

Reflection and Absorption of energy

Solar Energy...

The Sun is the Earth's main source of electromagnetic radiation. (light)
Not all of the solar energy reaching the Earth's atmosphere actually reaches the land and water.

What happens to the radiant energy from the sun that reaches the Earth?

- 27% is reflected by clouds and never reaches the Earth surface
- 3% is reflected off the earth's surface back into space
- the land and oceans absorb 50% of the sun's energy
- the clouds absorb 20% of this energy

The albedo (percentage of light reflected) of a material will determine how much radiation is reflected. Clean snow has a high albedo whereas black soil has a low albedo.

Any material that absorbs energy and becomes warmer is called

a heat sink. The oceans are good heat sinks whereas soil and rock are poor heat sinks. ↑

Heat Capacity:

The heat capacity of a substance will indicate whether a substance is a good heat sink or not. Heat capacity is a measure of how much heat it takes to raise the temperature of an object by one degree, . The heat capacity of water is 4186 Joules per kilogram.

It takes 4.18 J to raise 1g of water by 1C

What makes a good heat sink?

- heat up slowly and cool off slowly
- high heat capacity : can hold heat
- releases more heat as it cools than a substance with a low heat capacity

Why are oceans good heat sinks?

- has high heat capacity because it can hold a lot more heat
- oceans heat up slowly

- solar energy causes particles to move and set up convection currents transferring the energy hundreds of meters deep

What makes a poor heat sink?

- tends to heat up and cool off quickly
- has a low heat capacity: doesn't hold a lot of heat

Why is soil a poor heat sink?

- low heat capacity
- solid particles do not set up convection currents
- conduction occurs very slowly

How does this affect our weather?

- solar energy that is reflected does not raise temperatures

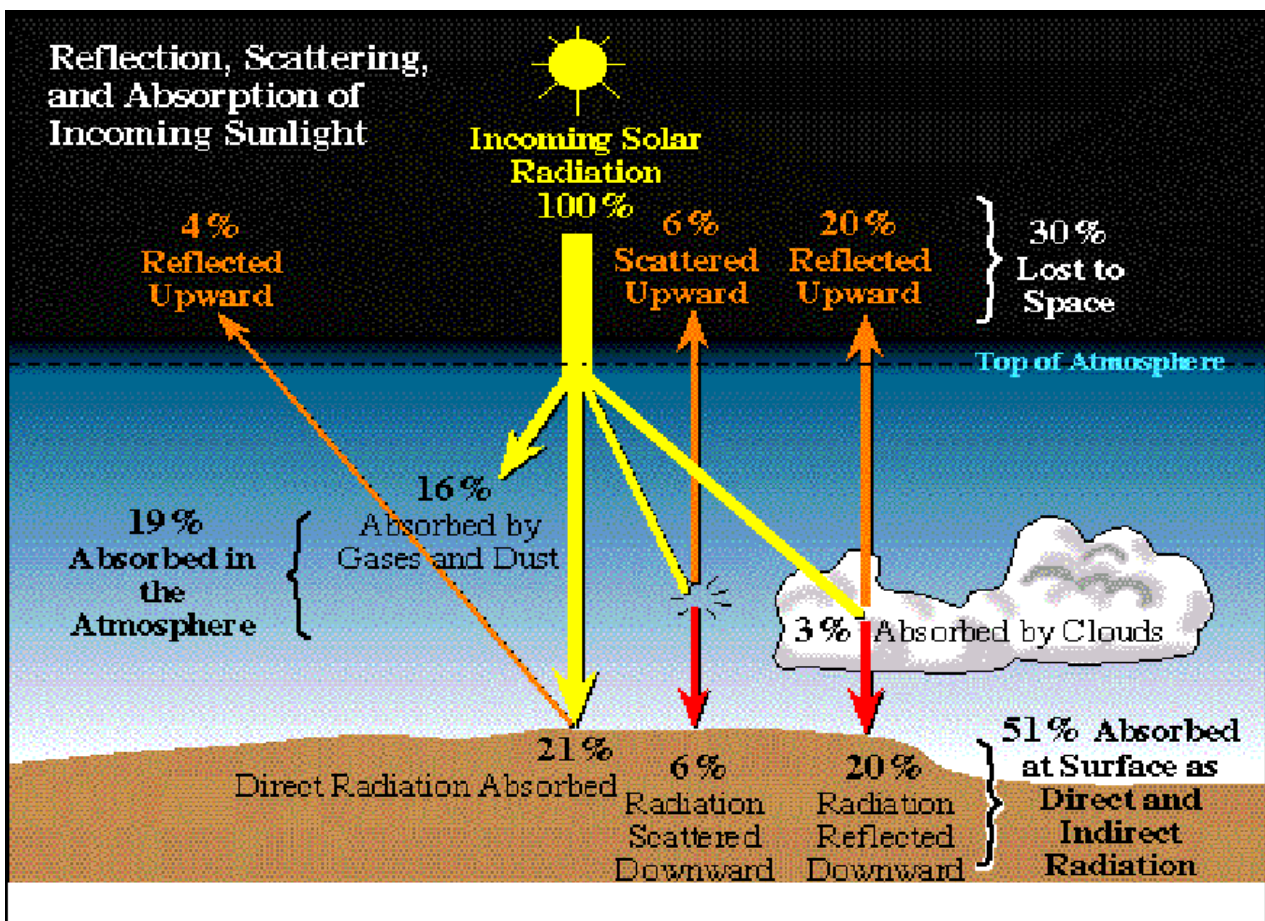
-heat sinks can increase temps

examples??

OCEANS!

Spring/summer...

Fall/winter...



Oceans...

→ oceans have high heat capacity (good heat sink)

It takes a lot of heat energy to raise the temperature.

So temperature rises slowly. Takes a long time for the ocean to heat up.

How does this affect our weather?

→ In spring / summer, we are surrounded by cold ocean.

So we get cool spring / summer.

(We don't get extremely hot.)

→ The ocean also take a long time to cool down.

So... fall / winter we are surrounded by a 'warm' ocean.

Our temperatures in fall/ winter are mild

We don't get extremely cold winters.

* The ocean has a moderating effect on our climate.

"Lab"