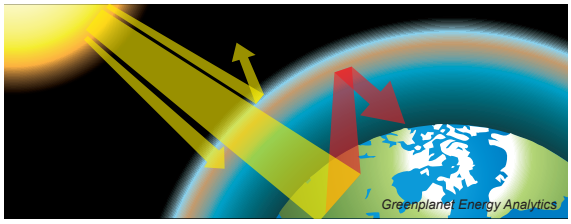
FACT SHEET: Heat From Solar Energy (Basic)

We use many forms of energy in our every day life to warm our homes, cook our meals and fuel our cars. This energy use produces greenhouse gases. These are the gases that trap heat in the atmosphere contributing to climate change.

One way to reduce greenhouse gases is to use alternative energy sources. Let's explore how solar energy can be used to make a heat source.



Importance of Sunlight

- Light is a form of energy.
- The light energy that we receive from our Sun is, without a doubt, the most important element to all life on Earth.
- Sunlight supplies plants with energy which they use (through the process of photosynthesis) to make food (sugar).
- Animals then eat the plants to make their energy.
- Sunlight delivers heat energy that drives ocean currents, wind and on a larger scale, weather and climate systems!
- In fact, nearly all energy on Earth originates from sunlight. Powerful stuff!
- Unless disrupted, light travels in a straight line to Earth.
- The Earth's atmosphere filters a portion of visible light so only about 74% of solar energy reaches the Earth's surface.

How Light Makes Heat

- The molecules and atoms that make up everything are moving all the time.
- Light traveling through space to Earth will eventually come into contact with molecules in some type of material.
- The light energy is absorbed by the molecules and causes them to move faster, bumping into each other. This movement produces heat!
- Neighboring molecules bump into each other, causing even more molecules to vibrate until heat is spread throughout the material.
- This material could be anything: water, sand, air, or the food in a solar oven.
- Heat is energy.
- Temperature is a measurement of that energy.

Color Makes A Difference

- Color makes a difference in how much light is reflected from a surface.
- Lightly colored things, like snow, reflect most of the light, keeping it cool.
- Dark colored objects, such as the ground, absorb most of the light that touches it, causing it to warm up.
- If something is dark, its molecules will end up moving faster than something with a light color.
- Dark colored materials are needed to produce the most heat from the sun.

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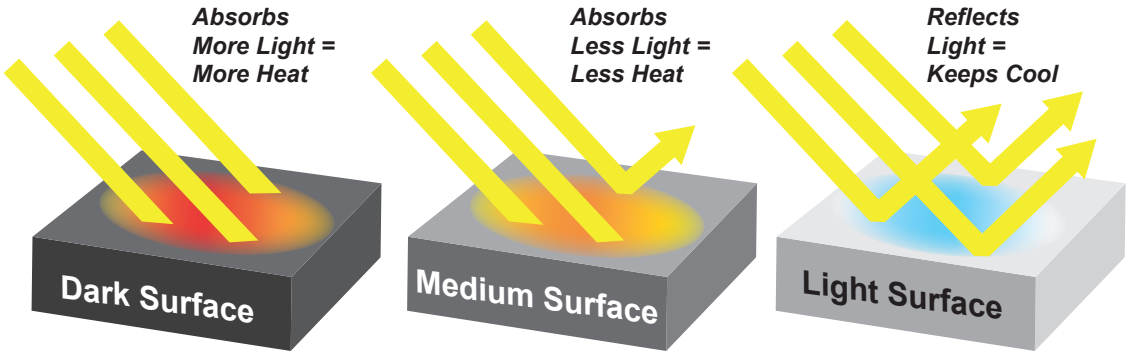

Greenplanet Energy Analytics

Solar Cooker

WikiMedia

Uses of Heat from Solar Energy

Heat from solar energy is called Solar THERMAL Energy. It can be used for;

- heating homes and other buildings, often as in-floor heating systems.
- running air conditioning and refrigeration appliances.
- heating water for homes - for showers, laundry, etc.
- heating indoor and outdoor swimming pools.
- industrial drying of wood, food products, etc.
- solar stills to make drinking water in areas where clean water is not available
- desalination which removes salt from ocean water
- producing electrical power by collecting and concentrating sunlight to produce the high temperature heat needed to produce steam. The steam is then used to power a turbine that produces electricity.
- cooking, using solar ovens or solar cookers

Solar Shower

Mother Earth News

More Information

What Colors Absorb More Heat?
https://sciencing.com/colors-absorb-heat-8456008.html

Thermal Energy - Feel the Burn - SolarSchools.net
https://www.solarschools.net/knowledge-bank/energy/types/thermal

The 5 Most Common Examples Of Solar Power
https://news.energysage.com/most-common-solar-energy-uses/

Solar Energy to the Earth - Energy Education
https://energyeducation.ca/encyclopedia/Solar_energy_to_the_Earth

Solar: A brilliant way to get energy - David Suzuki Foundation
https://davidsuzuki.org/story/solar-a-brilliant-way-to-get-energy/

Solar Energy Facts - Cool Kid Facts
Solar Energy Facts https://www.coolkidfacts.com/solar-energy-facts/

VIDEO - Solar Thermal 101 - YouTube - Student Energy
https://www.youtube.com/watch?v=FgjfJGfusdE

VIDEO - Concentrating Solar Power-Power Towers - KeepItCleanCreative
https://www.youtube.com/watch?v=QTNU1JMhzxA

Solar Thermal Power Plant

The world's first commercial concentrating solar power tower operating near Seville, Spain. It produces electricity with 624 large movable mirrors called heliostats that are controlled by computers so they always face towards the sun.

It took four years to build and produces about 23,400 megawatt-hours of electricity per year

Koza1983/Wikipedia