-year equivalent)
- ☐ 2.0 (two-year equivalent)
- ☐ Other:

Approvals	Name/Signature	Date
Director of Curriculum & Instruction		3/20/24
Asst. Superintendent of Educational Services	Kimberlee Mackamul	3/21/24
Governing Board		

Prerequisite(s) (REQUIRED):
None
Corequisite(s) (REQUIRED):
Algebra II/Trigonometry
Brief Course Description (REQUIRED):
This is a mathematical and conceptual based course that covers Newtonian Mechanics (Kinematics, Dynamics, Forces, Universal Law of Gravitation, Linear Momentum, and the Conservation of Momentum and Energy), Electricity and Magnetism, DC Circuits, Waves and Light, Modern Physics, and Cosmology. This course includes a rigorous laboratory component.

B. COURSE CONTENT

Course Purpose (REQUIRED):
What is the purpose of this course? Please provide a brief description of the goals and expected outcomes. Note: More specificity than a simple recitation of the State Standards is needed.

The purpose of this course is to introduce students to classical and modern physics. The course will promote critical and mathematical thinking, as well as prepare students for college level coursework. This course benefits students who hope to pursue science, technology, engineering, and medical fields.

Course Outline (REQUIRED):
Detailed description of topics covered. All historical knowledge is expected to be empirically based, give examples. Show examples of how the text is incorporated into the topics covered.

Segment 1: Methods of Science/Math in Physics
In this segment, students will seek to answer the Encounter the Phenomenon Question "What tools and skills do physicists use?" The lessons in this module each provide part of the answer to this question.

Unit 0 Module 1 (Lessons 1-4)

- Lesson 1: Methods of Science

    - Students will explore the nature of science and the practices scientists use. This will lead them to understand that physicists use a variety of scientific practices to study the world around them.
- Lesson 2: Mathematics and Physics
    - Students will explore some of the key mathematical concepts needed in physics, including SI units, dimension analysis, significant figures, and problem-solving strategies. This will lead them to understand the critical role that math plays in physics.
- Lesson 3: Measurement
    - Students will explore uncertainty, precision, and accuracy in measurement. This will lead them to understand the importance of good measurement skills.
- Lesson 4: Graphing Data
    - Students will explore how graphs are constructed and the types of relationships they reveal. This will lead them to understand that graphs are a tool that physicists use to analyze data.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
    - Background
    - Hypothesis(es)
    - Materials
    - Methods
    - Results
    - Discussion
    - Conclusion
- Alternative Report Structure (Based on UCLA)
    - Intro (Done the night before, prelab)
    - Materials and Methods (Labeled Sketch of the lab setup) (Done the night before, prelab)
    - Results (During class/lab)
    - Analysis (Mathematics) (Homework)
    - Discussion (Homework)

Example Labs/Activities:

Physics and Measurements

In this laboratory exercise, you will gain experience making measurements as a physicist does. All measurements will be made using units to the precision allowed by your instruments.

Students will:

- Measure accurately using typical laboratory equipment.
- Measure length and mass in SI units.
- Determine appropriate numbers of significant figures for various measurements and calculations.
- Examine the relationships between measured physical quantities by using graphs and data analysis.

Lab Safety Activity:
During this activity, students will identify lab safety rules that are broken.

Segment 2: Motion 1D
In this unit, students will seek to answer the question "How can we model motion and forces?" The modules in this unit each provide part of the answer to this question.

Unit 1 Module 2 and 3

- **Module 2**: Representing Motion
    - Students will learn that motion can be modeled by motion diagrams, particle models, vectors, graphs, and mathematical equations.
- **Module 3**: Accelerated Motion
    - Students will expand their knowledge of modeling motion to include accelerated motion.
- **Module 4**: Forces in One Dimension
    - Students will learn that forces can be modeled using a free-body diagram and that forces cause changes in motion, as described by Newton's laws of motion.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
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    - Discussion (Homework)

Example Labs/Activities:
Lab 05: The Domino Effect (Kinematic Equations)
A central property of motion is speed—the rate at which distance is covered. By rate, we mean how much or how many of something per unit of time: how many kilometers traveled in an hour, how many feet moved in a second, how many raindrops hitting a roof in a minute, how much interest earned on a bank account in a year. When we measure the speed of an automobile, we measure the rate at which this easily seen physical

thing moves over the ground—for instance, how many kilometers per hour. But when we measure the speed of sound or the speed of light, we measure the rate at which energy moves. We cannot see this energy. We can, however, see and measure the speed of the energy pulse that makes a row of dominoes fall.

Objective
To investigate the ways in which distance, time, and average speed are interrelated by maximizing the speed of falling dominoes. To become familiar with elementary graphing techniques.

Lab 09: Back and Forth (Kinematic Graphing)

Lots of objects go back and forth; that is, they move along a path first in one direction, then move back the other way. An oscillating pendulum or a ball tossed vertically into the air are examples of things that go back and forth. Graphs of the position *vs.* time and velocity *vs.* time for such objects share several features. When an object changes speed *or* direction, it accelerates. By examining the graphs, you will be able to tell if an object is accelerating. In this experiment, you will observe several objects that change speed and direction as they go back and forth:

- Oscillating pendulum
- Dynamics cart rolling up and down an incline
- Student jumping into the air
- Mass oscillating at the end of a spring
- Ball tossed into the air

Analyzing and comparing graphs of the motion of these objects will help you to apply ideas of kinematics more clearly.

Objectives:

- Qualitatively analyze the motion of objects that move back and forth.
- Analyze and interpret back and forth motion in kinematics graphs.
- Use kinematic graphs to catalog objects that exhibit similar motion.

Segment 3: Forces
In this segment, students will seek to answer the questions "How can we model motion and forces?" and "How can forces cause so many different types of motion?" The modules in this unit each provide part of the answer to this question.

Segment Description:
In this segment, students will seek to answer the questions "How can we model motion and forces?" and "How can forces cause so many different types of motion?" The modules in this unit each provide part of the answer to this question.

Unit 1 Module 4

- **Module 4:** Forces in One Dimension
    - Students will learn that forces can be modeled using a free-body diagram and that forces cause changes in motion, as described by Newton's laws of motion.

Unit 2 Module 5 and 6

- **Module 5:** Displacement and Force in Two Dimensions
    - Students will learn about the basics analyzing forces in two dimensions, friction, and motion on inclined planes.
- **Module 6:** Motion in Two Dimensions
    - Students will learn that gravity and drag forces determine the path of a projectile, while centripetal forces result in circular motion.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
    - Background
    - Hypothesis(es)
    - Materials
    - Methods
    - Results
    - Discussion
    - Conclusion
    - Alternative Report Structure (Based on UCLA)
        - Intro (Done the night before, prelab)
        - Materials and Methods (Labeled Sketch of the lab setup) (Done the night before, prelab)
        - Results (During class/lab)
        - Analysis (Mathematics) (Homework)
        - Discussion (Homework)

Example Labs/Activities:
Projectile Motion Lab: Students investigate and solve horizontal projectile problems

Lab 18: Newton's Second Law

How does a cart change its motion when you push and pull on it? You might think that the harder you push on a cart, the faster it goes. Is the cart's velocity related to the force you apply? Or, is the force related to something else? Also, what does the mass of the cart have to do with how the motion changes? We know that it takes a much harder push to get a heavy cart moving than a lighter one.

A Force Sensor and an Accelerometer will let you measure the force on a cart simultaneously with the cart's acceleration. The total mass of the cart is easy to vary by adding masses. Using these tools, you can

determine how the net force on the cart, its mass, and its acceleration are related. This relationship is Newton's second law of motion.

Objectives:

- Collect force and acceleration data for a cart as it is moved back and forth.
- Compare force *vs.* time and acceleration *vs.* time graphs.
- Analyze a graph of force *vs.* acceleration.
- Determine the relationship between force, mass, and acceleration.

Segment 4: Forces at a Distance (Gravity, electricity, DC Circuits, magnetism)
In this segment, students will seek to answer the question "How can forces cause so many different types of motion?" and "What role do electricity and magnetism play in the technology we use every day?" The modules in this unit each provide part of the answer to this question.

Unit 2 Module 7

- **Module 7:** Gravitation
    - Students will learn that the gravitational force is responsible for objects falling to the ground, as well as orbits.

Unit 5 Module 18, 19, 20, 21

- **Module 18:** Electrostatics
    - Students will learn that electrically charged objects exert forces on each other and that this force can be used in various applications, including capacitors.
- **Module 19:** Electric Current and Circuits
    - Students will learn that electric currents allow for the transfer of energy, which can be transformed into other useful forms of energy.
- **Module 20:** Magnetism
    - Students will learn that both permanent magnets and electromagnets produce magnetic fields, which can be used in a variety of applications, including motors.
- **Module 21**: Electromagnetism
    - Students will learn that electricity and magnetism are part of the same force and that the interaction between electric and magnetic fields allows for a variety of technological applications, including generators and the use of electromagnetic waves.

Inspire Physical Science with Earth Science Unit 8 Module 29

- **Module 29:** The Earth-Moon-Sun System
    - Students will learn about Earth's rotation and revolution around the Sun, the phases of the Moon, and how eclipses occur.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:

    - Background
    - Hypothesis(es)
    - Materials
    - Methods
    - Results
    - Discussion
    - Conclusion
- Alternative Report Structure (Based on UCLA)
    - Intro (Done the night before, prelab)
    - Materials and Methods (Labeled Sketch of the lab setup) (Done the night before, prelab)
    - Results (During class/lab)
    - Analysis (Mathematics) (Homework)
    - Discussion (Homework)

Example Labs/Activities:

- Ohm's Law Lab

Segment 5: Quantity of Motion (Energy and Momentum)

In this unit, students will seek to answer the question "Why is energy important to humans and society?" The modules in this unit each provide part of the answer to this question.

Unit 3 Module 9 and 10

- **Module 9**: Momentum and Its Conservation
    - Students will learn about impulse, momentum, and the conservation of momentum, which will help them analyze collisions
- **Module 10:** Energy and Its Conservation
    - Students will learn that energy comes in many forms, can be transferred or transformed, and is conserved, and that these properties allow humans to manipulate and use energy.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
    - Background
    - Hypothesis(es)
    - Materials
    - Methods
    - Results
    - Discussion
    - Conclusion
- Alternative Report Structure (Based on UCLA)
    - Intro (Done the night before, prelab)
    - Materials and Methods (Labeled Sketch of the lab setup) (Done the night before, prelab)

- Results (During class/lab)
- Analysis (Mathematics) (Homework)
- Discussion (Homework)

Example Labs/Activities:

Loop de Loop
Knowledge Objectives

- I will acquire vocabulary and learn relationships of variables expressed in the equations for circular and rotary motion.
- I will describe the relationships between torque and angular acceleration.

Reasoning Objectives

- I will use vectors to pictorially analyze problems for circular and rotary motion.
- I will solve problems for torque in rotary motion using vectors and trigonometry.
- I will use vectors to pictorially analyze problems for work and conservation of energy problems.
- I will solve conservation of energy word problems.

Objective: Students will determine the minimum height necessary for the Teflon ball to roll through the loop de loop.

Lab 32: Impulse and Momentum
The impulse-momentum theorem relates impulse, the average force applied to an object times the length of time the force is applied, and the change in momentum of the object:

Here, we will only consider motion and forces along a single line. The average force, $\bar{F}$, is the *net* force on the object, but in the case where one force dominates all others, it is sufficient to use only the large force in calculations and analysis.

For this experiment, a Dynamics Cart will roll along a level track. Its momentum will change as it collides with a hoop spring. The hoop will compress and apply an increasing force until the cart stops. The cart then changes direction and the hoop expands back to its original shape. The force applied by the spring is measured by a Dual-Range Force Sensor. The cart velocity throughout the motion is measured with a Motion Detector. You will then use data-collection software to find the impulse to test the impulse-momentum theorem.

Objectives:

- Measure a cart's momentum change and compare it to the impulse it receives.
- Compare average and peak forces in impulses.

Segment 6: Waves (Vibrations, Sound) and Light
In this unit, students will seek to answer the question "How do waves affect our everyday lives?" The

modules in this unit each provide part of the answer to this question.

Unit 4 Module 13, 14, 15, 16, 17

- **Module 13**: Vibrations and Waves
  - Students will learn about periodic motion and develop an understanding of the basic properties and behaviors of waves.
- **Module 14**: Sound
  - Students will learn about the generation, manipulation, detection, and applications of sound waves.
- **Module 15**: Fundamentals of Light
  - Students will learn that light allows us to see and that its wave properties are responsible for effects like color and polarization.
- **Module 16**: Reflection and Refraction
  - Students will learn mirrors and lenses can be used to reflect and refract light in ways that are helpful to humans.
- **Module 17**: Interference and Diffraction
  - Students will learn that the interference and diffraction of light are responsible for optical effects such as thin-film interference, iridescence, and diffraction patterns.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
  - Background
  - Hypothesis(es)
  - Materials
  - Methods
  - Results
  - Discussion
  - Conclusion
- Alternative Report Structure (Based on UCLA)
  - Intro (Done the night before, prelab)
  - Materials and Methods (Labeled Sketch of the lab setup) (Done the night before, prelab)
  - Results (During class/lab)
  - Analysis (Mathematics) (Homework)
  - Discussion (Homework)

Example Labs/Activities:

Lab 46: Speed of Sound

Compared to most things you study in the physics lab, sound waves travel very fast. It is fast enough that measuring the speed of sound is a technical challenge. One method you could use would be to time an echo. For example, if you were in an open field with a large building a quarter of a kilometer away, you could start

a stopwatch when a loud noise was made and stop it when you heard the echo. You could then calculate the speed of sound.

To use the same technique over short distances, you need a faster timing system, such as a data-collection interface. In this experiment, you will use this technique with a Microphone connected to an interface to determine the speed of sound at room temperature. The Microphone will be placed next to the opening of a hollow tube. When you make a sound by snapping your fingers next to the opening, the computer will begin collecting data. After the sound reflects off the opposite end of the tube, a graph will be displayed showing the initial sound and the echo. You will then be able to determine the round trip time and calculate the speed of sound.

Objectives:

- Measure how long it takes sound to travel down and back in a long tube.
- Determine the speed of sound.
- Compare the speed of sound in air to the accepted value.

Segment 7: Subatomic Physics

In this unit, students will seek to answer the question "What is the universe made of?" The modules in this unit each provide part of the answer to this question.

Unit 6 Module 22, 23, 24

- **Module 22**: Quantum Theory and the Atom
    - Students will learn about the development of quantum mechanics and its influence on the current atomic model.
- **Module 23**: Solid-State Electronics
    - Students will learn that the atomic structure of materials relates to their electrical conductivity and how that conductivity can be controlled.
- **Module 24**: Nuclear and Particle Physics
    - Students will learn that atoms are made up of even smaller particles and will be introduced to the Standard Model, which describes the fundamental building blocks of the universe.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
    - Background
    - Hypothesis(es)
    - Materials
    - Methods
    - Results
    - Discussion
        - Conclusion
    - Alternative Report Structure (Based on UCLA)

- Intro (Done the night before, prelab)
- Materials and Methods (Labeled Sketch of the lab setup) (Done the night before, prelab)
- Results (During class/lab)
- Analysis (Mathematics) (Homework)
- Discussion (Homework)

Example Labs/Activities:

Lab 52: Radioactive Half-life (Candium)
Some naturally occurring isotopes of elements are not stable. They slowly decompose by discarding part of the nucleus. The isotope is said to be radioactive. This nuclear decomposition is called nuclear decay. The length of time required for half of the isotope to decay is the substance's half-life. Each radioactive isotope has its own particular half-life. However, when the amount of remaining isotope is plotted against time, the resulting curve for every radioisotope has the same general shape.

Segment 8: Cosmology (Stellar Evolution)
In this unit, students will seek to answer the question "What technology do we use to explore the universe?" The modules in this unit each provide part of the answer to this question.

Inspire Physical Science with Earth Science
Unit 8 Module 30, 31

- **Module 30**: The Solar System
  - Students will learn about the structure of our solar system and the characteristics of planets and other celestial bodies within it.
- **Module 31**: Stars and Galaxies
  - Students will learn about how scientists observe the universe as well as how stars and galaxies form.

Writing Assignments:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
  - Background
  - Hypothesis(es)
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  - Discussion
  - Conclusion
- Alternative Report Structure (Based on UCLA)
  - Intro (Done the night before, prelab)
  - Materials and Methods (Labeled Sketch of the lab setup) (Done the night before, prelab)

- Results (During class/lab)
- Analysis (Mathematics) (Homework)
- Discussion (Homework)

Example Labs/Activities:
Convince Someone: The Origin of the Universe Lab: Students use resources to develop an argument regarding the origin of the universe.

Writing Assignments (REQUIRED):
Give examples of the writing assignments and the use of critical analysis within the writing assignments.

Throughout the year, students will be performing the following writing assignments during each unit:

- Discussion Questions: Students answer questions as they go through the lab report.
- Summaries: Students summarize the guiding questions and for the unit.
- Lab Reports: Students format and write formal lab reports for specific import labs throughout the unit. These are formatted in the following way:
  - Background
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  - Results (During class/lab)
  - Analysis (Mathematics) (Homework)
  - Discussion (Homework)

INSTRUCTIONAL MATERIALS (REQUIRED)	
Textbook #1	
Title: California Inspire Physics	Edition:
Author: McGraw Hill	ISBN: 9780076742356
Publisher: McGraw Hill	Publication Date: 2020
Usage:	

☐ Primary Text ☑ Read in entirety or near	

Textbook #2	
Title: Inspire Physical Science with Earth Science	Edition: 1st
Author: McGraw Hill	ISBN: 978-0076716852
Publisher: McGraw Hill	Publication Date: 2020
Usage: ☐ Primary Text ☑ Read in entirety or near	

Supplemental Instructional Materials *Please include online, and open source resources if any.*
Walker, J. S. (2017). *Physics, 5th Edition*. Pearson Education, Inc.

Estimated costs for classroom materials and supplies (REQUIRED). *Please describe in detail.* If more space is needed than what is provided, please attach a backup as applicable.	
Cost for a class set of textbooks: $	Description of Additional Costs:
Additional costs:$	
Total cost per class set of instructional materials:	$

Key Assignments (REQUIRED):
Please provide a detailed description of the Key Assignments including tests, and quizzes, which should incorporate not only short answers but essay questions also. How do assignments incorporate topics? Include all major assessments that students will be required to complete

Labs/Activities:

Physics and Measurements

In this laboratory exercise, you will gain experience making measurements as a physicist does. All measurements will be made using units to the precision allowed by your instruments.

Students will:

- Measure accurately using typical laboratory equipment.
- Measure length and mass in SI units.
- Determine appropriate numbers of significant figures for various measurements and calculations.
- Examine the relationships between measured physical quantities by using graphs and data analysis.

The Domino Effect (Kinematic Equations)

A central property of motion is speed—the rate at which distance is covered. By rate, we mean how much

or how many of something per unit of time: how many kilometers traveled in an hour, how many feet moved in a second, how many raindrops hitting a roof in a minute, how much interest earned on a bank account in a year. When we measure the speed of an automobile, we measure the rate at which this easily seen physical thing moves over the ground—for instance, how many kilometers per hour. But when we measure the speed of sound or the speed of light, we measure the rate at which energy moves. We cannot see this energy. We can, however, see and measure the speed of the energy pulse that makes a row of dominoes fall.

Back and Forth (Kinematic Graphing)

Lots of objects go back and forth; that is, they move along a path first in one direction, then move back the other way. An oscillating pendulum or a ball tossed vertically into the air are examples of things that go back and forth. Graphs of the position *vs.* time and velocity *vs.* time for such objects share several features. When an object changes speed *or* direction, it accelerates. By examining the graphs, you will be able to tell if an object is accelerating. In this experiment, you will observe several objects that change speed and direction as they go back and forth:

- Oscillating pendulum
- Dynamics cart rolling up and down an incline
- Student jumping into the air
- Mass oscillating at the end of a spring
- Ball tossed into the air

Analyzing and comparing graphs of the motion of these objects will help you to apply ideas of kinematics more clearly.

Projectile Motion Lab: Students investigate and solve horizontal projectile problems

Newton's Second Law

How does a cart change its motion when you push and pull on it? You might think that the harder you push on a cart, the faster it goes. Is the cart's velocity related to the force you apply? Or, is the force related to something else? Also, what does the mass of the cart have to do with how the motion changes? We know that it takes a much harder push to get a heavy cart moving than a lighter one.

A Force Sensor and an Accelerometer will let you measure the force on a cart simultaneously with the cart's acceleration. The total mass of the cart is easy to vary by adding masses. Using these tools, you can determine how the net force on the cart, its mass, and its acceleration are related. This relationship is Newton's second law of motion.

Impulse and Momentum

The impulse-momentum theorem relates impulse, the average force applied to an object times the length of time the force is applied, and the change in momentum of the object:

Here, we will only consider motion and forces along a single line. The average force, $\bar{F}$, is the *net* force on the object, but in the case where one force dominates all others, it is sufficient to use only the large force in calculations and analysis.

For this experiment, a Dynamics Cart will roll along a level track. Its momentum will change as it collides with a hoop spring. The hoop will compress and apply an increasing force until the cart stops. The cart then changes direction and the hoop expands back to its original shape. The force applied by the spring is measured by a Dual-Range Force Sensor. The cart velocity throughout the motion is measured with a Motion Detector. You will then use data-collection software to find the impulse to test the impulse-momentum theorem.

Speed of Sound
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Radioactive Half-life (Candium)
Some naturally occurring isotopes of elements are not stable. They slowly decompose by discarding part of the nucleus. The isotope is said to be radioactive. This nuclear decomposition is called nuclear decay. The length of time required for half of the isotope to decay is the substance's half-life. Each radioactive isotope has its own particular half-life. However, when the amount of remaining isotope is plotted against time, the resulting curve for every radioisotope has the same general shape.

Convince Someone: The Origin of the Universe Lab: Students use resources to develop an argument regarding the origin of the universe.

Instructional Methods and/or Strategies (REQUIRED):

Please list specific instructional methods that will be used.

- Oral In-Class Participation/Classwork/Homework
- Focus Activities
- Homework/Classwork
- Student Presentations

- Quizzes and Tests
- Writing Assessments
- Projects (including Artifact, Written and Oral Assessment)

Assessment Methods and/or Tools (REQUIRED):

Please list different methods of assessments that will be used.

- Writing Assessments
- Labs experiments and write-ups
- Lesson Assessments
- Unit/Chapter Assessments
- Individual Presentations
- Group Presentations
- Cumulative Semester Final