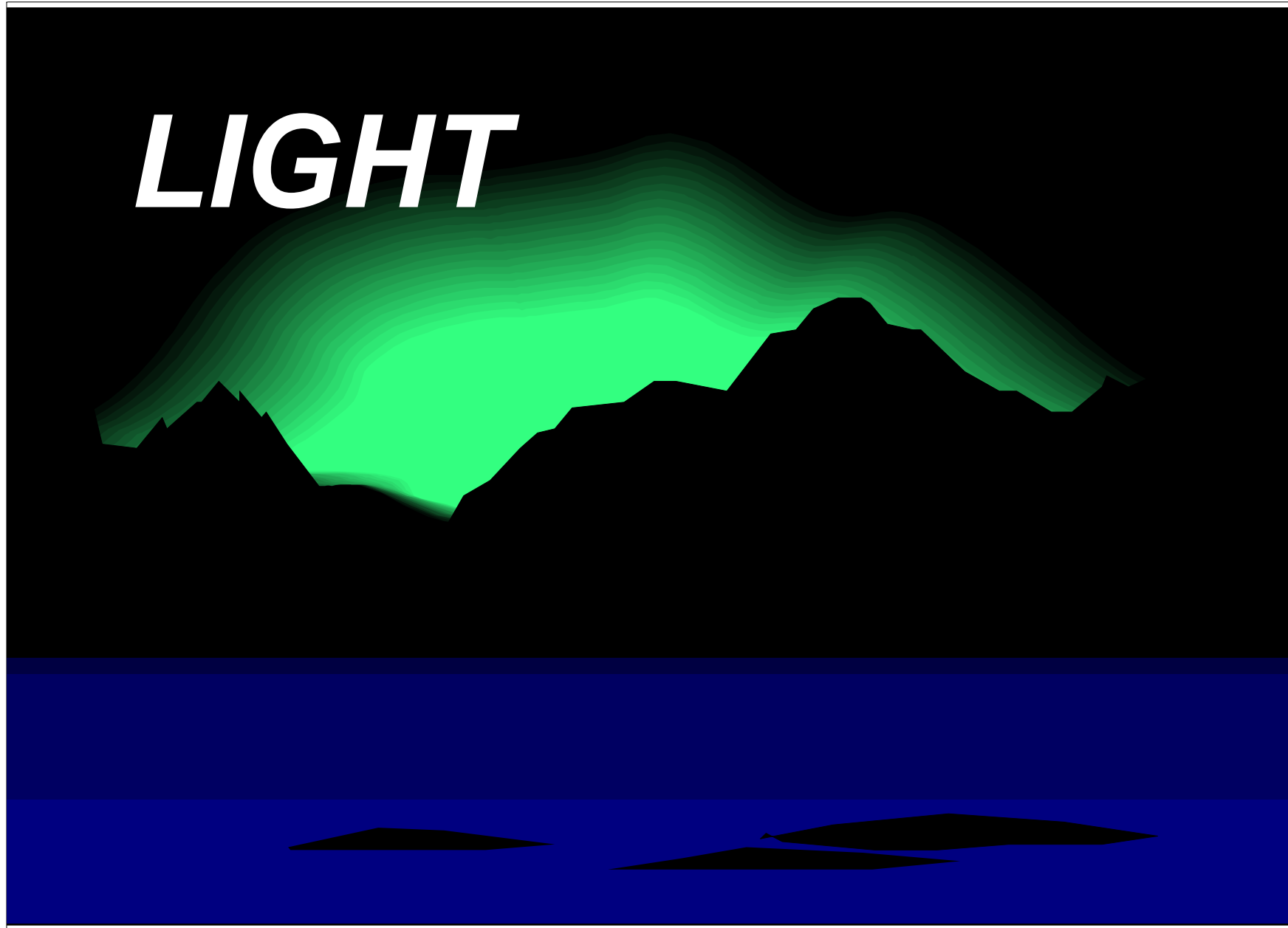


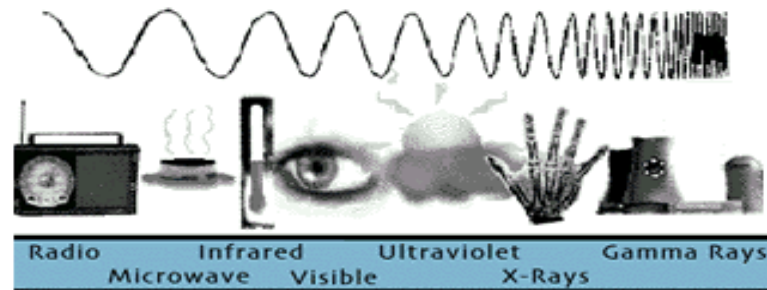
LIGHT



Physical Wave vs Electromagnetic Wave

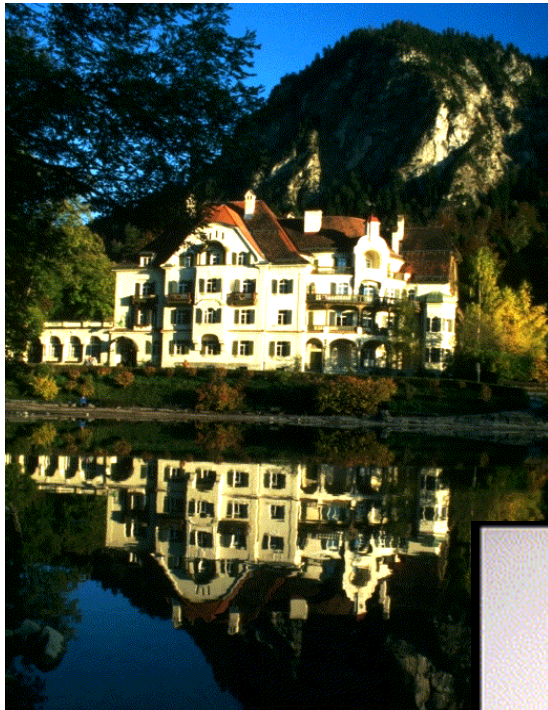


Light is a subset of an electromagnetic wave



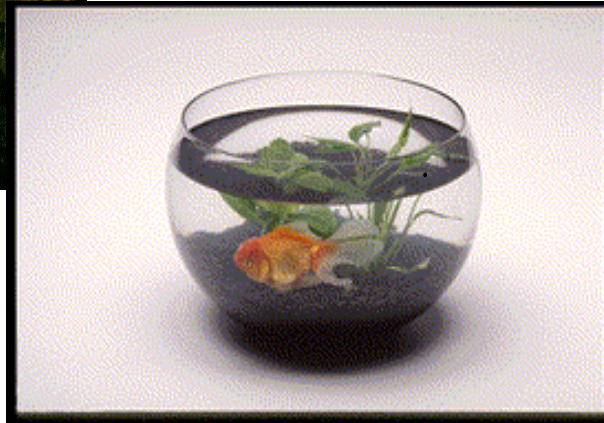
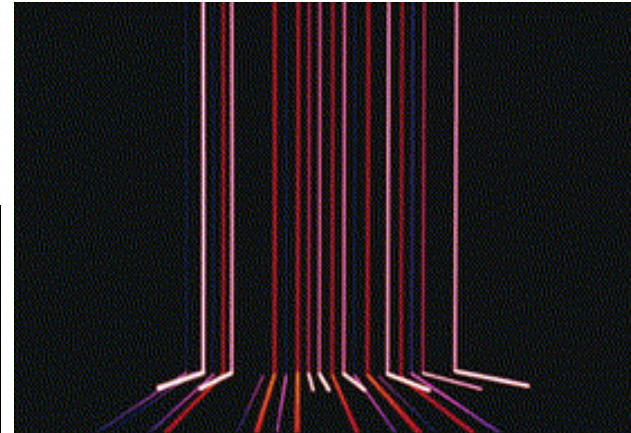
The electromagnetic spectrum stretches from radio waves to gamma rays.

Light can be moved



reflection

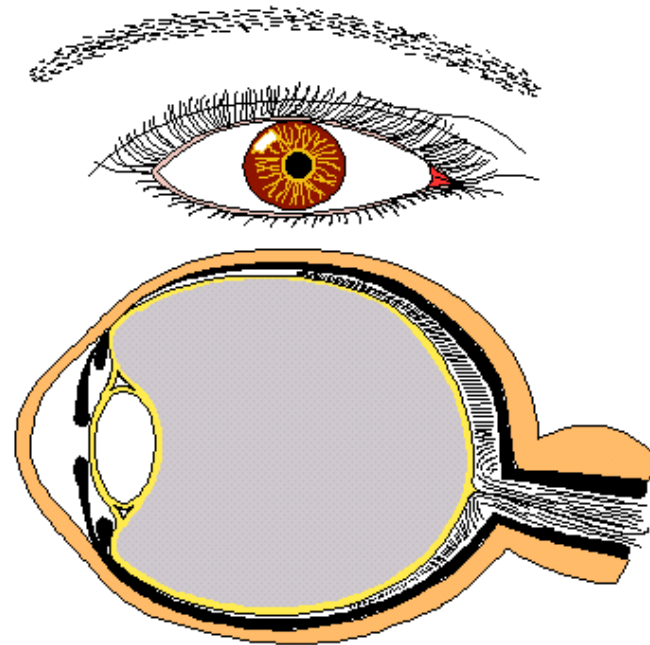
diffraction



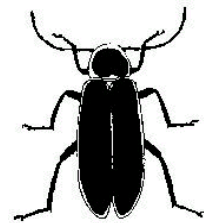
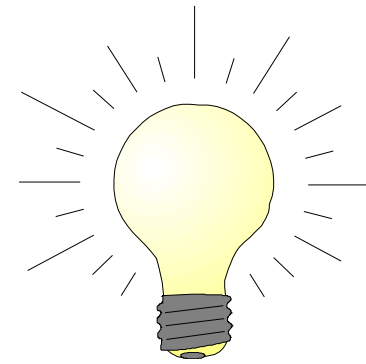
refraction

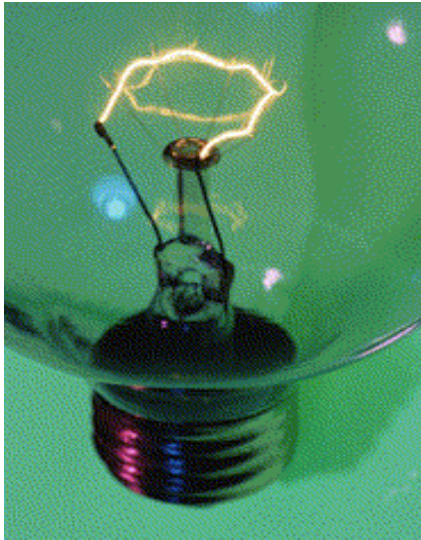
Who sees light

our eyes are adapted and have evolved to use the light created by sunlight; most organisms are sensitive to light, either by their eyes or photosensors



What produces light





INCANDESCENCE

light is emitted through radiation or heat; atom acting as a solid when electricity goes through i.e. light bulb

EXCITATION

electron is excited to higher energy level; energy released as photons which our eyes see as light; i.e. neon sign, mercury vapor street lights



FLUORESCENCE

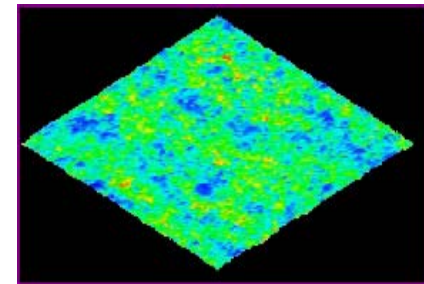


x-ray fluorescence

de-excitation photon, i.e. in fluorescent lamp, tube is filled with low pressure mercury vapor which is excited by high speed electron, upon de-excitation, energy is released as photon of light

PHOSPHORESCENCE

some materials stay excited longer; time between the process of excitation and de-excitation releases photons that may last from seconds to years





LASERS

*light amplification by stimulated
emission of radiation*

coherent vs

incoherent

Technology from light



The Age of Light

When the first laser beam, a bright pulse of deep red light was demonstrated at the Hughes Research Laboratory in 1960, it was little more than a laboratory curiosity. Now almost forty years later "Photonics", the exploitation of light in devices and systems, has revolutionized the way in which we live and work. It is the "pavement" for the Information Highway. It provides radically new approaches to the diagnosis and treatment of diseases. It is virtually impossible to buy groceries, turn on your television, print a letter, make a telephone call, or play recorded music without using photonic technologies.

HOLOGRAM

"Looking Forward" 1993

*created by laser light
on film*

Artist: Patrick Boyd



silver halide emulsion on glass