DCI: Energy

HS.PS3.D: Energy in Chemical Processes and Everyday Life

Solar cells are humanmade devices that likewise capture the sun's energy and produce electrical energy. (HS-PS4-5)

DCI: Waves and Their Applications in Technologies for Information Transfer

HS.PS4.A: Wave Properties

The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. (HS-PS4-1)

DCI: Waves and Their Applications in Technologies for Information Transfer

HS.PS4.A: Wave Properties

Information can be digitized (e.g., a picture stored as the values of an array of pixels); in this form, it can be stored reliably in computer memory and sent over long distances as a series of wave pulses. (HS-PS4-2), (HS-PS4-5)

DCI: Waves and Their Applications in Technologies for Information Transfer

HS.PS4.A: Wave Properties

[From the 3–5 grade band endpoints] Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. (Boundary: The discussion at this grade level is qualitative only; it can be based on the fact that two different sounds can pass a location in different directions without getting mixed up.) (HS-PS4-3)

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HS.PS4.B: Electromagnetic Radiation

Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features. (HS-PS4-3)

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HS.PS4.B: Electromagnetic Radiation

When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells. (HS-PS4-4)

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HS.PS4.B: Electromagnetic Radiation

Photoelectric materials emit electrons when they absorb light of a high enough frequency. (HS-PS4-5)

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HS.PS4.C: Information Technologies and Instrumentation

Multiple technologies based on the understanding of waves and their interactions with matter are part of everyday experiences in the modern world (e.g., medical imaging, communications, scanners) and in scientific research. They are essential tools for producing, transmitting, and capturing signals and for storing and interpreting the information contained in them. (HS-PS4-5)