



6-Variables and Design

Standards

MS-ETS-1; MS-ETS-2; MS-ETS-3; MS-ETS-4

Resources

Think Link

Competencies

- Understand engineering designs to define problems, develop solutions, and optimize solutions to a problem in physical science.

I can

- I can identify the problem that an engineer may want to solve
- I can plan and carry out an investigation to test one variable
- I can use mathematics and computational thinking to create a two coordinate graph and explore relationships between variables
- I can analyze and interpret data to serve as the basis for evidence to answer scientific questions
- I can undertake a design project, engaging in a design cycle to construct and/or implement a solution that meets specific criteria and constraints
- I can test and evaluate a design solution, then redesign as needed
- I can communicate information about the design process used by engineers
- I can define a design problem that can be solved through the development of an object or system that includes multiple criteria and constraints
- I can communicate information about a chosen design problem and a prototype solution

Vocab

Content: brainstorm, constraint, controlled experiment, criteria, define, dependent variable, distance, efficiency, engineer, evaluate, final, independent variable, initial, model, motion, position, prototype, reference point, scientist, system, variable, X-axis, Y-axis

Academic: analyze, carry out, communicate, construct, create, engage, explore, evaluate, identify, interpret, plan, test, use



6-Gravity and Kinetic Energy

Standards

MS-PS2-1; MS-PS2-2; MS-PS2-3; MS-PS2-4; MS-PS2-5; MS-PS3-1; MS-PS3-2; MS-PS3-3; MS-PS3-4; MS-PS3-5; MS-ETS-1; MS-ETS-2; MS-ETS-3; MS-ETS-4

Resources

Think Link

Competencies

- Understand the relationships among forces and motion and interactions between objects and within systems of objects
 - Understand how energy is defined, transferred, transformed and conserved by objects and within systems.
- Understand engineering designs to define problems, develop solutions, and optimize solutions to a problem in physical science.

I can

- I can understand Newton's Laws and the variables of time, position, velocity, and acceleration can be used to describe the position and motion of particles.
- I can analyze line slope to make claims about an objects's speed.
- I can calculate weight at locations with different gravitational forces.
- I can identify the force that acts on an object (i.e., gravity and friction).
- I can describe, measure, and represent data on a graph showing the motion of an object (position, direction of motion, speed).
- I can recognize and describe examples of Newton's Laws of Motion.
- I can understand the difference between potential and kinetic energy.
- I can identify appropriate problems for technological design, design a solution or product, implement the proposed design, evaluate the product, and communicate the process of technological design.

Vocab

Content: Acceleration, Air resistance, Average speed, Collision, Constant speed, Distance, Energy, Friction, Gram, Impulse, Kinetic energy, Mass, Newton, Position, Potential energy, Slope, Speed, Variables, Weight

Academic: Communicate, Describe, Design, Evaluate, Identify, Implement, Measure, Recognize, Represent, Understand



6-Electromagnetic Force

Standards

MS-PS2-2; MS-PS2-3; MS-PS2-5; MS-PS3-2

Resources

Think Link

Competencies

- Understand the relationships among forces and motion and interactions between objects and within systems of objects.
- Understand how energy is defined, transferred, transformed and conserved by objects and within systems.

I can

- I can analyze and interpret data about magnetic force in a series of experiments looking at force over a distance and force when more magnets are introduced.
- I can develop and use models to construct explanations about magnetic fields and explain their properties and interactions.
- I can understand that when work is done energy transforms from one form to another, including mechanical, heat, light, sound, electrical, chemical, and nuclear energy, yet is conserved.
- I can develop and use a model to explain how a magnetic field results from an electric current through a wire.

Vocab

Content: Attract, Battery, Circuit, Compass, Component, Contact point, Core, Electric current, Electromagnet, Electromagnetism, Energy transfer, Filament, Gravitational force, Induced magnetism, Insulation, Magnet, Magnetic field, Magnetism, Permanent magnet, Pole, Potential energy, Repel, Temporary magnet

Academic: Analyze, Construct, Develop, Explain, Interpret, Understand, Use a model



6-Waves

Standards

MS-PS4-1; MS-PS4-2; MS-PS4-3

Resources

Think Link

Competencies

- Understand characteristic properties of waves and electromagnetic radiation and how they behave and transmit information.

I can

- I can collect frequency data from multiple sources.
- I can create and describe longitudinal and transverse waves.
- I can apply computational thinking when diagramming a wave, measuring its properties, and calculating speed.
- I can understand that when work is done energy transforms from one form to another, including mechanical, heat, light, sound, electrical, chemical, and nuclear energy, yet is conserved.
- I can observe and communicates how light (electromagnetic) energy interacts with matter: transmitted, reflected, refracted, and absorbed.
- I can analyze graphical displays of carrier waves, sound waves, and modulated waves to understand their relationships and describe their properties.

Vocab

Content: Absorb, Amplitude, Amplitude modulation (AM), Analog, Angle of incidence, Angle of reflection, Color, Compression wave, Crest, Decibels, Digital, Electromagnetic, Spectrum, Electromagnetic, Wave, Filter, Frequency, Frequency modulation (FM), Incident beam, Interface, Kinetic energy, Laser, Longitudinal wave, Mechanical wave, Medium, Node, Normal line, Pulse, Ray, Reflected beam, Reflection, Refraction, Spectroscope, Spectrum, Transverse wave, Trough, Variable, Wave, Wavelength

Academic: Collect, Create, Describe, Apply, Measure, Calculate, Understand, Observe



6-Chemical Interactions

Standards

MS-PS1-1; MS-PS1-2; MS-PS1-3; MS-PS1-4; MS-PS1-5; MS-PS1-6; MS-ETS1-1; MS-ETS1-2; MS-ETS1-3; MS-ETS1-4; MS-PS3-1; MS-PS3-2; MS-PS3-3; MS-PS3-4; MS-PS3-5

Resources

Think Link

Competencies

- Understand characteristic properties of waves and electromagnetic radiation and how they behave and transmit information.

I can

- I can observe properties of kitchen powders (baking soda, salt, sugar, flour). Mixes in various combinations, then identify by properties.
- I can use a periodic table to identify the number and types of elements in a compound when given a chemical formula.
- I can compare and classify the states of matter; solids, liquids, and gases.
- I can understand that when work is done, energy transforms from one form to another, including mechanical, heat, light, sound, electrical, chemical, and nuclear energy, yet is conserved.
- I can understand that when work is done, energy transforms from one form to another, including mechanical, heat, light, sound, electrical, chemical, and nuclear energy, yet is conserved.
- I can measure and graph the effects of temperature on matter.
- I can understand the relationship of atoms to elements and elements to compounds.

Vocab

Content: Atoms, Bond, Chemical name, Chemical reaction, Common name, Compound, Compress, Elements, Expands, Gas, Matter, Ionic compound, Molecule, Periodic table of elements, Liquids, Matter, Particles, Solids, Substances, Symbol

Academic: classify, compare, design, graph, identify, measure, observe, understand, use