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CW High School

Physics B

1. Energy and Momentum (20.00%)

Learning Targets

1.1 I can apply the laws of conservation of energy and conservation of momentum to analyze interactions of objects contacting one another in elastic and inelastic collisions and use the impulse-momentum theorem.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the laws of conservation of energy and conservation of momentum to analyze interactions of objects contacting one another in elastic and inelastic collisions and use the impulse-momentum theorem.
3	Developing	I can use the laws of conservation of momentum and conservation of energy to analyze inelastic collisions.
2	Basic	I can use the law of conservation of momentum to analyze inelastic collisions.
1	Minimal	I can calculate the momentum, impulse, kinetic energy, and potential energy of any object.
0	No Evidence	No evidence shown.

1.2 I can recognize the relationships between work, power and energy, utilize a force-distance graph to find the work done on an object and utilize the conservation of work (energy) to solve a stored energy (work) situation.

Learning Target	Descriptor	Definition
4	Proficient	I can recognize the relationships between work, power and energy, utilize a force-distance graph to find the work done on an object and utilize the conservation of work (energy) to solve a stored energy (work) situation.
3	Developing	I can calculate the amount of work done on an object where the force is not applied in the direction of the motion.
2	Basic	I can analyze a force vs distance graph to find the amount of work done moving an object.
1	Minimal	I can find the amount of work and power done on or by an object.
0	No Evidence	No evidence shown.

1.3 I can evaluate the efficiency, mechanical advantage, ideal mechanical advantage, and be able to quickly estimate the mechanical advantage of a machine.

Learning Target	Descriptor	Definition
4	Proficient	I can evaluate the efficiency, mechanical advantage, ideal mechanical advantage, and be able to quickly estimate the mechanical advantage of a machine.
3	Developing	I can calculate the mechanical advantage of a simple machine.
2	Basic	I can calculate the ideal mechanical advantage of a simple machine.



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Learning Target	Descriptor	Definition
1	Minimal	I can estimate the mechanical advantage of a simple machine.
0	No Evidence	No evidence shown.

1.4 I can use appropriate vocabulary and language to explain the concepts of work, power, energy and momentum and their conservation.

Learning Target	Descriptor	Definition
4	Proficient	I can use appropriate vocabulary and language to explain the concepts of work, power, energy and momentum and their conservation.
3	Developing	I can recognize the difference between inelastic and elastic collisions and state why the law of conservation of energy appears to not be true for inelastic collisions.
2	Basic	I can interpret momentum, work, power, and energy situations by applying the conservation(s) of work and energy.
1	Minimal	I can recognize and use correct units for work, power, momentum, impulse and energy and convert when necessary.
0	No Evidence	No evidence shown.

1.5 I can interact directly with natural phenomena by using tools, collect and record data to investigate the power, momentum, work and energy of objects, the work (energy) stored in a force-distance situation, and compare the kinetic energy of an object

Learning Target	Descriptor	Definition
4	Proficient	I can interact directly with natural phenomena by using tools, collect and record data to investigate the power, momentum, work and energy of objects, the work (energy) stored in a force-distance situation, and compare the kinetic energy of an object
3	Developing	I can complete an energy-work lab in which the stored energy of the bow is converted to the kinetic energy of an arrow.
2	Basic	I can calculate my work and power in climbing and analyze how long it will take to burn off the energy of a meal.
1	Minimal	can use the conservation of momentum in a lab setting to find the velocity of a pellet before it collides with a block.
0	No Evidence	No evidence shown.

2. Waves and Sound (20.00%)

Learning Targets

2.1 I can use appropriate vocabulary to describe the interactions of waves as they rebound from barriers, collide with each other, bend around barriers, and move from one medium to another. and name historical figures who investigated wave motion

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Learning Target	Descriptor	Definition
4	Proficient	I can use appropriate vocabulary to describe the interactions of waves as they rebound from barriers, collide with each other, bend around barriers, and move from one medium to another. and name historical figures who investigated wave motion
3	Developing	I can explain the concept of Doppler shift and how it relates to sound.
2	Basic	I can explain the rebounding of mechanical waves and sound from a fixed or open barrier.
1	Minimal	I can explain the motion of transverse and longitudinal waves using correct terminology and relate wave terms to sound.
0	No Evidence	No evidence shown.

2.2 I can apply the velocity, frequency, wavelength equations to analyze the movement of sound and waves.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the velocity, frequency, wavelength equations to analyze the movement of sound and waves.
3	Developing	I can relate the change in frequency, velocity and wavelength of waves as they enter a different medium.
2	Basic	I can use the velocity, frequency, and wavelength equation with correct units.
1	Minimal	I can relate frequency and period and can state the velocity of sound on earth and variables that change its velocity.
0	No Evidence	No evidence shown.

2.3 I can apply the velocity, frequency, wavelength equations to analyze the movement of light waves.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the velocity, frequency, wavelength equations to analyze the movement of light waves.
3	Developing	I can utilize the speed of light to calculate the wavelength of various broadcast signals.
2	Basic	I can use the concept of a light year to calculate the distance and time to reach different celestial bodies.
1	Minimal	I can identify the wavelength and frequency spectrum of light and the velocity of light in a vacuum.
0	No Evidence	No evidence shown.

2.4 I can interact directly with natural phenomena by using tools, collect and record data to investigate the interaction of waves, their rebounding from barriers, velocities, and how humans perceive sound.

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Learning Target	Descriptor	Definition
4	Proficient	I can interact directly with natural phenomena by using tools, collect and record data to investigate the interaction of waves, their rebounding from barriers, velocities, and how humans perceive sound.
3	Developing	I can calculate the velocity of sound using its frequency and the reflection property to create resonance.
2	Basic	I can explain that light moves in straight lines by using a pinhole camera.
1	Minimal	I can interact with waves using a slinky or water waves to calculate the velocity, frequency and wavelength of a wave.
0	No Evidence	No evidence shown.

3. Light Reflection and Refraction (20.00%)

Learning Targets

3.1 I can apply the law of reflection and optics equations to analyze the reflecting of light by mirrors to find the location and orientation of images.

Learning Target	Descriptor	Definition
4	Proficient	I can apply the law of reflection and optics equations to analyze the reflecting of light by mirrors to find the location and orientation of images.
3	Developing	I can calculate the placement of an object to create a real or virtual image of a certain magnification and relate signs of solution to the location and orientation of images.
2	Basic	I can use the optics equations to calculate the location and size of and image from a curved mirror.
1	Minimal	I can state the location, size and orientation of images produced by plane mirrors.
0	No Evidence	No evidence shown.

3.2 I can apply Snell's Law and the optics equations to analyze the refraction of light by lenses or plates of glass to find the location and orientation of images

Learning Target	Descriptor	Definition
4	Proficient	I can apply Snell's Law and the optics equations to analyze the refraction of light by lenses or plates of glass to find the location and orientation of images
3	Developing	I can find the critical angle of light as it moves from a more dense to less dense medium.
2	Basic	I can use Snell's Law to predict the angle light will bend as it moves between mediums.
1	Minimal	I can calculate the index of refraction of a material using angles of incidence and angles of refraction.
0	No Evidence	No evidence shown.



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3.3 I can construct diagrams to explain the creation of images from mirrors and lenses.

Learning Target	Descriptor	Definition
4	Proficient	I can construct diagrams to explain the creation of images from mirrors and lenses.
3	Developing	I can construct ray diagrams for converging lenses to locate and describe images.
2	Basic	I can construct ray diagrams for concave mirror to locate and describe images.
1	Minimal	I can construct a ray diagram to predict the location of images from plane mirrors.
0	No Evidence	No evidence shown.

3.4 I can use appropriate vocabulary to describe the reflection and refraction of light waves as they interact with mirrors and lenses, explain common phenomena that occur with light and I know the names and discoveries of

Learning Target	Descriptor	Definition
4	Proficient	I can use appropriate vocabulary to describe the reflection and refraction of light waves as they interact with mirrors and lenses, explain common phenomena that occur with light and I know the names and discoveries of
3	Developing	I can explain phenomena such as mirages, amount of daylight, and why objects in water appear closer to the surface than they really are as they relate to the bending of light.
2	Basic	I can describe the differences between real and virtual images and when they occur with plane and curved mirrors and lenses.
1	Minimal	I can find the focus of a mirror or lens and describe what is happening to light waves at that point.
0	No Evidence	No evidence shown.

3.5 I can interact directly with mirrors, lenses and other mediums phenomena by using tools to collect and record data, engage in scientific reasoning to manipulate equipment, analyze results, and discuss their findings.

Learning Target	Descriptor	Definition
4	Proficient	I can interact directly with mirrors, lenses and other mediums phenomena by using tools to collect and record data, engage in scientific reasoning to manipulate equipment, analyze results, and discuss their findings.
3	Developing	I can measure distances, focal length, and sizes of objects and images formed by lenses to analyze the accuracy of the optics equations.
2	Basic	I can measure distances, focal length, and sizes of objects and images formed by concave mirrors to analyze the accuracy of the optics equations.
1	Minimal	I can measure appropriate angles and use Snell's Law to find the index of refraction of a material.
0	No Evidence	No evidence shown.



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4. Electricity (20.00%)

Learning Targets

4.1 I can use appropriate vocabulary to explain the basic properties of electrical interaction, methods of charging and discharging objects, electron flow in circuits, electric fields, grounding, analyze the forces


Learning Target	Descriptor	Definition
4	Proficient	I can use appropriate vocabulary to explain the basic properties of electrical interaction, methods of charging and discharging objects, electron flow in circuits, electric fields, grounding, analyze the forces
3	Developing	I can draw and electric field around a charged object and calculate the differences in electron flow and electrical potential of series and parallel circuits.
2	Basic	I can explain the process of grounding, how lightning and lightning rods work, and how an electroscope works.
1	Minimal	I can explain charging by induction and conduction by explaining electron flow.
0	No Evidence	No evidence shown.

4.2 I can calculate electrical potential, resistance, current flow, power, electric field intensity, force between two charges, and the cost of running an appliance.

Learning Target	Descriptor	Definition
4	Proficient	I can calculate electrical potential, resistance, current flow, power, electric field intensity, force between two charges, and the cost of running an appliance.
3	Developing	I can calculate the power and cost of running appliances for periods of time.
2	Basic	I can use Ohm's Law to calculate voltage, resistance, and amperage.
1	Minimal	I can calculate electric field intensity.
0	No Evidence	No evidence shown.

4.3 I can analyze the flow of electricity in both AC and DC circuits, calculate total resistance in both series and parallel circuits, and analyze voltage and current at any point in series, parallel, and combination circuits.

Learning Target	Descriptor	Definition
4	Proficient	I can analyze the flow of electricity in both AC and DC circuits, calculate total resistance in both series and parallel circuits, and analyze voltage and current at any point in series, parallel, and combination circuits.
3	Developing	I can calculate current splits in a parallel circuit.
2	Basic	I can calculate voltage drops in a series circuit.
1	Minimal	I can calculate total resistance and total current in series and parallel circuits.



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Learning Target	Descriptor	Definition
0	No Evidence	No evidence shown.

4.4 I can build a parallel, combination, and series circuit, then measure and calculate the total resistance and voltage across each branch.

Learning Target	Descriptor	Definition
4	Proficient	I can build a parallel, combination, and series circuit, then measure and calculate the total resistance and voltage across each branch.
3	Developing	I can build a simple series circuit, then calculate and measure the total resistance and voltage drops.
2	Basic	I can operate a VOM to measure resistance and voltage.
1	Minimal	I can create a positive and negative charge using tape and analyze the charge of an object using that tape.
0	No Evidence	No evidence shown.



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5. Motors and Generators (20.00%)

Learning Targets

5.1 I can construct a motor and use appropriate vocabulary to express the interaction between electricity and magnetism that are necessary for the motor to work, explain the items needed to create a motor and how to change the motor into a generator.

Learning Target	Descriptor	Definition
4	Proficient	I can construct a motor and use appropriate vocabulary to express the interaction between electricity and magnetism that are necessary for the motor to work, explain the items needed to create a motor and how to change the motor into a generator.
3	Developing	I can calculate and describe the direction of the force on a current carrying conductor in a magnetic field.
2	Basic	I can create a coil and state the relationship between the direction of the current flow and the north pole of the magnet, the number of coils, the core, and the magnetic strength.
1	Minimal	I can state the direction of a magnetic field between two magnets.
0	No Evidence	No evidence shown.

5.2 I can predict and test ways to make a motor or generator more powerful and the differences between AC and DC motors and generators.

Learning Target	Descriptor	Definition
4	Proficient	I can predict and test ways to make a motor or generator more powerful and the differences between AC and DC motors and generators.
3	Developing	I can locate the arrangement of brushes on a motor to tell if it is an AC or DC motor.
2	Basic	I can add magnetism, voltage, and current to a motor to produce more power.
1	Minimal	I can convert a motor into a generator.
0	No Evidence	No evidence shown.

Submitted on 2/17/2020 by Bill Munch