

ENERGY & WAVES PHYSICS LAB 201

APPLIED SCIENCES

Designed For Students:
 Grades 6th-12th
 Ages 11-18

Program Length:
 3 hours

Park:
 Disney California Adventure® Park
 in California

Understands energy types, sources, and conversions, and their relationship to heat and light

Grades 6-8

- Understand that energy cannot be created or destroyed only changed from one form to another
- Knows that vibrations move at different speed in different materials and have different wavelengths
- Knows that only a narrow range of wavelengths of electromagnetic radiation can be seen by the human eye: differences of wavelength within that range of visible light are perceived as differences in color
- Knows that energy is a property of many substances
- Knows how the Sun acts as a major source of energy for changes on the Earth's surface
- Knows that most chemical and nuclear reactions involve a transfer of energy
- Knows that vibrations move at different speeds in different materials, have different wavelengths, and set up wave-like disturbances that spread away from the source
- Knows that only a narrow range of wavelengths of electromagnetic radiation can be seen by the human eye; differences of wavelength within that range of visible light are perceived as differences in color

Grades 9-12

- Knows that waves have energy and can transfer energy when they interact with matter
- Knows that range of the electromagnetic spectrum; electromagnetic waves result when a charged object is accelerated or decelerated, and the energy of electromagnetic waves is carried in packets whose magnitude is inversely proportional to the wavelength
- Knows that waves have energy and can transfer energy when they interact with matter
- Knows the range of the electromagnetic spectrum
- Knows that although the total energy of the universe remains constant, matter tends to become steadily less ordered as various energy transfers occur, and the energy tends to spread out uniformly
- Understands motion and the principles that explain it
- Understand the sources and properties of energy

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Knows that kinds of forces that exist between objects and within atoms

Grades 6-8

- Knows that just as electric currents can produce magnetic forces, magnets can cause electric currents.
- Knows that all scientific ideas are tentative and subject to change and improvement in principle, but for most core ideas in science, there is much experimental and observational confirmation

Grades 9-12

- Knows that materials that contain equal proportions of positive and negative charges are electrically neutral, but a very small excess or deficit of negative charges in a material produces noticeable electric forces
- Knows that magnetic forces are very closely related to electric forces and can be thought of as different aspects of a single magnetic force; the interplay of these forces is the basis for electric motors, generators, radio, television, and many other technologies
- Understands the nature of scientific knowledge

Understands the nature of scientific inquiry

Grades 6-8

- Designs and conducts a scientific investigation
- Uses appropriate tools and techniques to gather, analyze, and interpret scientific data

Grades 9 -12

- Understands the use of hypotheses in science
- Knows that scientists conduct investigations for a variety of reasons