

*Amazing Weather!*

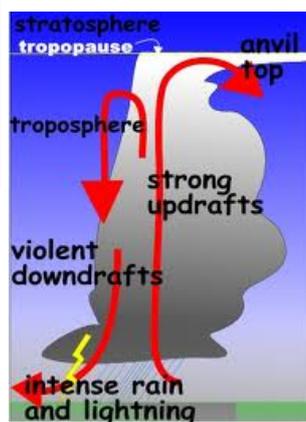
Hurricane Igor, St. John's, 2010  
Tsunami, Japan, 2011



**Weather Dynamics**

**Weather Dynamics** is the study of how the movement of water and air causes weather patterns. The main components of Earth that affects weather are:

- 1) the atmosphere
- 2) the land forms, and (cover 30% of the earth)
- 3) water in any form (solid, liquid, and vapor). (cover 70% of earth)





**But seriously...**

**Weather** - is the set of environmental conditions encountered from one day to the next.

ex. a weeks weather in St. John's in January could be mild, rainy, with a nperature of 2 C

**Climate** - is the set of environmental conditions averaged over many years.

ex. The climate in st. Johns in January is cold , snowy, windy, with an average day temperature of -5 C

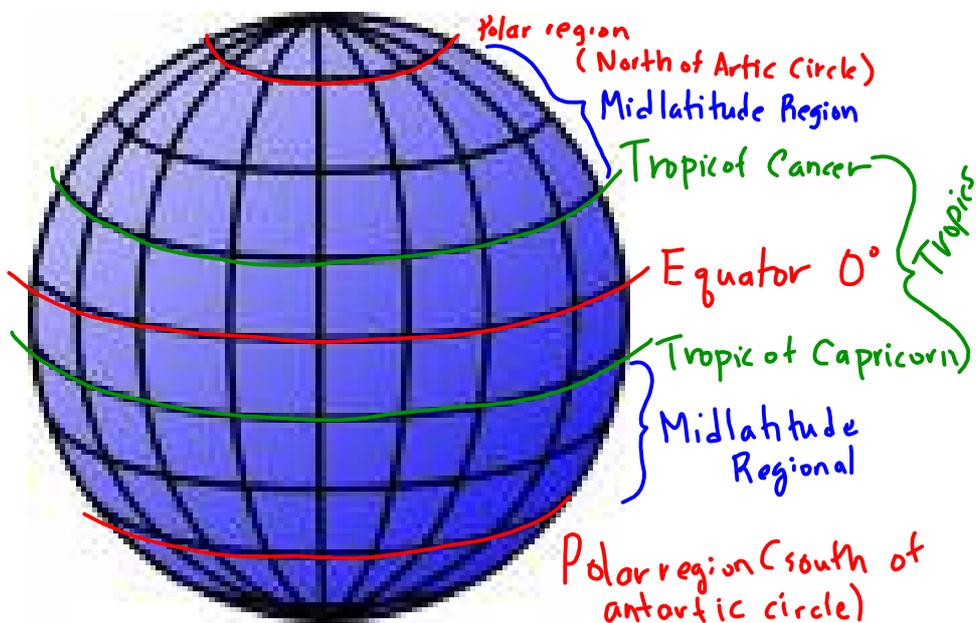
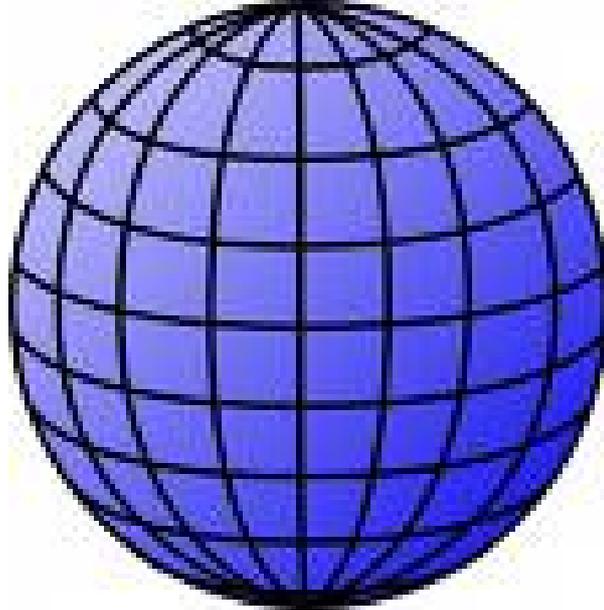
**Why does weather change?**

- uneven heating of the earth's surface
- Tropics receive more solar energy then the poles
- much solar radiation is reflected back into space
- the percentage reflected back is called albedo
- the earth's albedo is 30%

Global Geography:

Longitude - the angle measured east or west from the 0-line, which passes through Greenwich, England. (Prime Meridian)

Latitude - the angle measured south or north of the equator



## Areas of the Earth...

**Tropical Region (Tropics)** - region located between the Tropic of Cancer and the Tropic of Capricorn.

**Polar Regions** - Region north of the Arctic Circle and the region south of the Antarctic Circle.

**Mid-latitude Regions** - Regions between the tropics and the polar regions.

## Special Lines of Latitude

Northern Hemisphere:

Tropic of Cancer  $23.5^\circ$  North latitude

it is the most northerly latitude reached by sun's vertical rays . it is reached on the first day of summer in the northern hemisphere, approx. June 21st

Arctic circle  $66.5^\circ$  North latitude

most northern latitude reached by the sun's rays on the first day of winter in the Northern hemisphere approx. December 21st

# Southern Hemisphere

## Tropic of Capricorn 23.5° South latitude

most southerly latitude reached by the sun's vertical rays. It is reached on the first day of summer in the southern hemisphere approx. December 21st

## Antarctic circle 66.5° South latitude

most southerly latitude reached by the sun's rays on the first day of winter in the southern hemisphere, approx. June 21st

### **Earth's energy Balance**

- almost all energy to sustain life comes from the sun
- some of the energy is used to grow plants
- the incoming energy is equally balanced by energy leaving
- the energy balance keeps earth's temperature at about 15 C

### **Energy transfer**

- occurs in 4 different ways.
- they are all involved in earth's weather.
- These include:

**Radiation**

**conduction**

**Convection**

**Advection**

**How does heat energy get moved around to these different areas of the earth?**

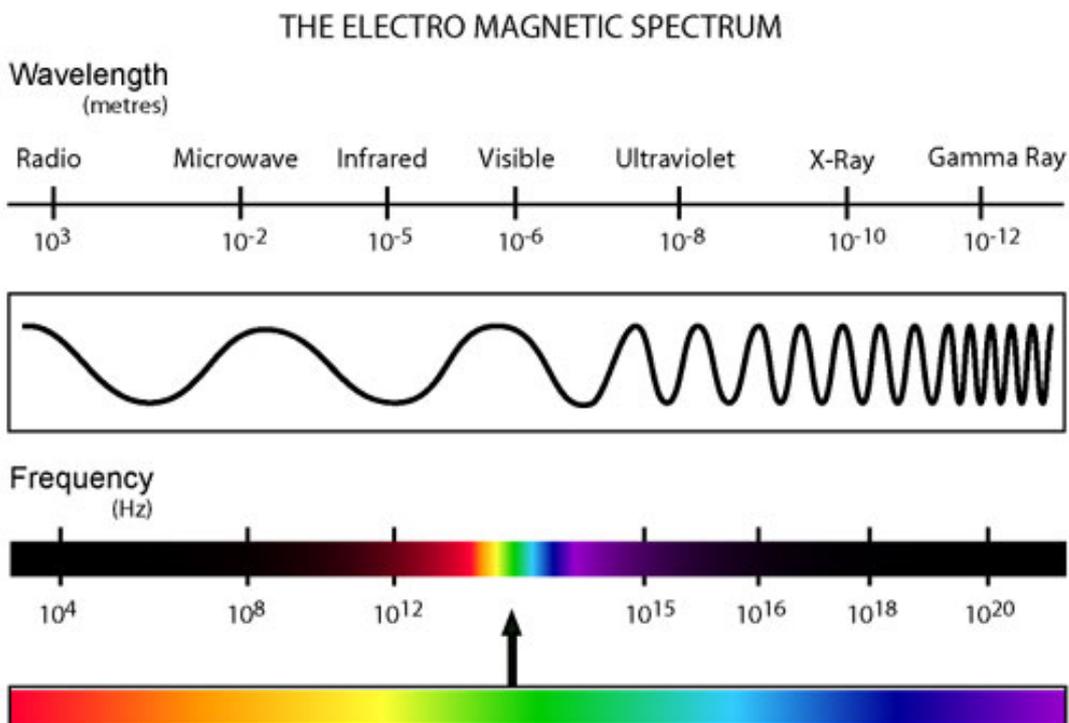
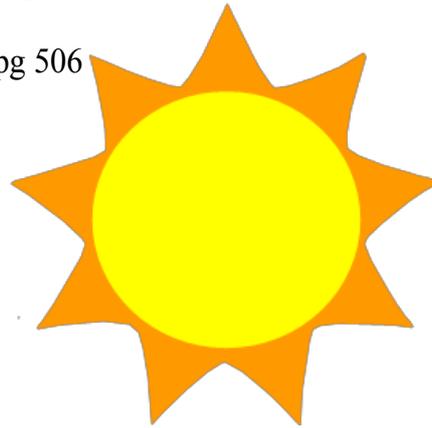
**1. Radiation** is the transfer of energy by waves travelling at 300 000 000 m/s.

Radiation does not require a medium. This means it can travel through empty space.

Visible light is one form of radiation that reaches us from the sun via empty space.

Visible light is only one part of the **electromagnetic spectrum**.

What are some other kinds of light waves? Fig 4 pg 506



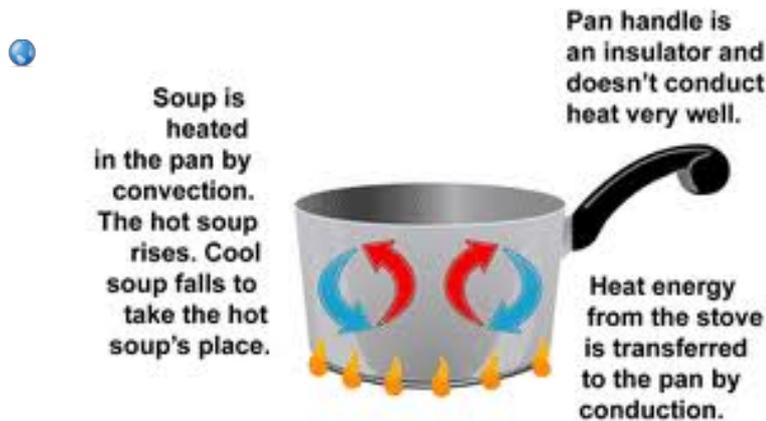
## 2. Conduction

...is the transfer of energy through the collision of particles in a **solid**.

A pan on a stove element heats up by conduction.

Some materials are better conductors of heat than others.

Metals are generally better conductors than materials like rock, sand, wood.



## 3. Convection

...is the transfer of energy **vertically** by movement of particles in a **fluid** ( water or atmosphere).  
can be lgas or liquid



<http://www.kscience.co.uk/animations/convection.htm>

## 4. Advection

...is the transfer of energy **horizontally** by movement of particles in a **fluid** ( water or atmosphere).

