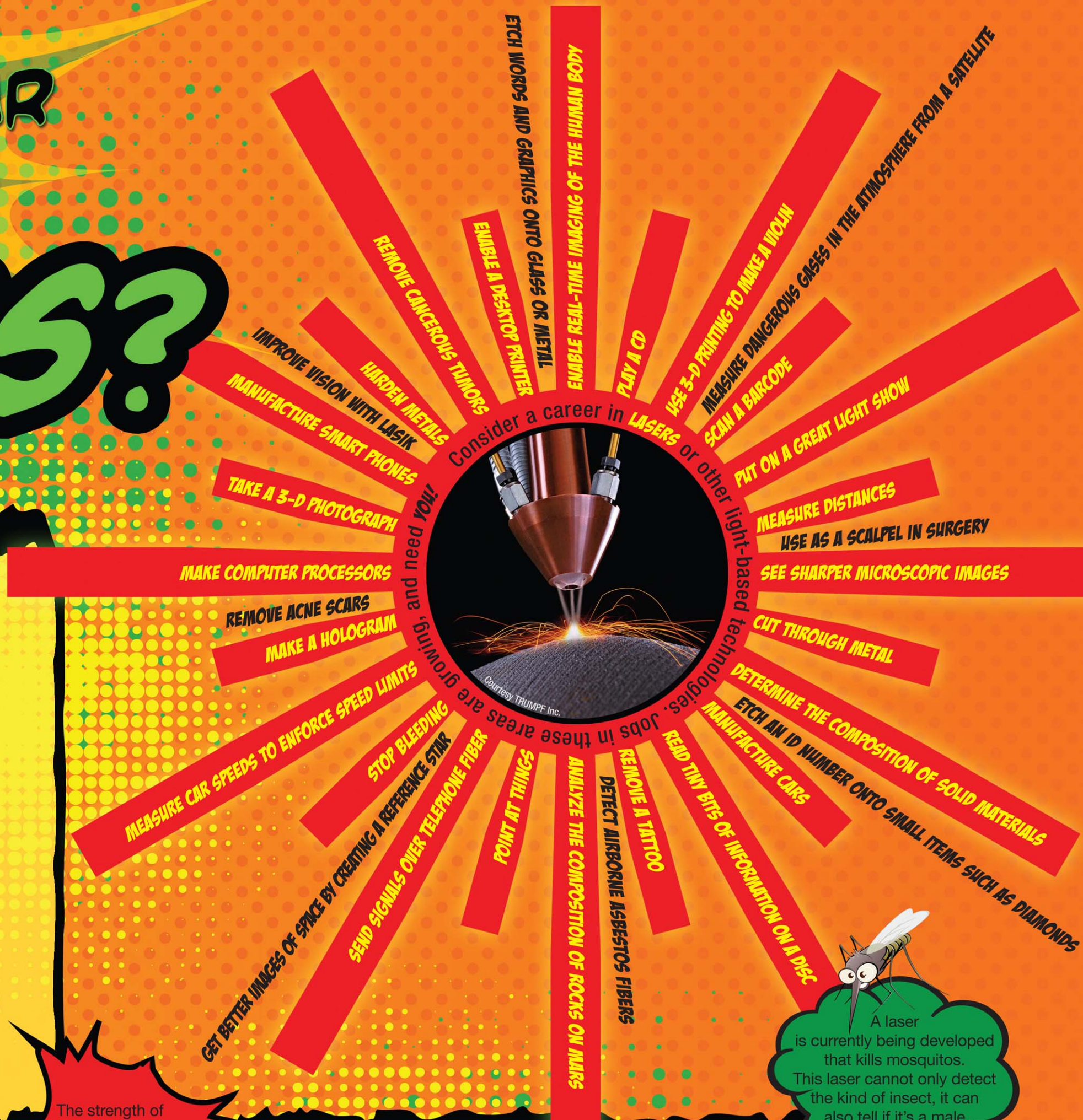


DID YOU GET YOUR DAILY DOSE OF LASERS?

Did you know that about six times a day, a laser does some work for you, and that there are already over 7 BILLION lasers operating daily?

Lasers are powerful tools, with an amazing range of uses—from making smart phones, playing CDs, and scanning bar codes in stores, to finding and destroying tumors, and detecting dangerous chemicals in the atmosphere. The unique characteristics of laser light make it possible to manipulate it very precisely. Lasers enrich our lives in many positive ways and have the potential to solve many of the world's challenges.



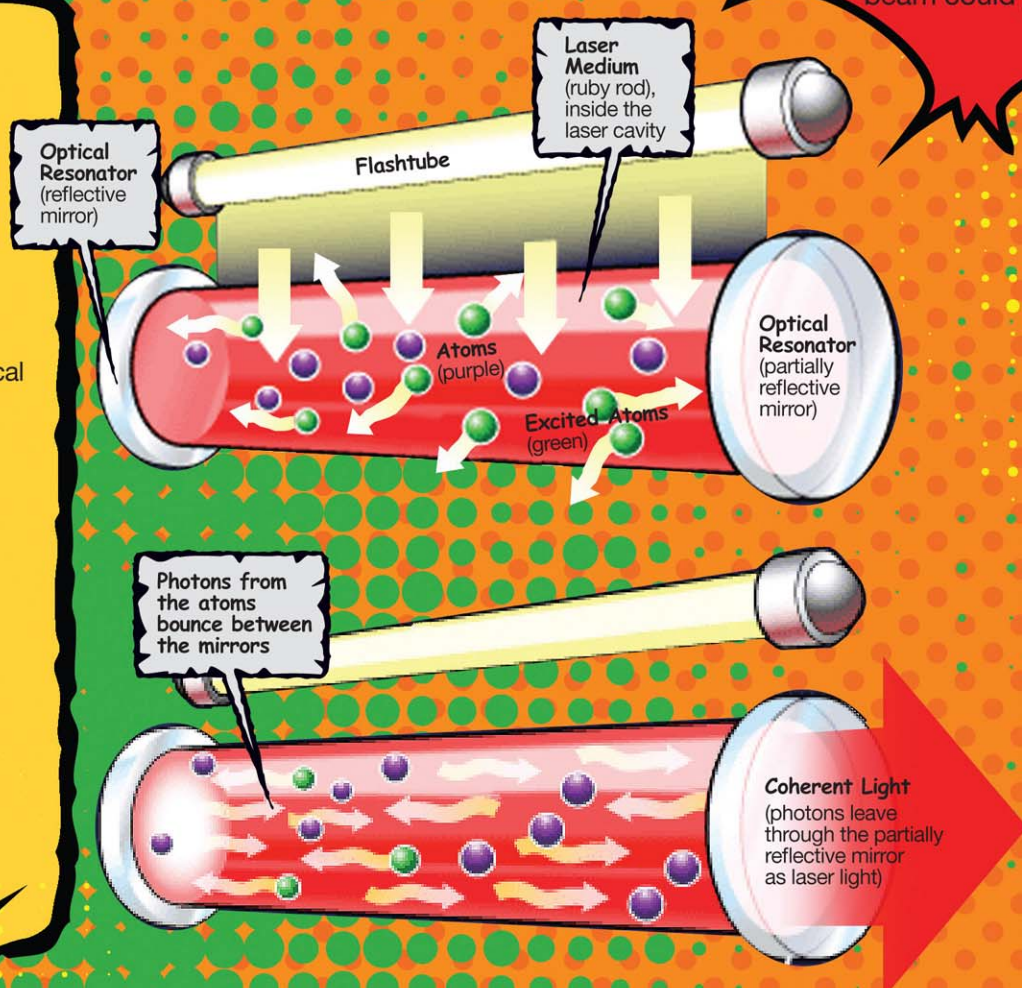
A laser is currently being developed that kills mosquitos. This laser cannot only detect the kind of insect, it can also tell if it's a male or female.

The strength of early lasers was measured in Gillettes. This was the number of blue Gillette razor blades that a beam could puncture.

Laser Construction

A laser device has three parts:

- An energy source, called the pump or pump source. This powers the device, and can be any number of things such as a flashtube, an electrical discharge, or a chemical reaction.
- A gain or laser medium, a material whose atoms are excited, then relax and emit light in the process. This can be a solid, liquid, gas, or semiconductor.
- Two or more mirrors that make an optical resonator. These mirrors reflect the photons repeatedly, allowing them to be amplified. One of the mirrors is partially reflective and allows some of the light to leave the device as a laser beam.



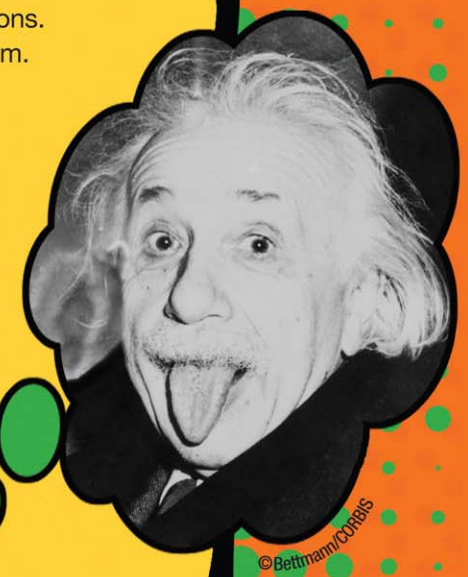
Light of all kinds can be described as a wave, a particle (or photon), or a combination of both. The observations of how light behaves in different situations demonstrates these different properties. The coherent light of lasers is a great demonstration of the wave properties of light.



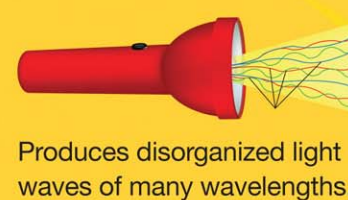
Soon after the invention of the laser in 1960, it was used as the death ray of choice for science fiction writers. Characters in the *Lost in Space* TV series carried laser weapons during its run from 1965 to 1968.

The word "LASER" is an acronym standing for "Light Amplification by Stimulated Emission of Radiation"

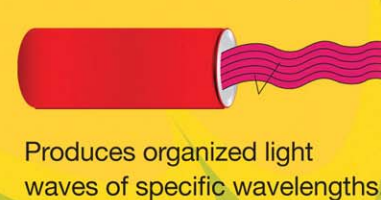
- L**ight: Light is a form of electromagnetic energy and includes both visible and invisible wavelengths. Light, including laser light, is made up of small packets called photons. The energy of a photon depends on where it falls on the electromagnetic spectrum.
- A**mplification: Laser light is amplified, meaning that a very bright, and intense beam is created.
- S**timulated: Amplified light is achieved by stimulating atoms to release more photons. An atom can exist in an excited state, similar to a bow when it is stretched. When the atom relaxes, it emits a photon. This is similar to releasing the string of the bow and letting the arrow fly. This in turn stimulates other nearby atoms to give off photons.
- E**mission: Emission refers to an atom giving off photons. This was described by Albert Einstein in 1917. In laser devices, released photons are bounced between mirrors through a medium that can be a liquid, solid, or gas. As the photons move between mirrors, more photons are released. These photons pass through one end of the device and are seen as the laser beam.
- R**adiation: For lasers, radiation refers to the photons that are being emitted as light. Laser light is different from regular light; the waves are organized and in step with each other.



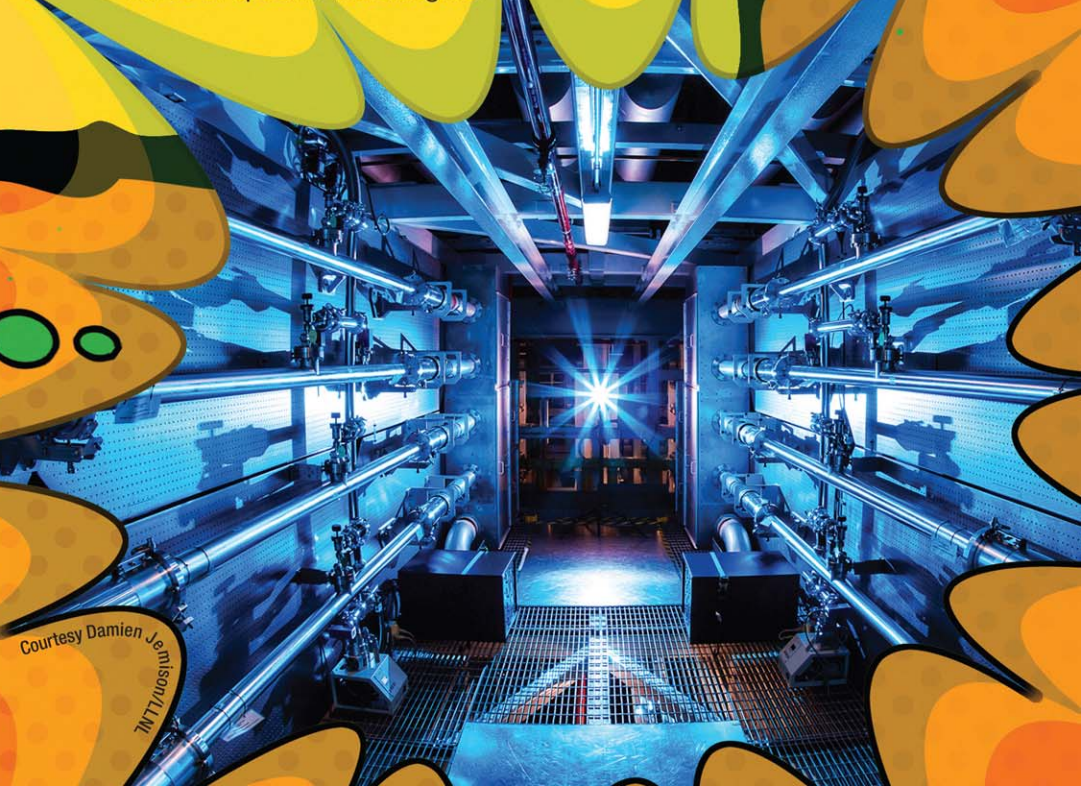
Incoherent Light



Coherent (Laser) Light



The world's largest laser is the National Ignition Facility (NIF) and has 192 intense laser beams, housed in a ten-story building the size of three football fields. These beams create high temperatures found only inside of stars.



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