GCSE Geography

Geo diagrams with answers

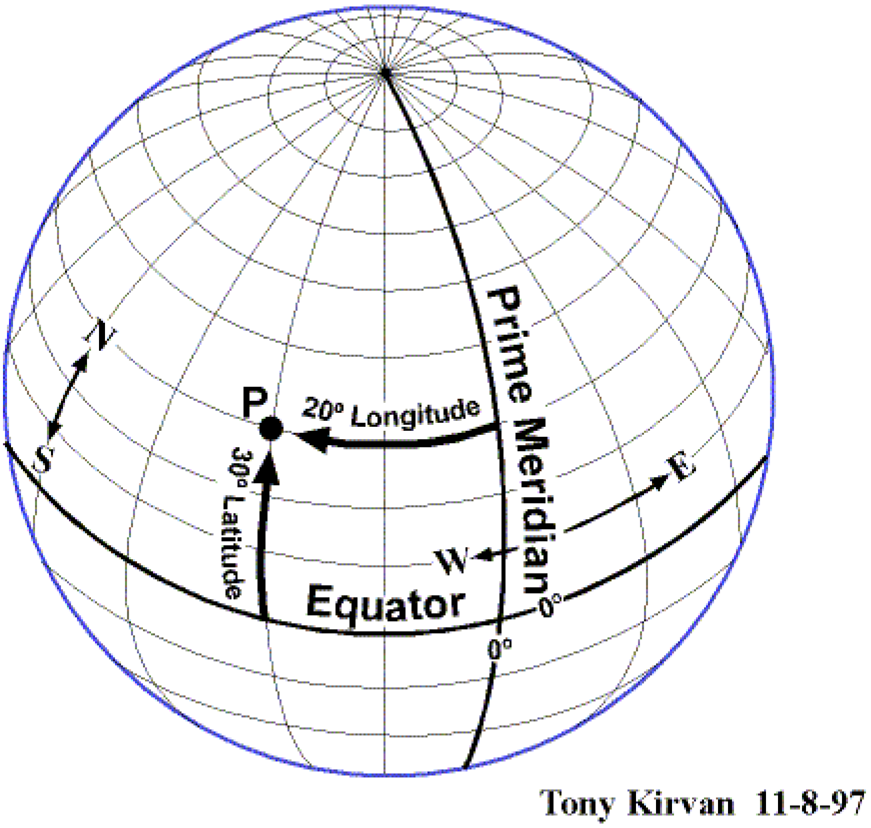
Edited by

Imre Varga B.

Kőszeg

2004

1. Longitude and latitude



Description:

A global grid system is used to locate places on a map. Latitude and longitude can be used to give accurate descriptions of any point on the surface of the globe. These global coordinates are measured in degrees, minutes and seconds. There are 60 minutes to a degree, and 60 seconds to a minute, so they are cumbersome units to work with.

Notes:

……………………………………………………………………………………………………

……………………………………………………………………………………………………

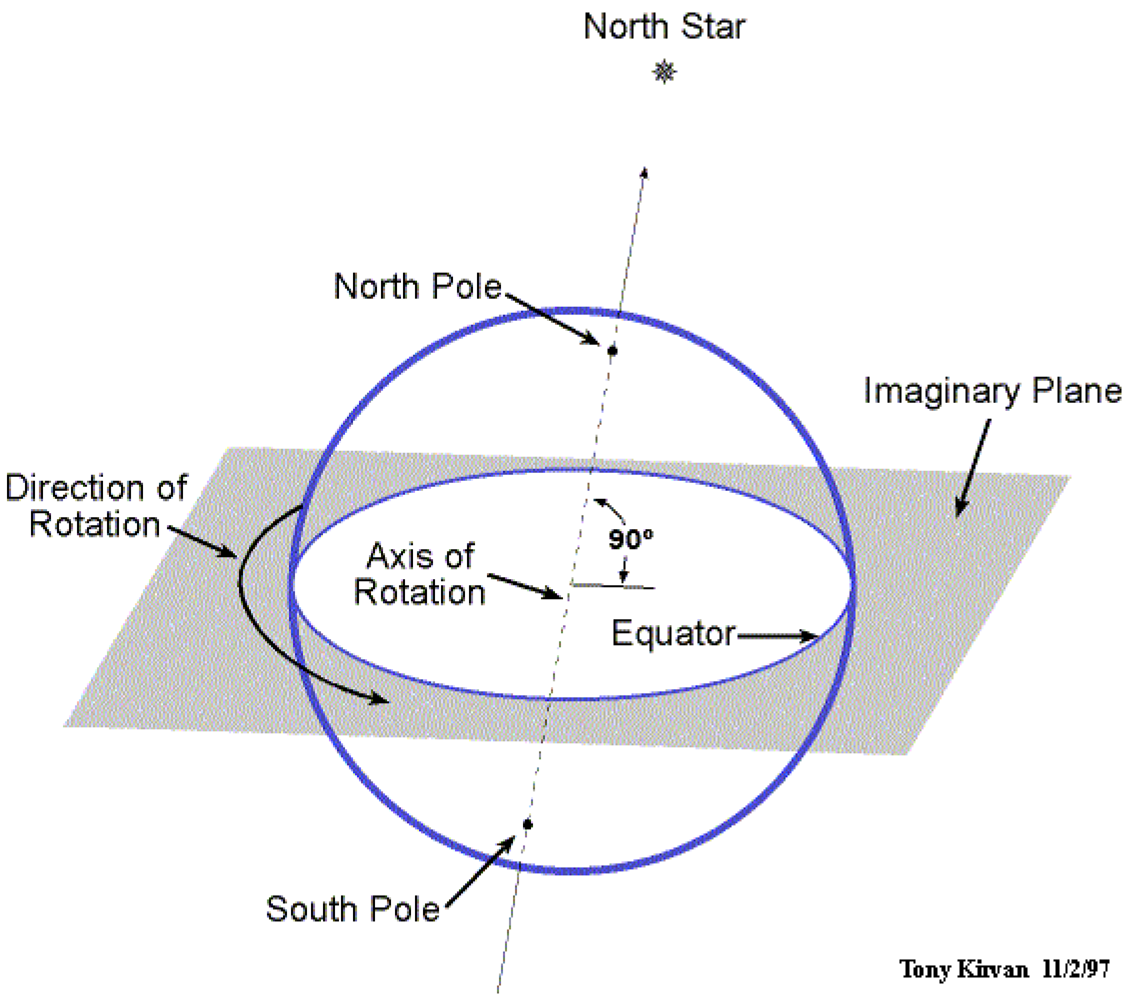
……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

2. Earth coordinate



Description:

2. 1. Rotation of the Earth

- The spinning of the earth on its imaginary axis is called *rotation*.

2. 2. The Equator

- If a plane bisected the earth midway between the axis of rotation and perpendicular to it, the intersection with the surface would form a circle.
    - This unique circle is the *equator*.
    - The equator is a fundamental reference line for measuring the position of points around the globe.

- The equator and the poles are the most important parts of the earth's coordinate system.

2. 3. The Geographic Grid

- The spherical coordinate system with latitudes and longtitudes used for determining the locations of surface features.
  - Parallels: east-west lines parallel to the equator.
  - Meridians: north-south lines connecting the poles.

- Parallels are constantly parallel, and meridians converge at the poles.

- Meridians and parallels always intersect at right angles.

2. 3. 1. Parallels of Latitude

- *Parallels of latitude* are all small circles, except for the equator.
  - True east-west lines
  - Always parallel
  - Any two are always equal distances apart
  - An infinite number can be created

2. 3. 2. Meridians of Longitude

- *Meridians of longitude* are halves of great circles, connecting one pole to the other.
  - All run in a true north-south direction
  - Spaced farthest apart at the equator and converge to a point at the poles
  - An infinite number can be created on a globe

Notes:

....

....

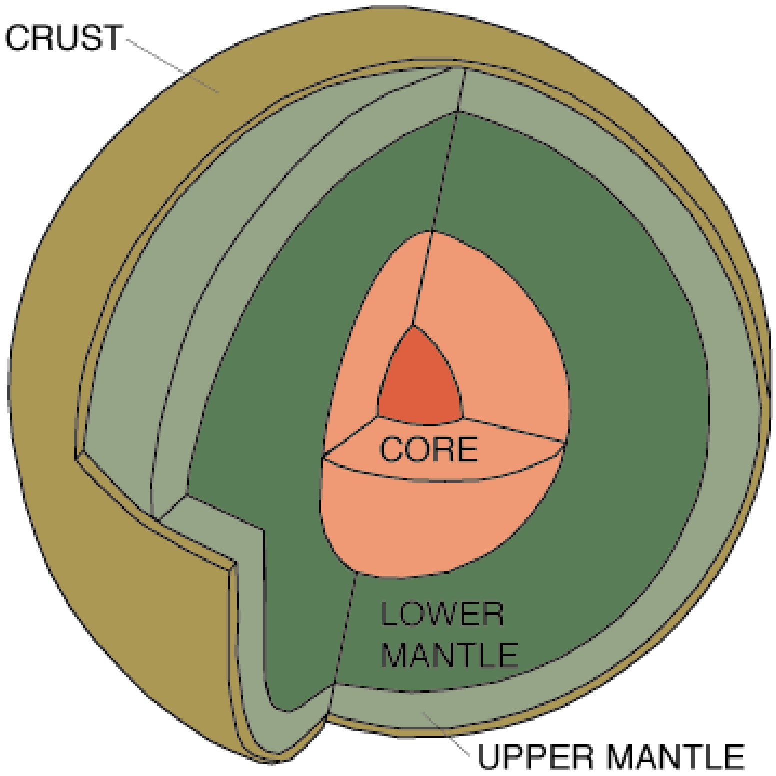
....

....

....

....

3. Layers of the Earth



Description:

The Earth is composed of four different layers. The Earth crust is very thin in comparison to the other three layers. The crust is only 3-5 miles (8 kilometers) thick under the oceans (oceanic crust) and about 25 miles (32 kilometers thick under the continents (continental crust).The crust is composed of two basic rock types granite and basalt. The continental crust is composed mostly of granite and the oceanic crust consists of volcanic lava rock called basalt. Basaltic rocks of ocean plates are much denser and heavier than the granitic rock of the continental plates. The crust and the upper layer of the mantle together make up a zone of rigid, brittle rock called the lithosphere.The layer below the rigid lithosphere is a zone of asphalt-like consistancy called asthenosphere. The asthenosphere is part of the mantle that flows and moves the plates of the Earth. The outer core is molten rock and the inner core is solid and both made of metals: iron and nickel.

Type of crust	**Average thickness**	**Average age**	**Major component**
Continental crust	**20-80 kilometers**	**3 billion years**	**granite**
Oceanic crust	**10 kilometers**	**Generally 70-100million years old**	**basalt**

Notes:

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

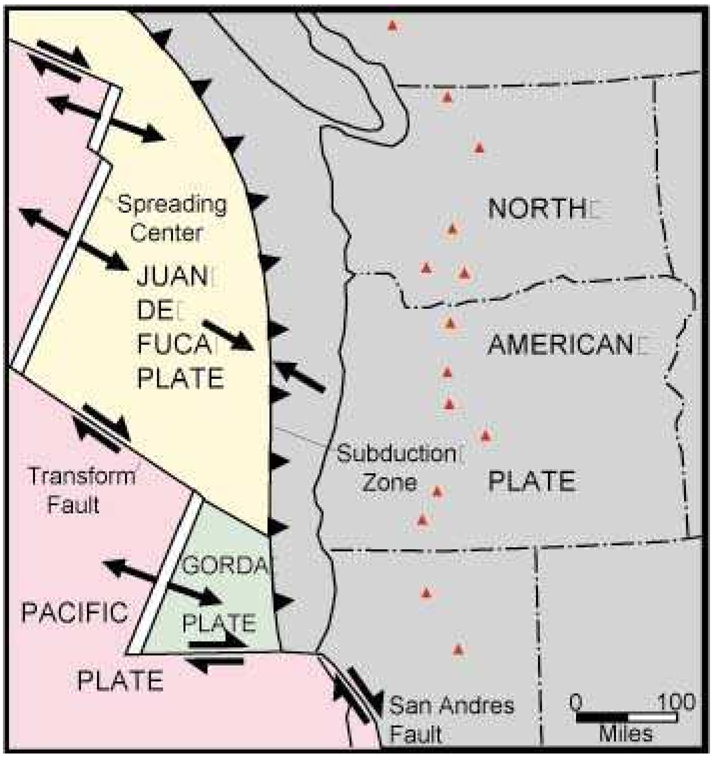
....

....

....

....

4. Plate tectonics of the western United states

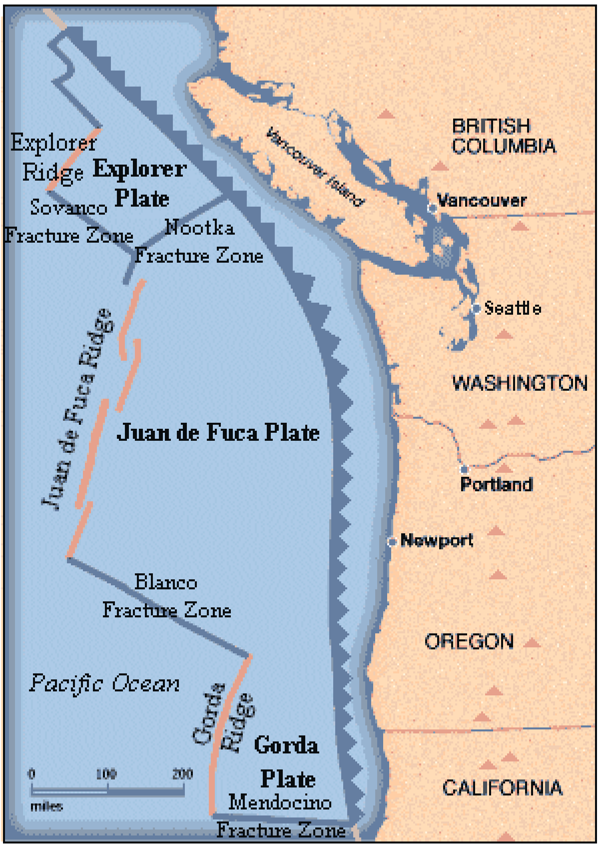


Description:

In the Pacific Northwest the Juan de Fuca Plate plunges beneath the North American Plate, locally melting at the depth, the magma rises to feed and form the cascade volcanoes. The process is known as subduction.

The Juan de Fuca Plate is a small tectonic plate located off the western edge of North America. It is bound by the Pacific Plate to the west, the Explorer Plate to the north, the North American Plate to the east, the Gorda Plate to the south, and runs from just north of Cape Mendicino in California to the northern tip of Vancouver Island, British Columbia, Canada. The Juan de Fuca Plate, at its widest point, spans less than 485 kilometers (300 miles) from its divergent boundary with the Pacific Plate to its convergent boundary with the North American Plate. The Juan de Fuca Ridge, the active spreading center separating the Pacific and Juan de Fuca Plates, has hydrothermal vent fields with thriving biological communities, and the convergent plate boundary between the Juan de Fuca and North American Plates is responsible for the formation of the Cascade Mountain Range, located along the Pacific

Northwest, and the 1980 eruption of Mount Saint Helens volcano in Washington state.



Location map of Juan de Fuca plates

(Modified from Washington Post)

Notes:

....

....

....

....

....

....

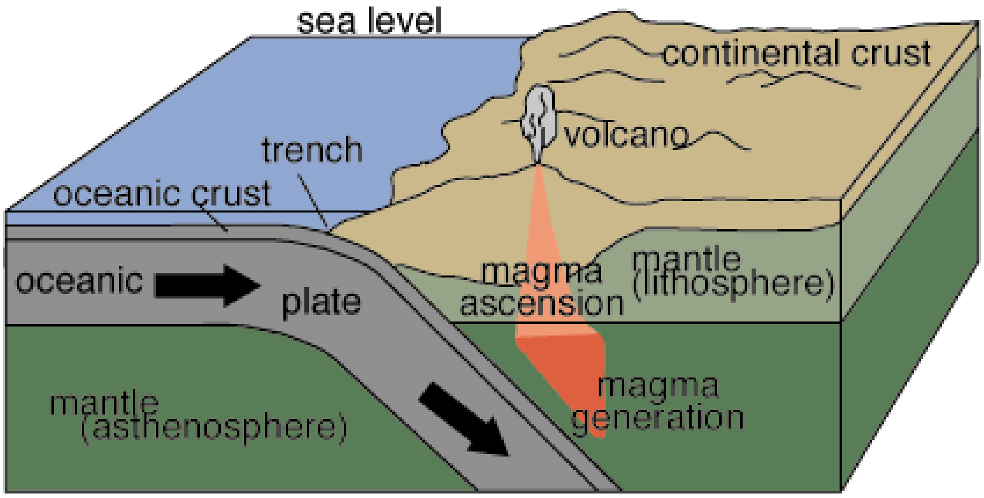
....

....

....

....

5. Subduction

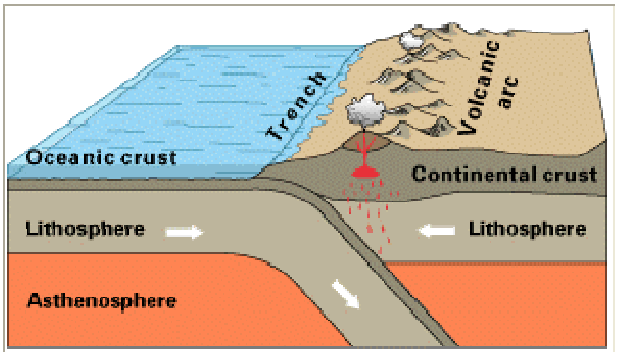
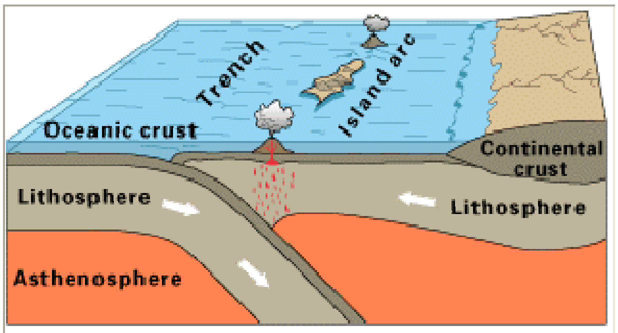


Magma is generated at subduction zones where dense oceanic plates are pushed under lighter continental plates.

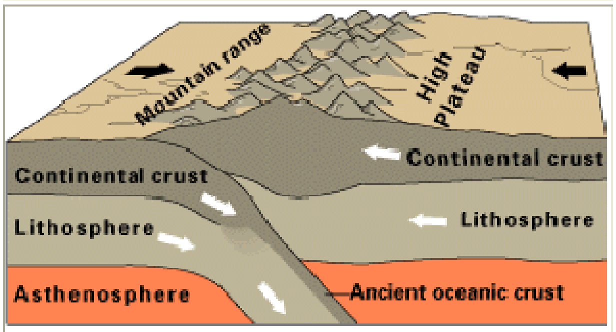
Description:

The process of the oceanic lithosphere colliding with and descending beneath the continental lithosphere. An oceanic trench is a linear depression of the sea floor caused by the subduction of one plate under another.

Three types of subduction

Ocean-Continent convergence (Andes, Cascades)	Ocean-Ocean convergence (Marianas, Japan)
 Oceanic-continental convergence	 Oceanic-oceanic convergence

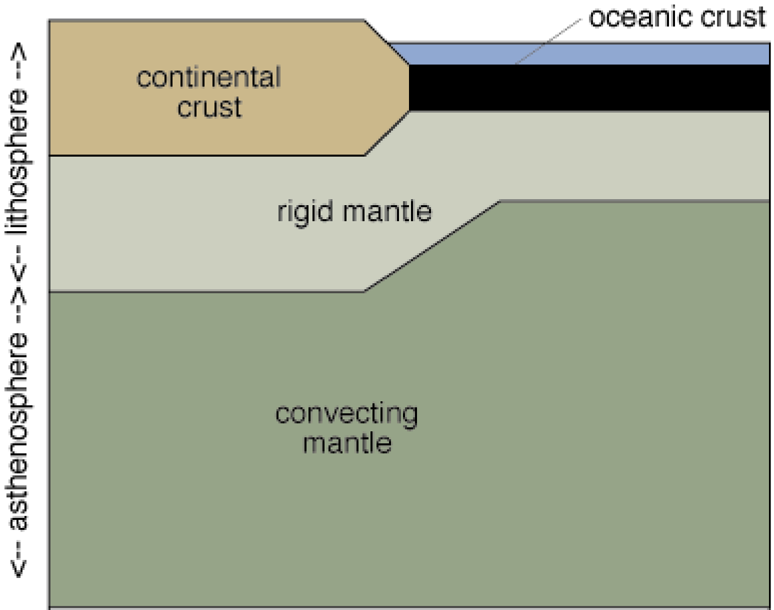
Continent-Continent convergence (Himalayas)



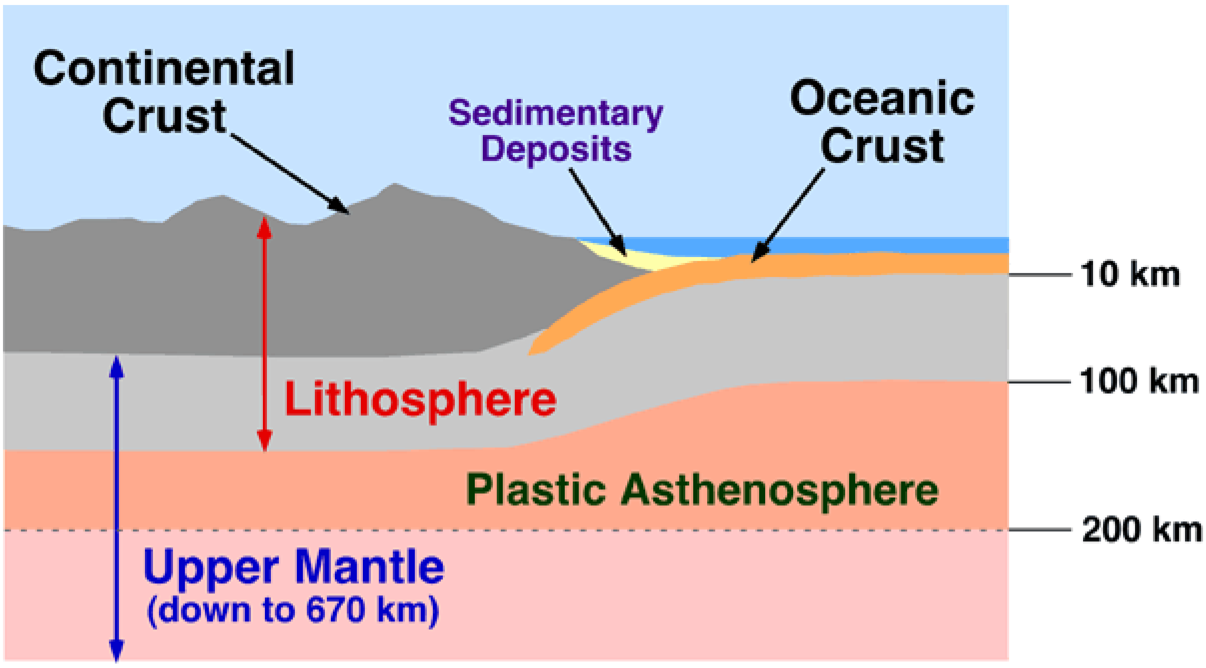
Continental-continental convergence

Notes:

6. Parts of the lithosphere



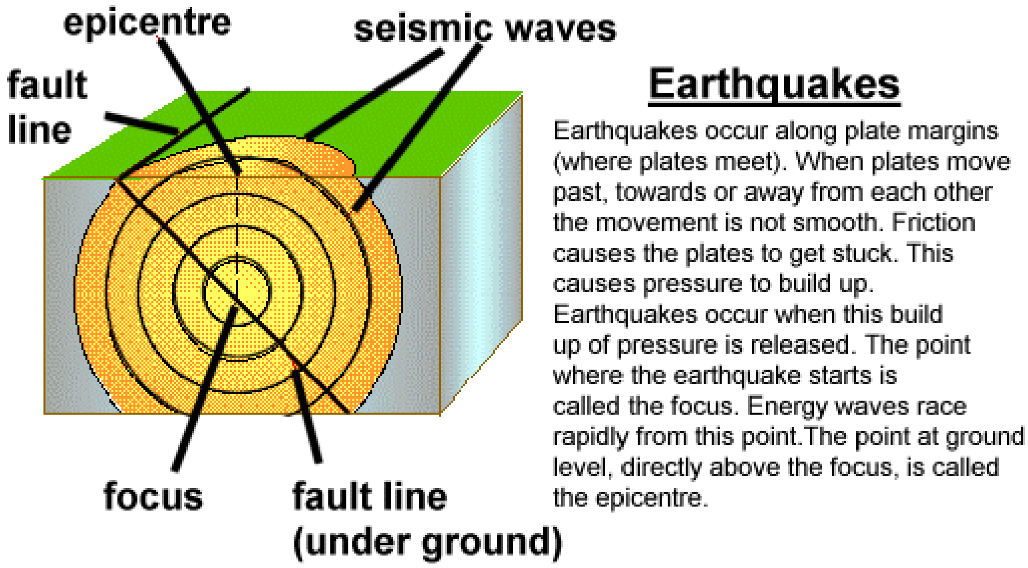
Outer layers of the Earth. Plates are made of crust and rigid upper mantle.



Description:

Lithosphere: the Earth's crust, including the SiAl and SiMa layers above the Mohorovocic discontinuity. There are two kinds of crust: continental, which has an average density 2.7 , average thickness 35 to 40 km but under high mountain chains ranging between 60 and 70.The core is a layer rich in iron and nickel that is composed of two layers: the ***inner*** and ***outer cores***. The inner core is theorized to be solid with a density of about 13 grams per cubic centimeter and a radius of about 1220 kilometers. The outer core is liquid and has a density of about 11 grams per cubic centimeter. It surrounds the inner core and has an average thickness of about 2250 kilometers.The mantle is almost 2900 kilometers thick and comprises about 83 % of the Earth's volume. It is composed of several different layers. The upper mantle exists from the base of the crust downward to a depth of about 670 kilometers. This region of the Earth's interior is thought to be composed of peridotite, an ultramafic rock made up of the minerals olivine and pyroxene. The top layer of the upper mantle, 100 to 200 kilometers below surface, is called the asthenosphere. Scientific studies suggest that this layer has physical properties that are different from the rest of the upper mantle. The rocks in this upper portion of the mantle are more rigid and brittle because of cooler temperatures and lower pressures. Below the upper mantle is the lower mantle that extends from 670 to 2900 kilometers below the Earth's surface. This layer is hot and plastic. The higher pressure in this layer causes the formation of minerals that are different from those of the upper mantle.The lithosphere is a layer that includes the crust and the upper most portion of the asthenosphere .This layer is about 100 kilometers thick and has the ability to glide over the rest of the upper mantle. Because of increasing temperature and pressure, deeper portions of the lithosphere are capable of plastic flow over geologic time. The lithosphere is also the zone of earthquakes, mountain building, volcanoes, and continental drift.The topmost part of the lithosphere consists of crust. This material is cool, rigid, and brittle. Two types of crust can be identified: oceanic crust and continental crust . Both of these types of crust are less dense than the rock found in the underlying upper mantle layer. Ocean crust is thin and measures between 5 to 10 kilometers thick. It is also composed of basalt and has a density of about 3.0 grams per cubic centimeter. The continental crust is 20 to 70 kilometers thick and composed mainly of lighter granite.

7. Cause of Earthquakes



What is an earthquake?

An earthquake occurs when rocks break and slip along a fault in the earth. Energy is released during an earthquake in several forms, including as movement along the fault, as heat, and as seismic waves that radiate out from the "source" and causes the ground to shake, sometimes hundreds of kilometres away.

What causes earthquakes?

Earthquakes occur from the deformation of outer, brittle portions of "tectonic plates", the earth's outermost layer of crust and upper mantle. Due to the heating and cooling of the rock below these plates, the resulting convection causes the adjacently overlying plates to move, and, under great stresses, deform. The rates of plate movements range from about 2 to 12 centimeters per year. Sometimes, tremendous energy can build up within a single, or between neighbouring plates. If the accumulated stress exceeds the strength of the rocks making up these brittle zones, the rocks can break suddenly, releasing the stored energy as an earthquake.

Where do earthquakes occur?

Earthquakes occur all over the world; however, most occur on active faults that define the major tectonic plates of the earth. 90% of the world's earthquakes occur along these plate boundaries (that represent about 10% of the surface of the earth). The "Ring of Fire" circling the Pacific Ocean, and including Canada's west coast, is one of the most active areas in the world.

Modified Mercalli Intensity Scale

(I) - Not felt except by a very few under especially favourable conditions.

(II) - Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.

(III) - Felt quite noticeably by persons indoors, especially on the upper floors of buildings. Many do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration similar to the passing of a truck. Duration estimated.

(IV) - Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.

(V) - Felt by nearly everyone; many awakened. Some dishes and windows broken. Unstable objects overturned. Pendulum clocks may stop.

(VI) - Felt by all; many frightened and run outdoors, walk unsteadily. Windows, dishes, glassware broken... books off shelves... some heavy furniture moved or overturned; a few instances of fallen plaster. Damage slight.

(VII) - Difficult to stand... furniture broken..damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.

(VIII) - Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture moved.

(IX) - General panic... damage considerable in specially designed structures, well designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.

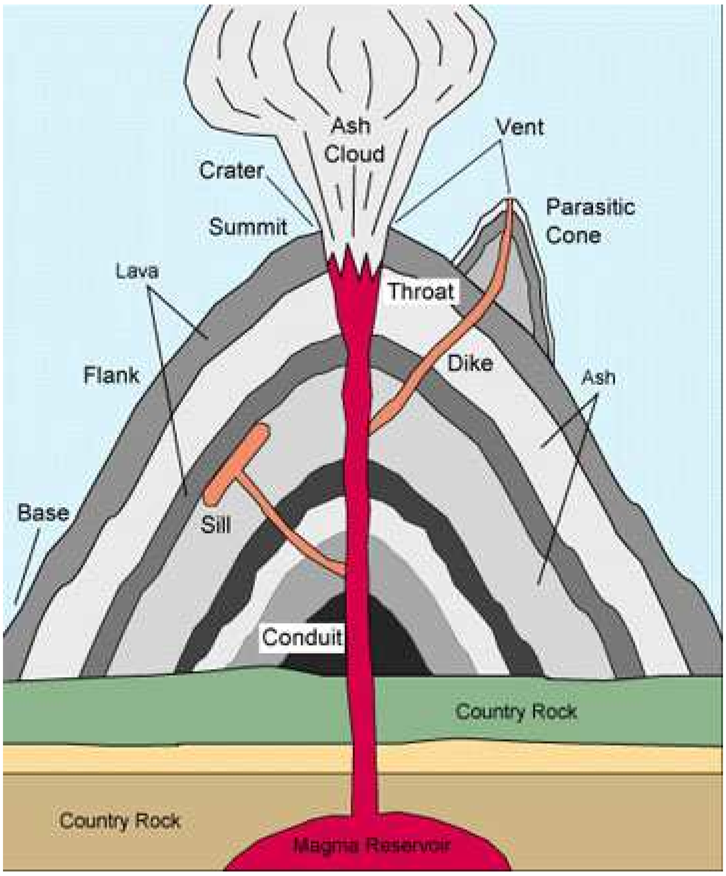
(X) - Some well built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent."

(XI) - Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.

(XII) - Damage total. Lines of sight and level distorted. Objects thrown into the air.

Notes:

8. Parts of a volcano



Description:

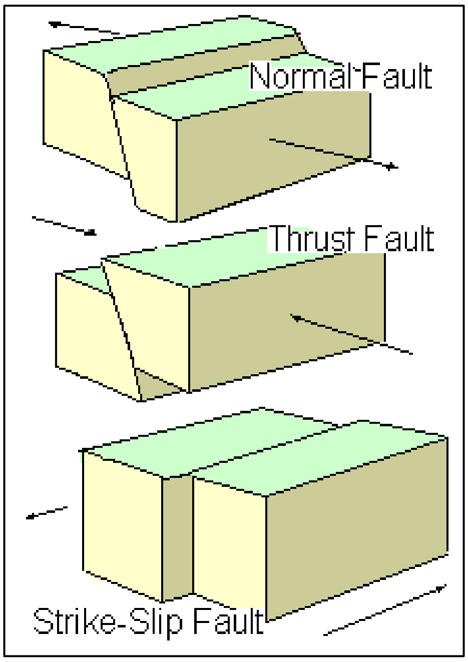
A cone-shaped mountain formed by lava and cinders, which have erupted through Earth's crust, an opening in the Earth's surface from which molten rock, steam, cinder, gas, and rock fragments flow or have flowed. An active volcano is one which pouring forth any or all these materials and has erupted or is likely to erupt again. An extint volcano will never erupt again. A dormant volcano has not erupted in 2000 years. Volcanoes are found along destructive (subducting) plate boundaries, contrastive (divergent) plate boundaries and at hot spots in the Earth's surface.

Volcano types : fissure volcano, basic shield volcano, dome volcano, ash-cinder volcano, composite volcano, caldera volcano.

9. Types of faults

Description:

A fault is a fracture or zone of fractures between two blocks of rock. Faults allow the blocks to move relative to each other. This movement may occur rapidly, in the form of an earthquake - or may occur slowly, in the form of creep. Faults may range in length from a few millimeters to thousands of kilometers. Most faults produce repeated displacements over geologic time. During an earthquake, the rock on one side of the fault suddenly slips with respect to the other. The fault surface can be horizontal or vertical or some arbitrary angle in between. Earth scientists use the angle of the fault with respect to the surface (known as the dip) and the direction of slip along the fault to classify faults. Faults which move along the direction of the dip plane are **dip-slip** faults and described as either **normal** or **reverse**, depending on their motion. Faults which move horizontally are known as **strike-slip** faults and are classified as either **right-lateral** or **left-lateral**. Faults which show both dip-slip and strike-slip motion are known as **oblique-slip** faults



Normal Fault

A dip-slip fault in which the block above the fault has moved downward relative to the block below. This type of faulting occurs in response to extension and is often observed in the Western United States Basin and Range Province and along oceanic ridge systems.

Reverse Fault

A dip-slip fault in which the upper block, above the fault plane, moves up and over the lower block. This type of faulting is common in areas of compression, such as regions where one plate is being subducted under another as in Japan. When the dip angle is shallow, a reverse fault is often described as a **thrust fault.**

Left-Lateral Fault

A strike-slip fault on which the displacement of the far block is to the left when viewed from either side.

Right-Lateral Fault

A strike-slip fault on which the displacement of the far block is to the right when viewed from either side. The San Andreas Fault is an example of a right lateral fault.

Notes:

....

....

....

....

....

....

....

....

....

....

....

....

....

....

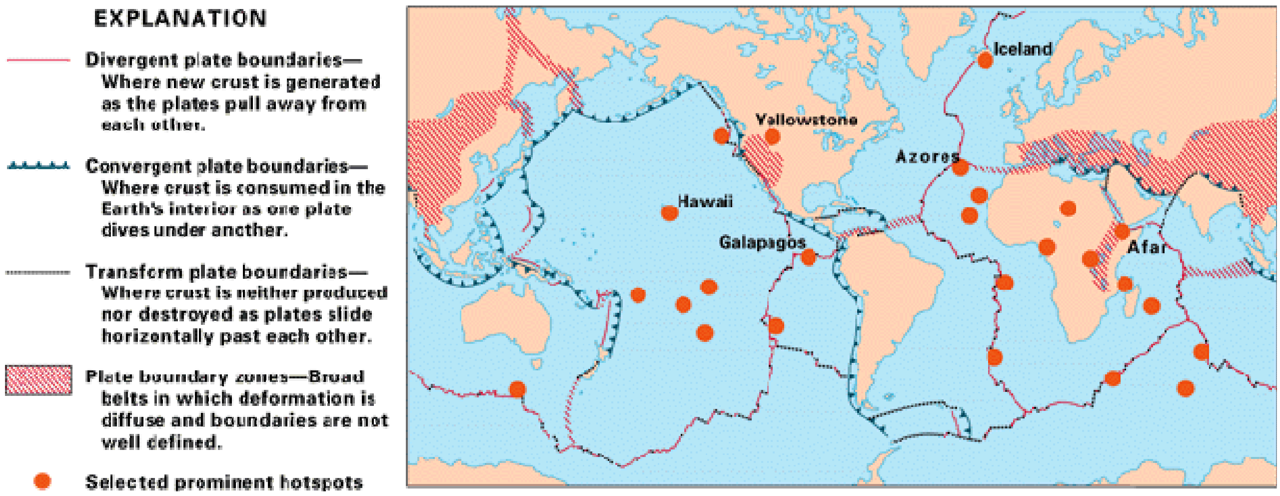
....

....

....

....

10. Plate tectonics with hot spots



Description:

A hot spot is an area of persistent volcanic activity. Hot spots originate at unusually hot areas of the mantle-core boundary. Overlying mantle melts forming plumes of magma that rise and penetrate the crust forming volcanoes. Hawaii, Iceland, and Yellowstone are examples of hot spots. Hot spots are generally characterized by large outpourings of basaltic lava for relatively long periods of time.

Notes:

....

....

....

....

....

....

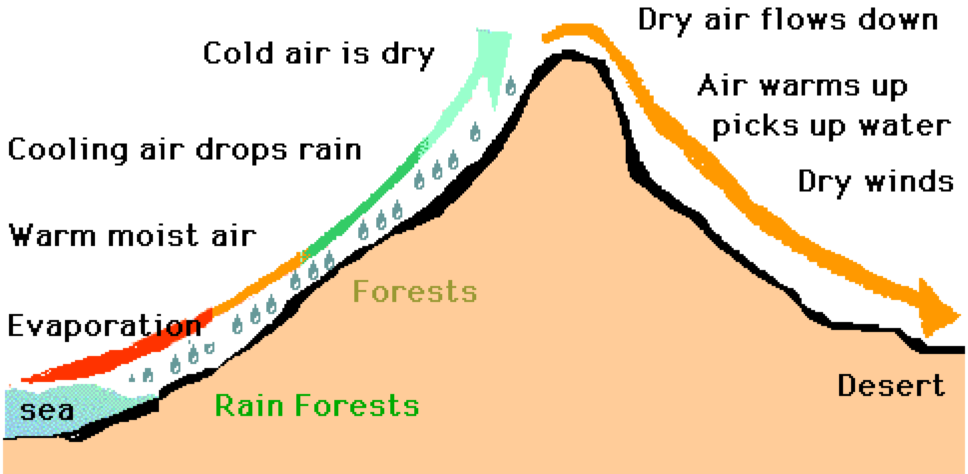
....

....

....

....

11. Orographic uplift



Description:

Sometimes referred to as relief rainfall, precipitation caused by the rising of air over, for example, a coastal mountain range. When moist air flowing from the ocean meets a mountain barrier, the air is forced to rise. The higher the air rises, the more it cools. When the air cools, it is forced to give up moisture in the form of rain or snow. As a result, the side of the mountain facing the wind receives a great deal of moisture. This side of the mountain is called the windward side. The side of the mountain facing awway from the wind is called the leeward side. As the moist air moves down the leeward side, it begins to warm up and becomes drier. Since the leeward side is cut off from the moist ocean air, it has much drier climate than the windward side.

Notes:

....

....

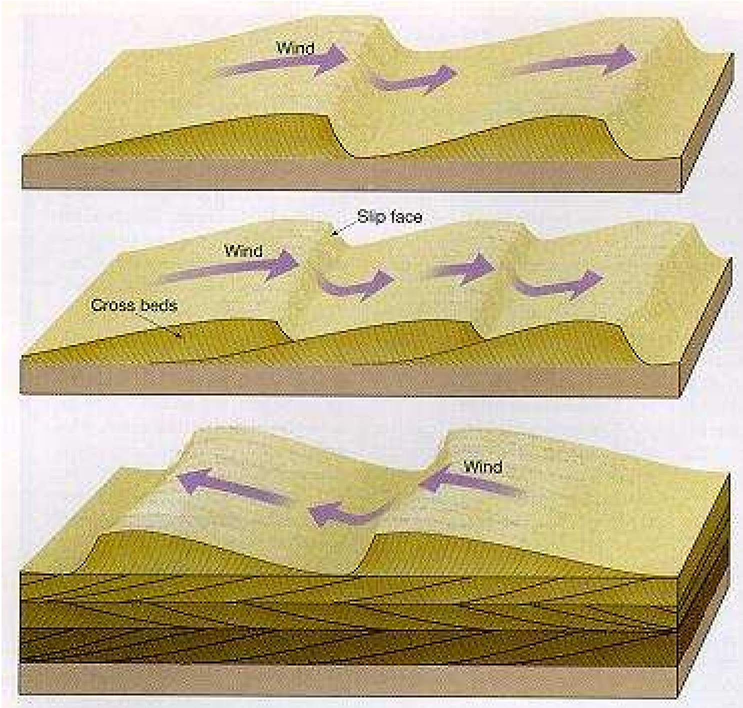
....

....

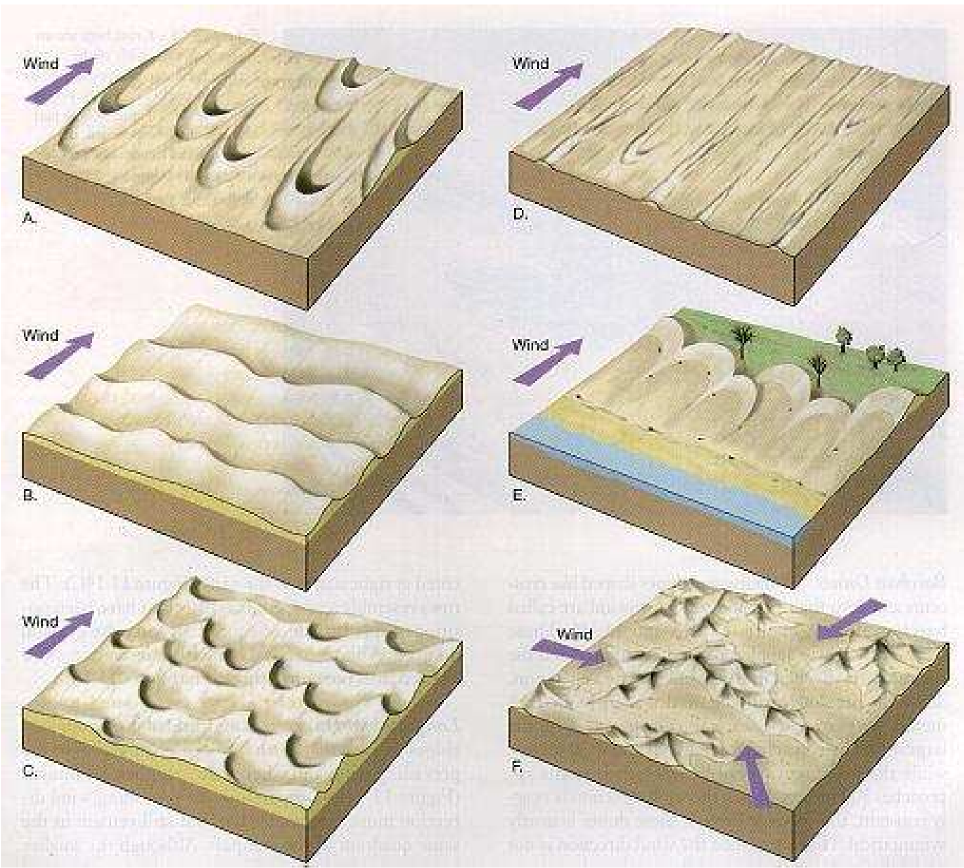
....

12. Formation of dunes

A.



B.



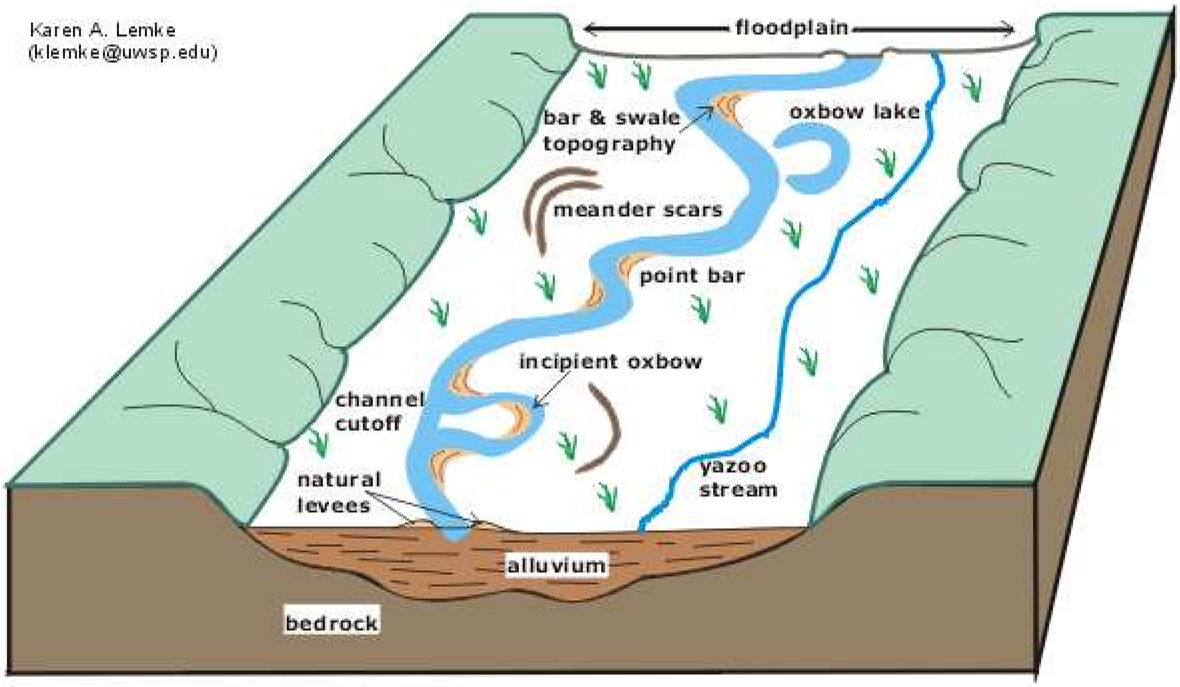
Description:

Sand dunes are depositional features that are shaped by the wind. Active dunes are constantly moving. **Barchan dunes** and **transverse dunes** develop at right angles to the wind. Sand dunes move slowly downwind as sand is removed from the gentle upwind slope and is deposited on the slip face downwind. **Longitudinal dunes** parallel the wind. Dune types depend upon wind strength and direction, sand supply, and vegetation.

Notes:

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

13. Fluvial landforms



Description:

River terraces are areas of flat land (located on either side of the flood plain) which are raised above the flood plain. These river terraces used to be the flood plain but the river has cut down deeper and formed a new flood plain at a lower level.

The flood plain is an area of flat land found on either side of a river This usually becomes wider as the river nears its mouth. The flood plain is the area of land which is flooded when a river overflows its banks. In this area layers of alluvium are laid down. The soils are thus thick and fertile and the land is flat.

Notes:

....

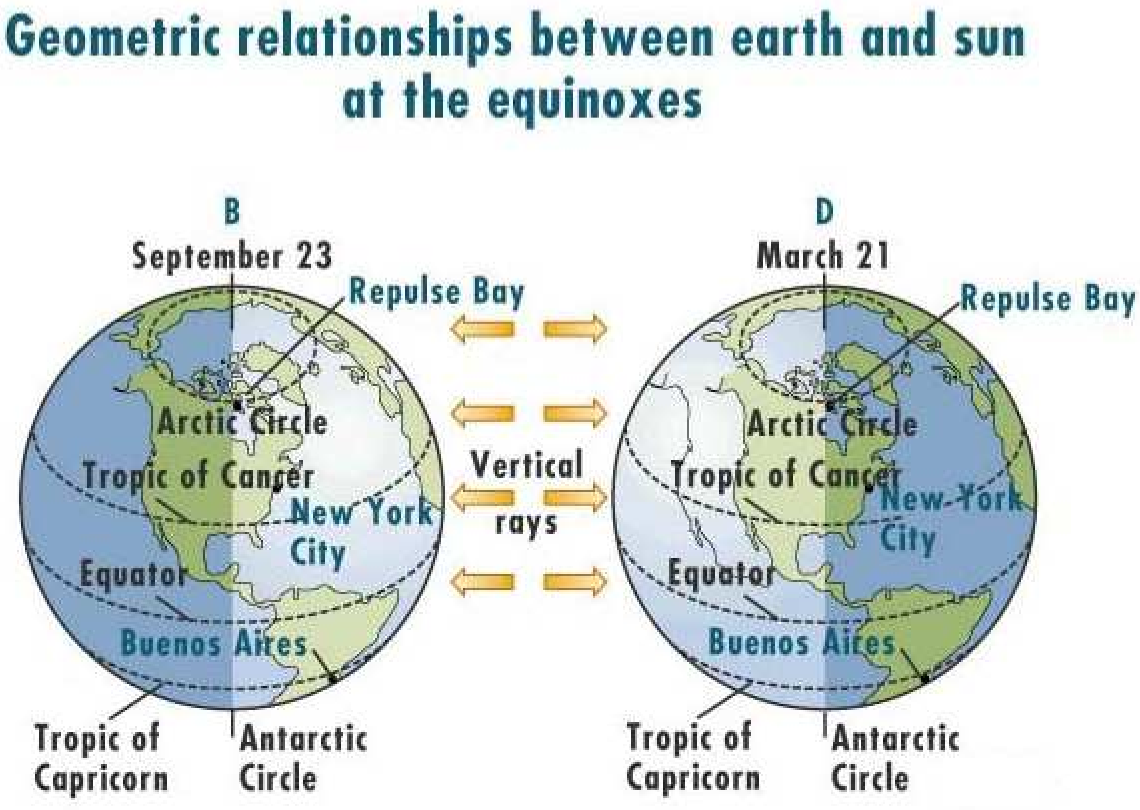
....

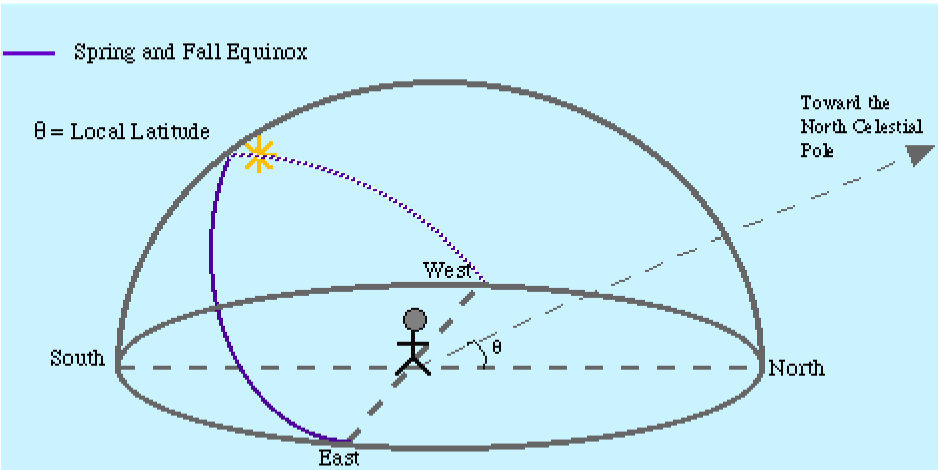
....

....

....

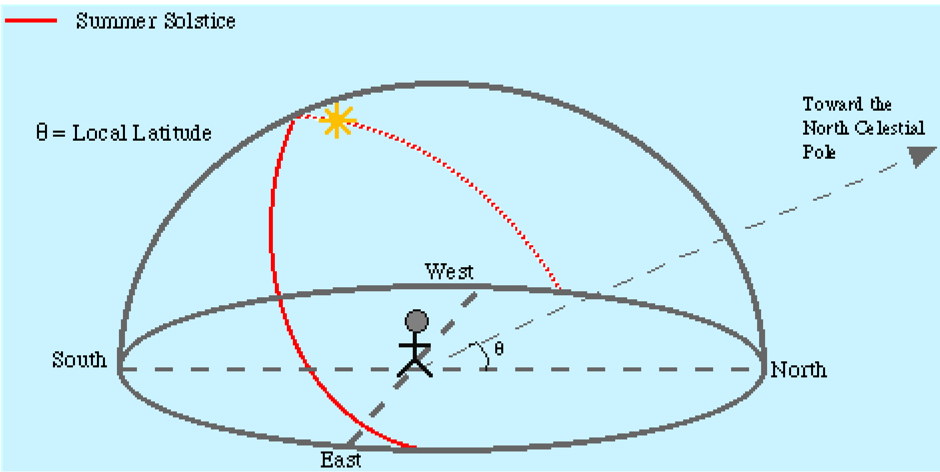
14. Geometric relationship between Earth and Sun at the equinoxes.





Description:

The Sun is at its lowest path in the sky on the Winter Solstice. After that day the Sun follows a higher and higher path through the sky each day until it is in the sky for exactly 12 hours. On the Spring Equinox the Sun rises exactly in the east travels through the sky for 12 hours and sets exactly in the west. On the Equinox this is the motion of the Sun through the sky for everyone on earth. Every place on earth experiences a 12 hours day twice a year on the Spring and Fall Equinox. After the Spring Equinox, the Sun still continues to follow a higher and higher path through the sky, with the days growing longer and longer, until it reaches it highest point in the sky on the Summer Solstice.



Description:

On the Summer Solstice, which occurs on June 21, the Sun is at its highest path through the sky and the day is the longest. Because the day is so long the Sun does not rise exactly in the east, but rises to the north of east and sets to the north of west allowing it to be in the sky for a longer period of time.

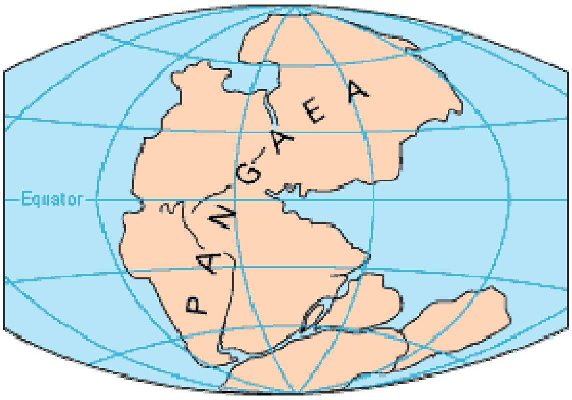
After the summer solstice the Sun follows a lower and lower path through the sky each day until it reaches the point where it is in the sky for exactly 12 hours again. This is the Fall Equinox. Just like the Spring Equinox, the Sun will rise exactly east and set exactly west on this day and everyone in the world will experience a 12 hour day.

After the Fall Equinox the Sun will continue to follow a lower and lower path through the sky and the days will grow shorter and shorter until it reaches its lowest path and then we are back at the Winter Solstice where we started.

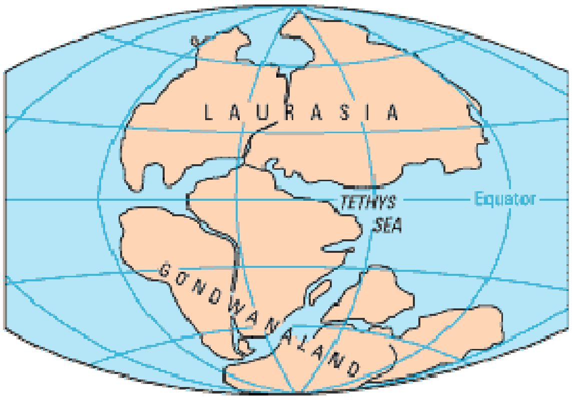
Notes:

………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………
………

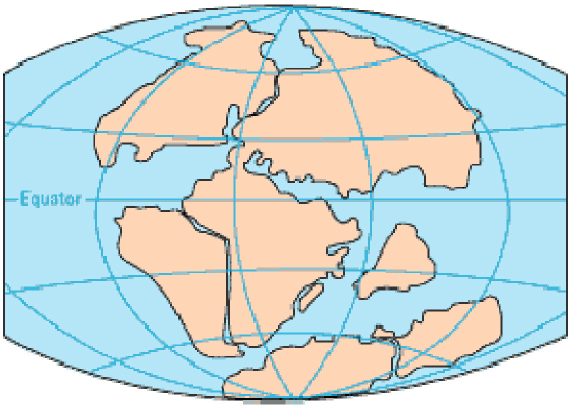
15. History of the Earth I – II.



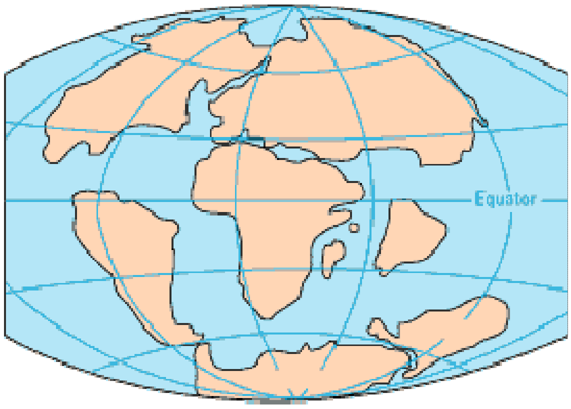
PERMIAN
225 million years ago



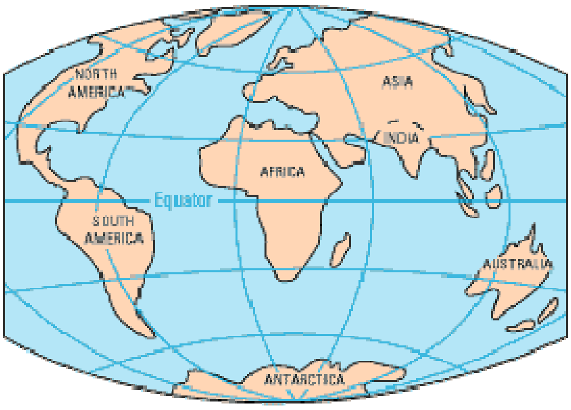
TRIASSIC
200 million years ago



JURASSIC
135 million years ago



CRETACEOUS
65 million years ago



PRESENT DAY

<u>Description:</u>

Fossils of the same species were found on several different continents. Wegener proposed that the species dispersed when the continents were connected and later carried to their present positions as the continents drifted. For example, Glossopteris, a fern, was found on the continents of South America, Africa, India, and Australia. If the continents are reassembled into Pangaea, the distribution of Glossopteris can be accounted for over a much smaller contiguous geographic area. The distribution of other species can also be accounted for by initially spreading across Pangaea, followed by the breakup of the supercontinent, and movement of the continents to their present positions. Just before the days of the dinosaurs the Earth's continents were all connected into one huge landmass called ***Pangaea*** . This huge supercontinent was surrounded by one gigantic ocean called ***Panthalassa.***

Description:

Plate tectonics is movements of plates of the earths surface and over the years causes the earths land masses to move and shift. (Pangea and Movement of Plates) Alfred Wegner is a German meteorologist and geophysicist who had the idea that the continents had once been united. The continents are moving about 2 to 4 inches every year. Strahler says, " A single great continent, Pangea, surrounded by a single great ocean, Panthalassa, broke apart during millions of years to form the present-day continents. 5 changes have taken place to the shape of the earth's land masses starting 250 million years ago in the Permian era.

Permian ~ single super continent called pangea, super ocean called Panthalassa

Late Triassic ~ 210 million years ago , Laurasia (South America, Africa, Antarctica, Australia, New Zealand, Madagascar, and India) and Eurasia together called Gondwana start breaking apart,

Late Jurassic ~ 150 million years ago, Continuous moving of plats causing continents to separate further, dinosaurs present during this era

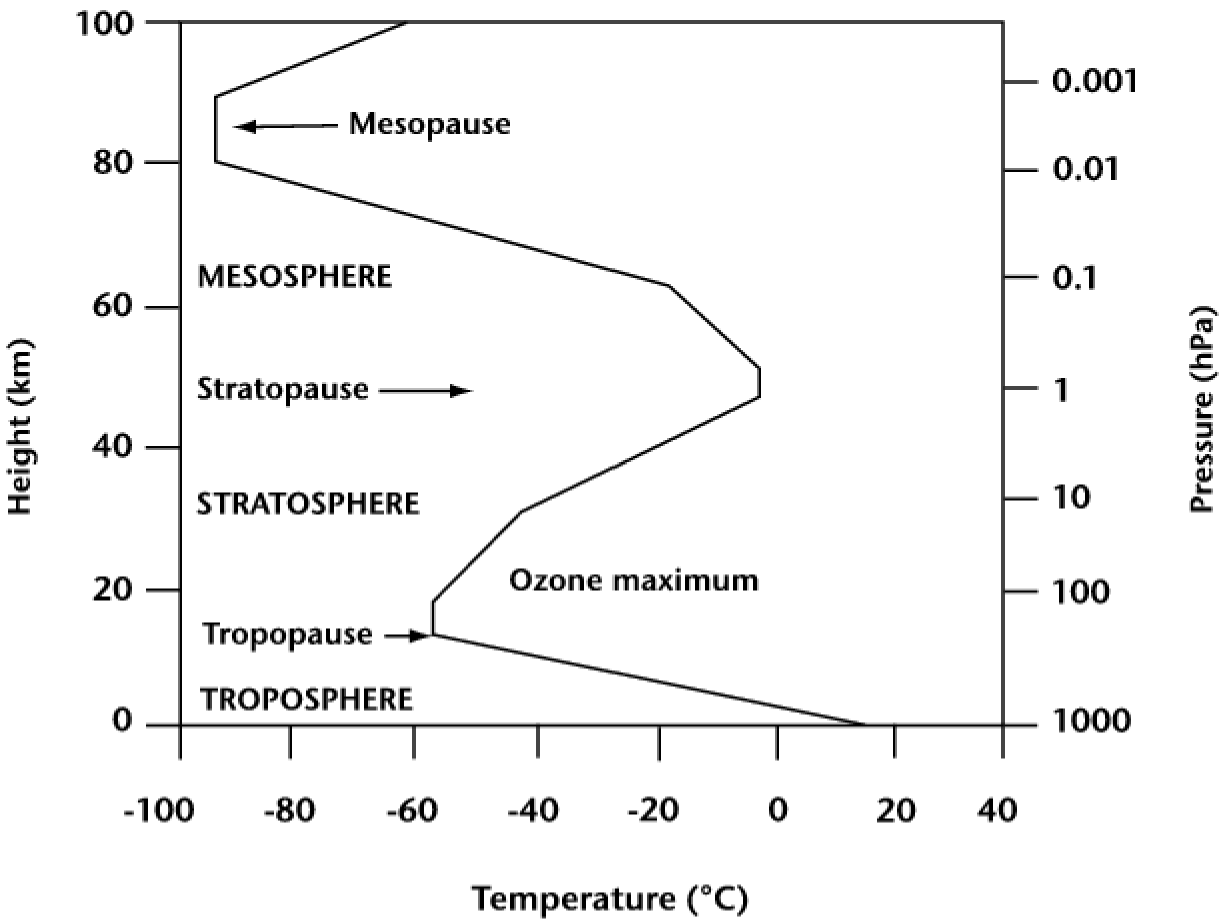
Late Cretaceous ~ 75 million years ago, chalk was formed

Present Day ~ The Earth as we know it today

Notes:

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

16. Structure of the atmosphere



Description:

The atmosphere is a mixture of different gases, particles and aerosols collectively known as air which envelops the Earth. The atmosphere provides various functions, not least the ability to sustain life. The atmosphere protects us by filtering out deadly cosmic rays, powerful ultraviolet (UV) radiation from the Sun, and even meteorites on collision course with Earth. Although traces of atmospheric gases have been detected well out into space, 99% of the mass of the atmosphere lies below about 25 to 30 km altitude.

Atmospheric Gases

There are a number of atmospheric gases which make up air. The main gases are nitrogen and oxygen, which make up 78% and 21% of the volume of air respectively. Oxygen is utilised primarily by animals, including humans, but also to a small degree by plants, in the process of respiration (the metabolism of food products to generate energy). The remaining 1% of the atmospheric gases is made up of trace gases. These include the noble gases, very inert or unreactive gases, of which the most abundant is argon. Other noble gases include neon, helium, krypton and xenon. Hydrogen is also present in trace quantities in the atmosphere, but because it is so light, over time much of it has escaped Earth's gravitational pull to space.

Atmospheric Layers

Although air is well mixed throughout the atmosphere, the atmosphere itself is not physically uniform but has significant variations in temperature and pressure with altitude, which define a number of atmospheric layers. These include the troposphere (0 to 16 km), stratosphere (16 to 50 km), mesosphere (50 to 80km) and thermosphere (80 to 640km). The boundaries between these four layers are defined by abrupt changes in temperature, and include respectively the tropopause, stratopause and mesopause. In the troposphere and mesosphere, temperature generally falls with increasing altitude, whilst in the stratosphere and thermosphere, temperature rises with increasing altitude. In addition to temperature, other criteria can be used to define different layers in the atmosphere. The ionosphere, for example, which occupies the same region of the atmosphere as the thermosphere, is defined by the presence of ions, a physico-chemical criterion. The region beyond the ionosphere is known as the exosphere. The ionosphere and the exosphere together make up the upper atmosphere (or thermosphere). The magnetosphere is the region above the Earth's surface in which charged particles are affected by the Earth's magnetic field.

Notes:

....

....

....

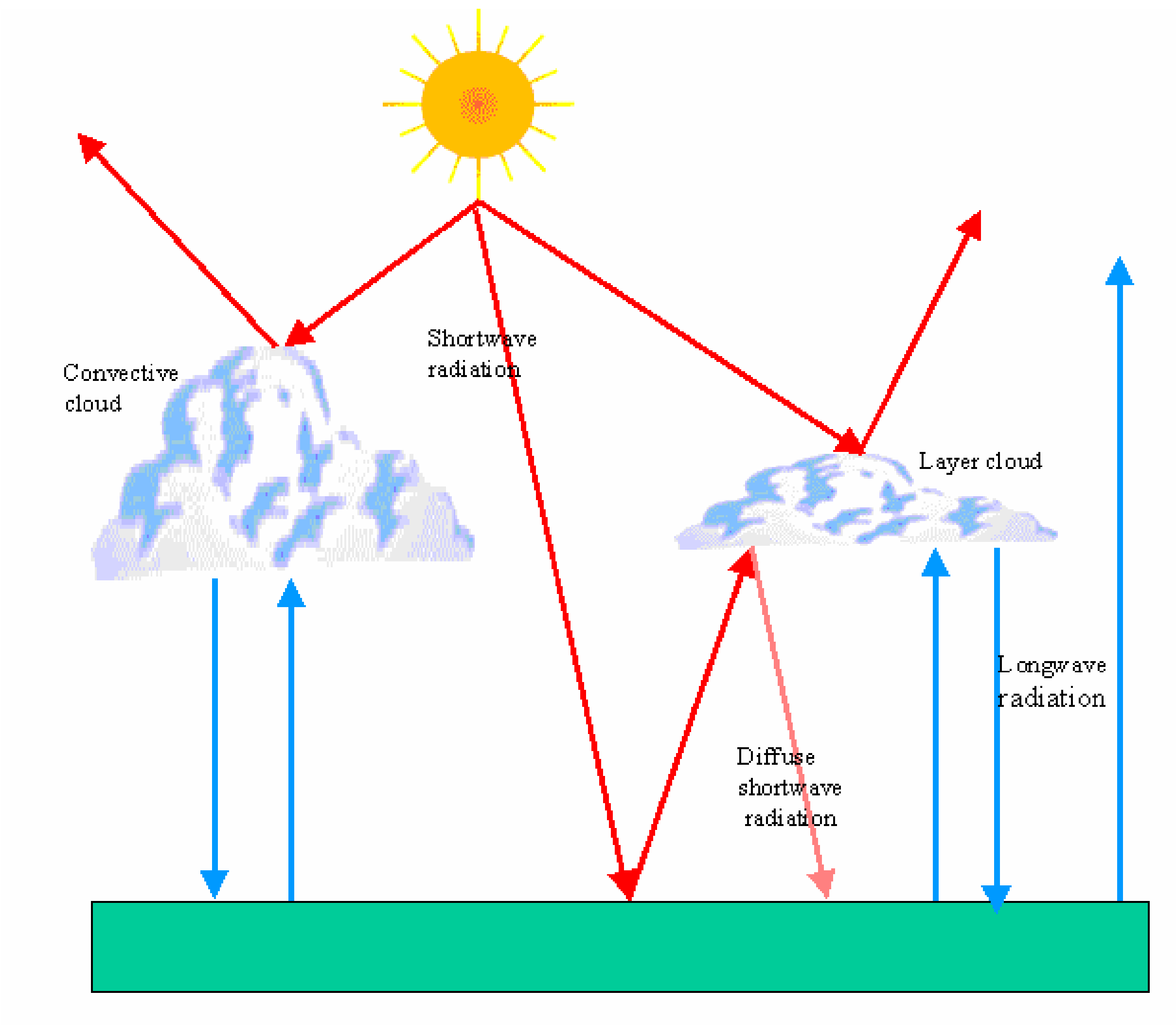
....

....

....

....

17. Radiation



Description:

The Sun has no sharply defined surface like that of the Earth, because it is too hot to be anything but gas. Rather, what appears to us as the surface is a layer in the Sun's atmosphere, the "photosphere" (sphere of light) which emits light ("radiates") because ot its high temperature.

All hot substances radiate light, either the visible kind or beyond the rainbow spectrum, in the "infra red" (IR; "below red") and "ultra violet" (UV; "above violet") ranges.

The Heating of the Earth

Sunlight carries energy, which warms up the Earth and is the driving force behind all our weather and climate. As the ground is heated by sunlight, it begins to radiate, but being too cool to radiate even a dull red, its radiation is in the infra-red range. A hot pot or a hot laundry iron also radiates IR, and your hand can easily sense that radiation (as heat), if held close without touching.

Because the ground is nowhere as hot as the Sun, its emission is also much weaker. However, at any location the ground **sends out** radiation in all directions in the half-sky that is visible, while **receiving** radiation only from the small solar disk, covering only a small circle in the sky, 0.5 degrees across. Because of this, the **total energy** any area **receives** should be equal to the total energy it **returns** back to space.

If all of Earth's heat comes from the outside (neglecting internal heat), and if it maintains a steady temperature, no other way exists. Of course, only the average temperature is steady. Actually the ground is heated only in the daytime, but radiates back day and night, so nights, when energy only goes out and hardly any comes in, are cooler than days.

The "Greenhouse Effect"

The actual flow of heat is complicated by the atmosphere, which has three strong effects:

Clouds in the atmosphere reflect some of the sunlight before it reaches the ground, **reducing the heating** of the ground.

The atmosphere absorbs the infra-red (IR) light radiated from the ground and thus delayes the escape of heat to outer space, **keeping the ground warmer** than it would otherwise be.

Air can flow, and thus carry its heat from one place to another. That is what produces our **weather**.

The **second** process (which keeps us warmer) is stronger than the first (which reduces warming), so the net effect is that like a blanket, the atmosphere helps keep Earth warmer than it would be otherwise. This is called the "greenhouse effect," because the same process operates in greenhouses used for growing vegetables in cold climates. A greenhouse is enclosed and roofed by glass panes, which let sunlight enter, but absorb the IR emitted back by the ground, and thus keep the greenhouse warm.

The chief absorbers of IR in the atmosphere are not nitrogen and oxygen, the main constituents of air, but a relatively minor percentage of "greenhouse gases" such as water vapor (H_2O), carbon dioxide (CO_2) and methane (CH_4), which are strong absorbers of IR.

Another molecule, responsible for an important effect even though only a very small amount of it is present, is **ozone**, a variant of the oxygen molecule--O_3 rather than the usual O_2. It is produced at high altitudes by the action of sunlight on ordinary oxygen and its peak concentration is around 25 kilometers. It is also a greenhouse gas, but more important, it absorbs the Sun's ultra-violet (UV) light, which on can cause skin burns and hurt eyes. The ozone found near the ground and forming part of the urban air pollution comes from a completely different process.

Notes:

....

....

....

....

....

....

....

....

....

....

....

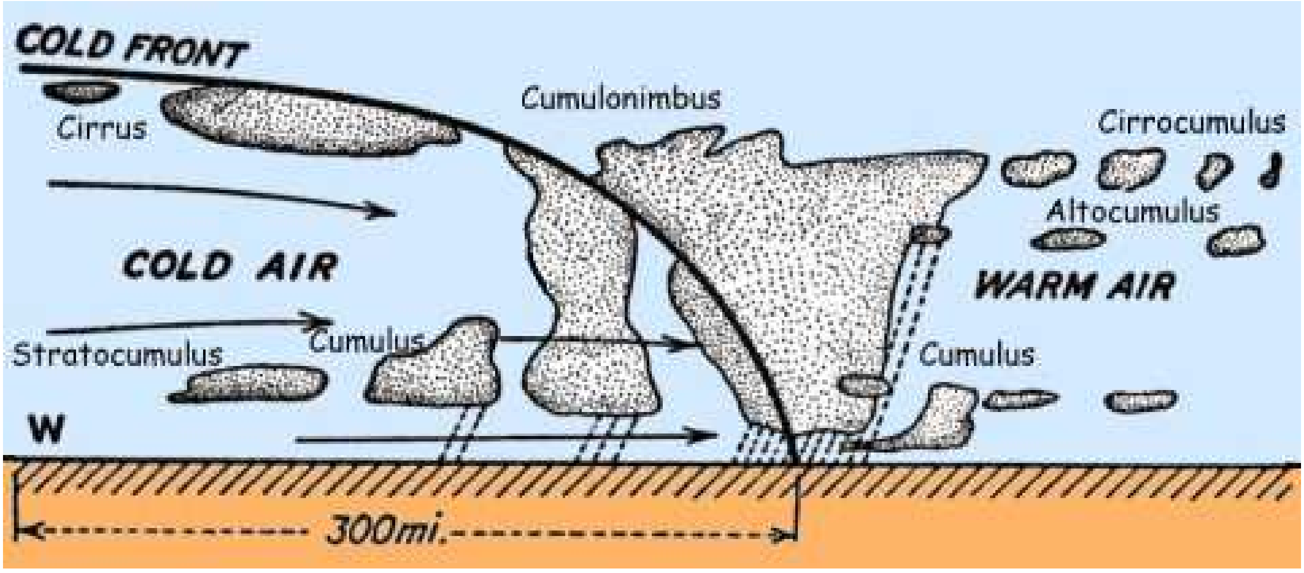
....

....

....

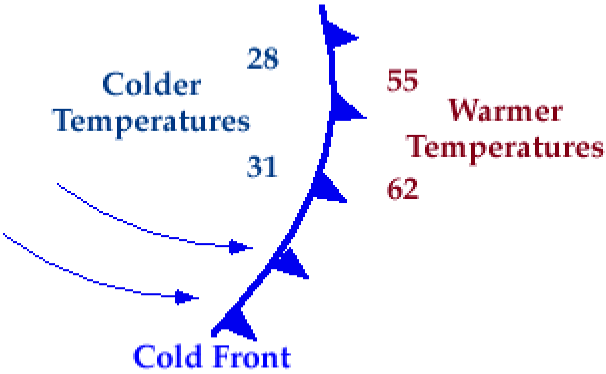
....

18. Cold front



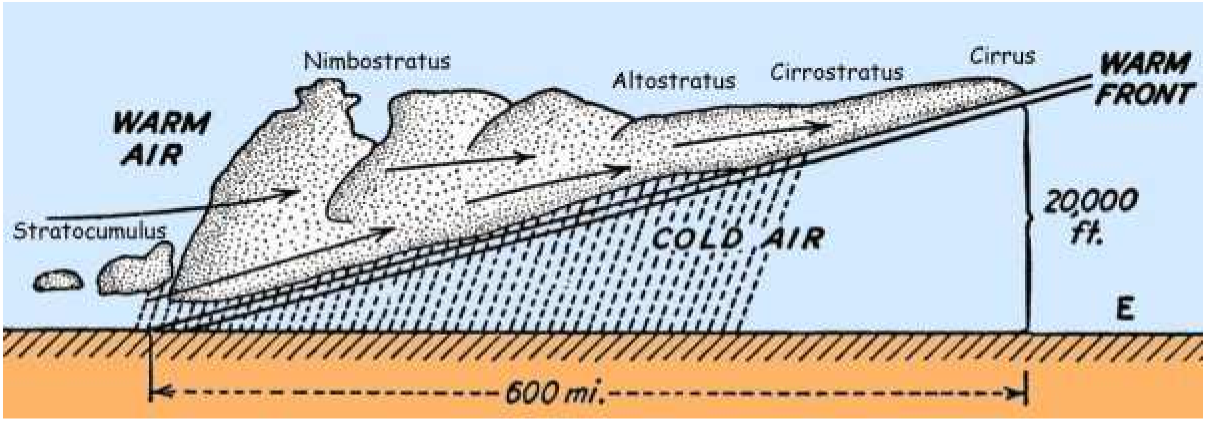
Description:

A cold front is defined as the transition zone where a cold air mass is replacing a warmer air mass. Cold fronts generally move from northwest to southeast. The air behind a cold front is noticeably colder and drier than the air ahead of it. When a cold front passes through, temperatures can drop more than 15 degrees within the first hour.



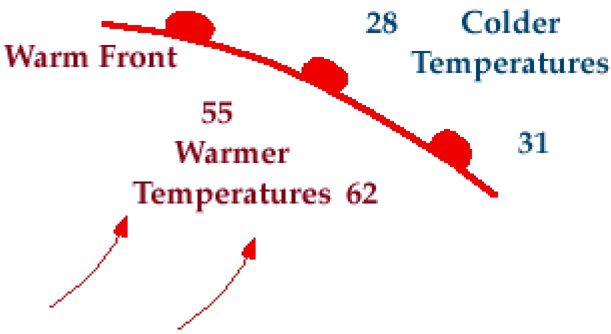
Symbolically, a cold front is represented by a solid line with triangles along the front pointing towards the warmer air and in the direction of movement. On colored weather maps, a cold front is drawn with a solid blue line.

19. Warm front



Description:

A warm front is defined as the transition zone where a warm air mass is replacing a cold air mass. Warm fronts generally move from southwest to northeast and the air behind a warm front is warmer and more moist than the air ahead of it. When a warm front passes through, the air becomes noticeably warmer and more humid than it was before.



Symbolically, a warm front is represented by a solid line with semicircles pointing towards the colder air and in the direction of movement. On colored weather maps, a warm front is drawn with a solid red line.

Notes:

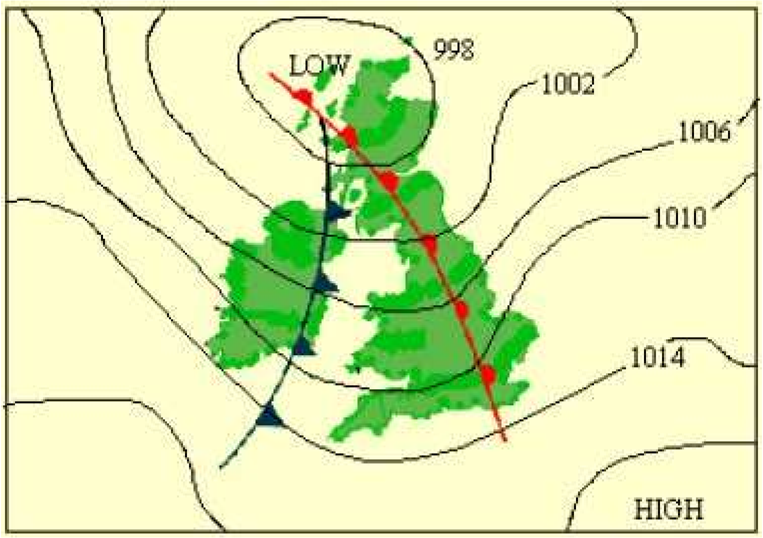
....

....

....

....

20. Fronts



Description:

A front is defined as the transition zone between two air masses of different density. Fronts extend not only in the horizontal direction, but in the vertical as well. Therefore, when referring to the frontal surface (or frontal zone), we referring to both the horizontal and vertical components of the front.

Notes:

....

....

....

....

....

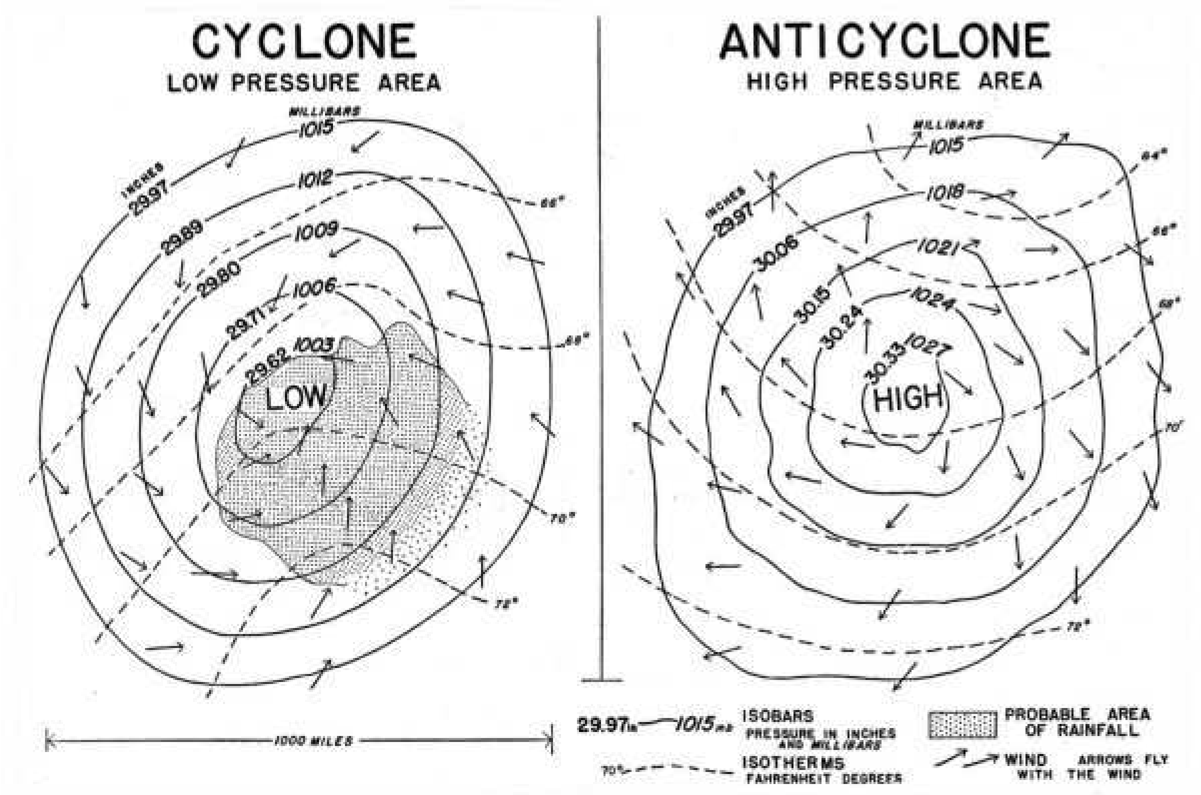
....

....

....

....

21. Cyclones and anticyclones



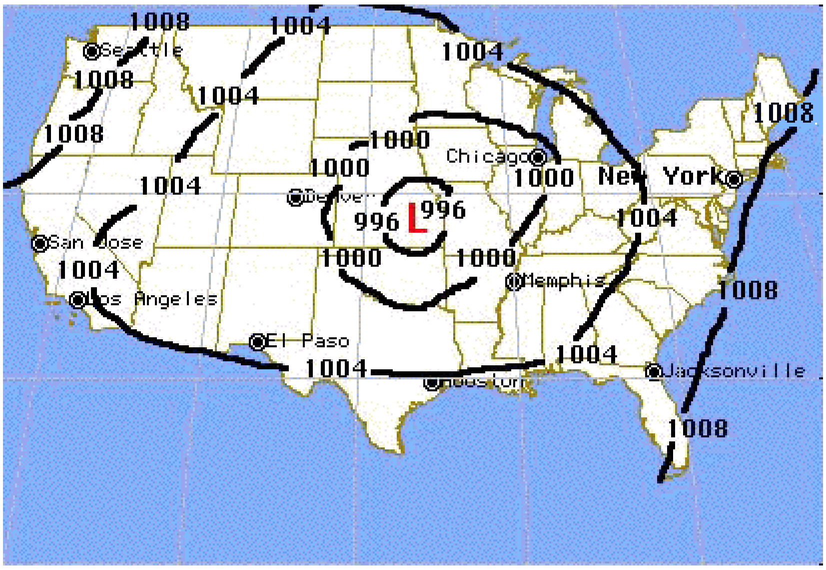
Description:

Cyclone: An area of low atmospheric pressure that has closed circulation. Cyclones (or commonly called „low pressures") usually bring about marked changes in the weather. Cyclones are large weather systems that rotate counterclockwise in the Northern hemisphere and clockwise in the Southern hemisphere. Because there is a low pressure at the centre of cyclones, these systems are also called lows. Areas of clouds and precipitation are usually associated with cyclones. As the airstreams come together and rise near the centre of a cyclone or low, the air cools and expands, often resulting in clouds and precipitation.

Anticyclone: Anticyclones are large weater systems in which air tends to spin clockwise in the Northern hemisphere and counterclockwise in the Southern hemisphere. They are areas of high barometric pressure and are called high pressure systems or highs. Anticyclones may form wherever air sinks – the condition that produces high pressure areas.As descending air blows outward from the high pressure, the Coriolis effect deflects it to the right in the Northern Hemisphere, causing clockwise rotation. An approaching anticyclone generally brings clearer, more settled weater, since sinking air is usually stable. Anticyclones can be warm or cold. During the summer warm highs from the subtropics can stall over land areas, creating heat waves. Cold winter highs, formed in the high latitudes, often bring cold waves.

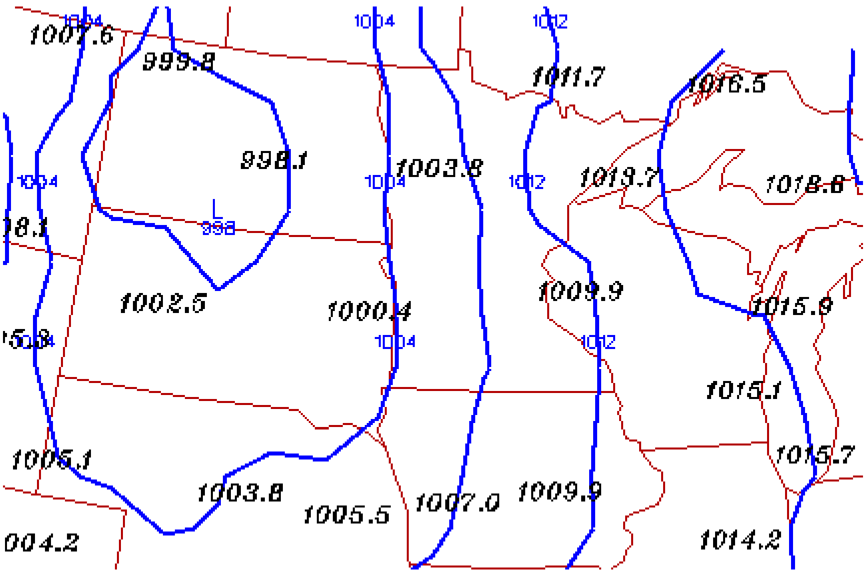
Notes:

22. Isobar map



Description:

Lines of equal barometric pressure as shown on a weather map or a line connecting points of equal pressure is called an isobar. That means, that at every point along a given isobar, the values of pressure are the same. Isobars are represented by solid blue contours. An image of sea-level pressure reports and isobars has been given below.



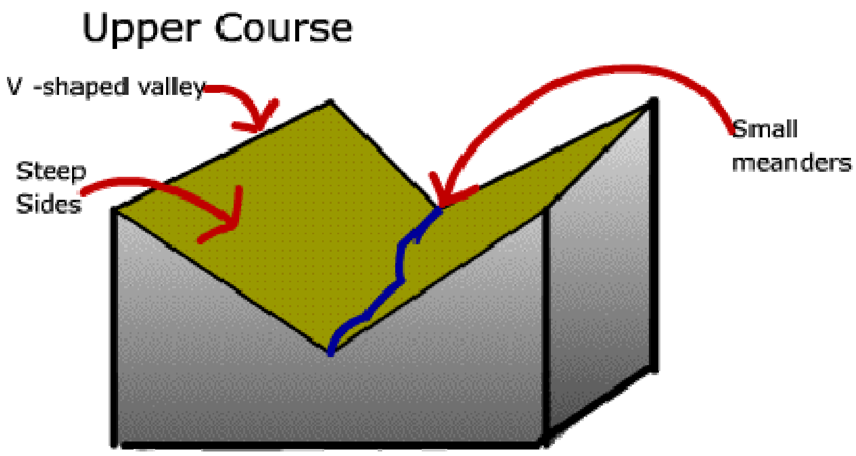
The black numbers are station reports of sea-level pressure in millibars. Isobars are normally drawn at 4 mb intervals, with 1000 mb being the base value. The small blue numbers are contour labels, which identify the value of an isobar (for example 1004 mb, 1012 mb, etc.).

The isobars displayed here have been generated from these pressure observations. For example, pressure reports in South Dakota are 1002.5 mb and 1000.4 mb respectively, and notice that they are contained within the region bound by the 1000 mb and 1004 mb contours.
An area of relatively lower pressure is centered in western North Dakota, while the pressure increases outward from this region.

Notes:

....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....

23. Upper course of a river



Description:

The upper course is the highest section which is found in the mountains or hills. Here the river erodes a V-shaped valley , the path is fairly straight and flows downhill steeply. The land forms that are common in this course of the river are waterfalls and gorges. In the upper course of a river the land is highest, steepest and most exposed. The weather in this part of the valley is colder, wetter, windier and more humid than the parts lower down. Snow lies here for longer than elsewhere. The soils are often acid, thin and waterlogged. All these limitations make it difficult to make use of the land in the upper course. Farming is extensive, with foresty, hill sheep and deer stalking being common uses. Building and transport links are rare.. This lack of developement makes the land attractive for hill walkers and rock climbers, and some areas in the highest part can be used for winter sports like skiing and snowboarding. The heavy rain does make the land suitable for reservoirs and the fast flowing rivers can be dammed to make hydro-electric power stations.

Notes:

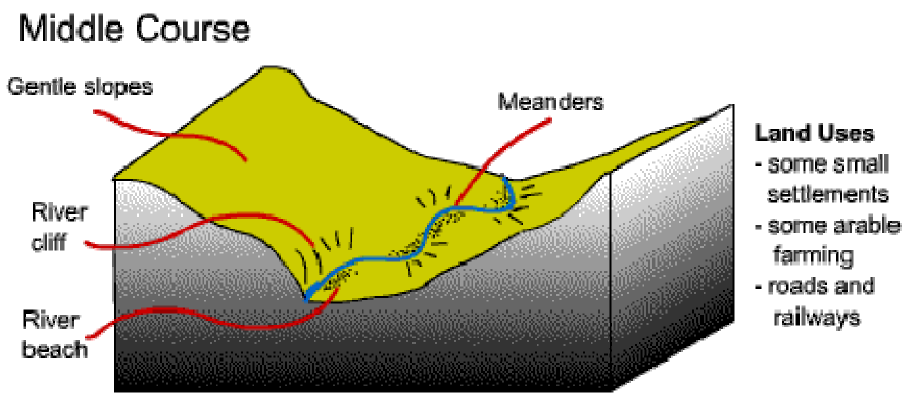
………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………

24. Middle course of a river



Description:

In the middle course the angle that the river flows down is less steep, the river begins to meander and the valley sides are also less steep. Common landforms here are river beaches and river cliffs. The land is getting lower, less steep and the climate is less extreme. This allows for greater use of the valley. Arable farming can now take place although livestock will still be found. The land is suitable for building and thereare villages and small towns here. The flatter and wider valley floor may have road and even rail transport links. Forestry is still carried out in the middle course, especially where the soil is nor fertile enough for farming. The population density is greater than in the upper course.

Notes:

....

....

....

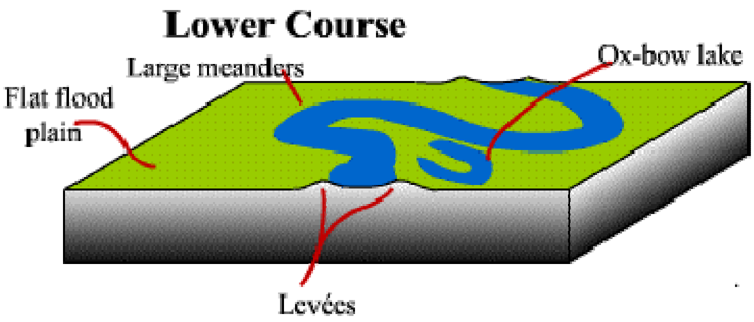
....

....

....

....

25. Lower course of a river



Description:

The lower course has the gentlest slopes – both in long profile and across the valley floor. This almost flat land is known as the flood plain. The river may have very large meanders and ox-bow lakes. The mouth of a river is when it reaches open water – either a lake or the sea. Under certain conditions a delta can be formed here. Here the land is low, flat, or very gently sloping, and the temperatures are the warmest. The soils are often deepand fertle and so the land is best siuted to intensive agriculture with arable farms and market gardens. Close to the river wher the land may be marshy or at risk from flooding may be kept as permanent pasture for livestock. The largest settlements and the greatest concentration of road and rail links are found in the lower course. The industrial areas, which need good communications, many workers and large areas of flat land are also located here. This part of a river valley has the greatest population density.

Notes:

....

....

....

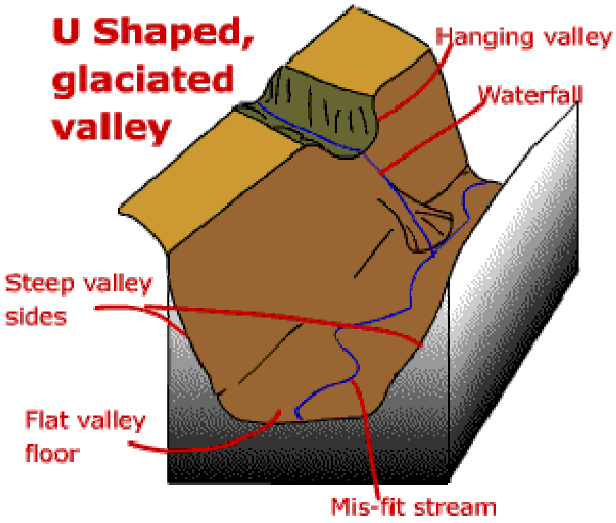
....

....

....

....

26. U-shaped valley



Description:

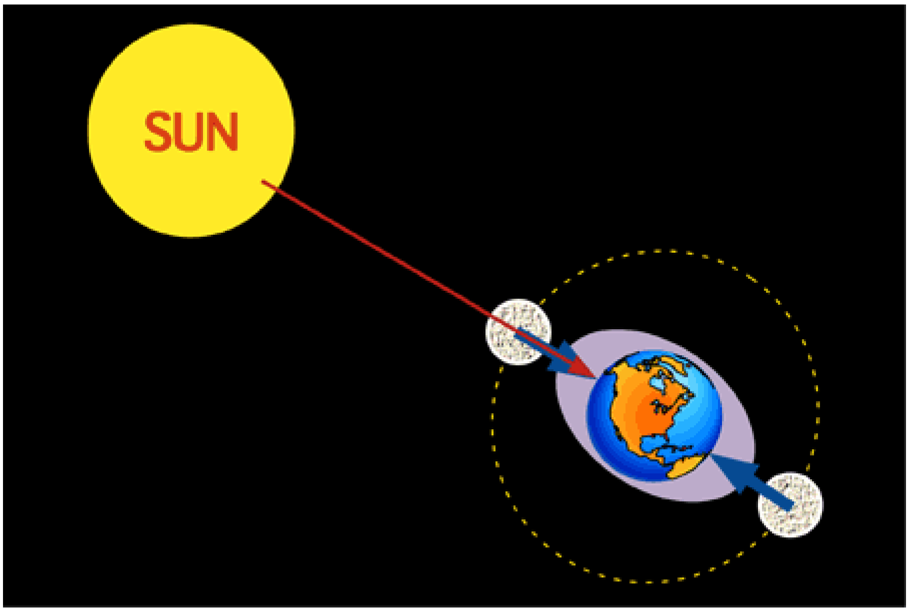
In highland areas the most obvious glaciers features are usually those created by erosion, not deposition. Features such as corries, ribbon lakes, U shaped valleys and hanging valleys are typical of upland areas such as the Alps in Europe, the English Lake District and the Southern Alps in New Zealand. When a glacier erodes its valley , a classic U shape is formed, the side walls tending to be steep and possibly curving inwards at the base, and the valley floor almost flat. U shaped valleys often start life as river valleys that existed before glaciation occurred. The glaciers then followed the existing V shaped valleys, eroding and deepening them as the ice moved. Over time the valleys became straightened, widened and deepened, keeping the steep sides and acquiring a flat base. U shaped valleys are also known as glacial troughs. The flat floor is roughly shaped by the ice which tends to cut down more evenly than flowing water. A thick layer of glacial debris (ground moraine) is deposited as the ice retreats, smothering any minor irregularities, and creating a well drained and fertile soil.

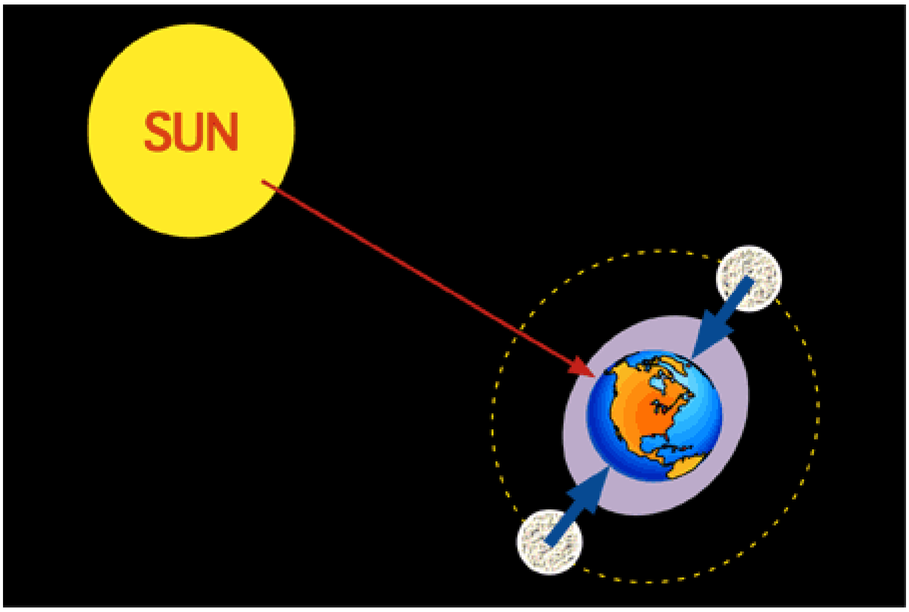
Notes:

……

……

27. Tides





Description:

Tides are periodic rises and falls of large body of water. Tides are caused by gravitational interaction betwwen the Earth and the Moon. The gravitational attraction of the Moon causes the oceans to bulge out in the direction of the Moon. Another bulge occurs on the opposite side, since the Earth is also being pulled toward the

Moon (and away from the water on the far side). Since the Earth is rotating while this is happening , two tides occur each day.

Notes:

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

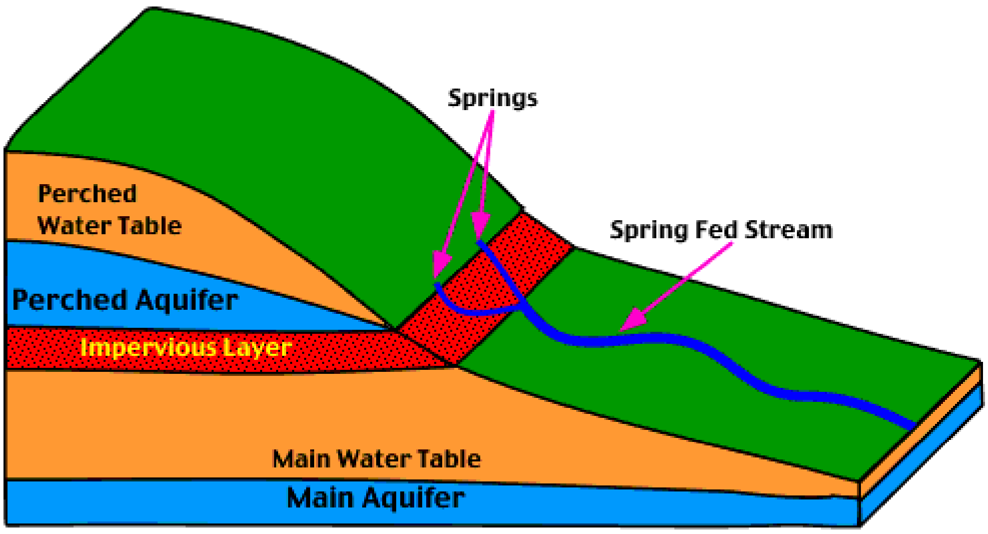
....

....

....

....

28. Unconfined ground water



Description:

Ground water occurs in aquifers under two conditions: confined and unconfined. A confined aquifer is overlain by a confining bed, such as an impermeable layer of clay or rock. An unconfined aquifer has no confining bed above it and is usually open to infiltration from the surface.

Unconfined aquifers are often shallow and frequently overlie one or more confined aquifers. They are recharged through permeable soils and subsurface materials above the aquifer. Because they are usually the uppermost aquifer, unconfined aquifers are also called water table aquifers. Confined aquifers usually occur at considerable depth and may overlie other confined aquifers. They are often recharged through cracks or openings in impermeable layers above or below them. Confined aquifers in complex geological formations may be exposed at the land surface and can be directly recharged from infiltrating precipitation. Confined aquifers can also receive recharge from an adjacent highland area such as a mountain range. Water infiltrating fractured rock in the mountains may flow downward and then move laterally into confined aquifers.

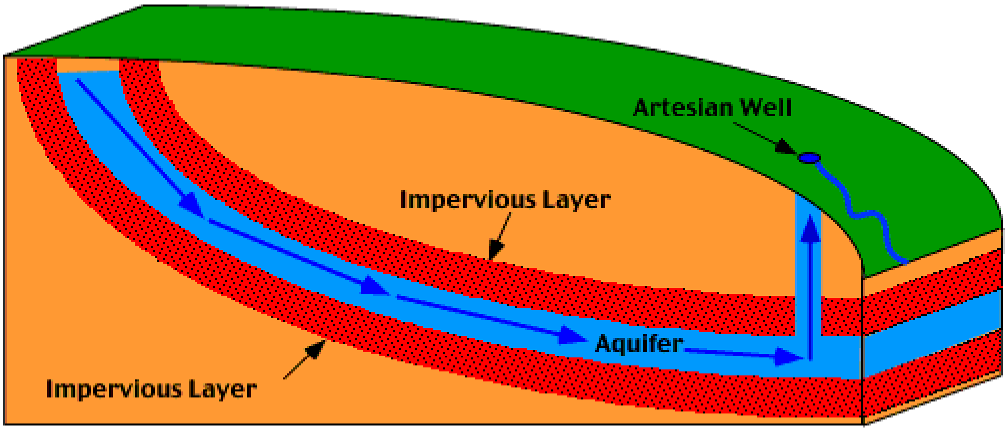
Notes:

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

29. Confined ground water



Description:

A confined aquifer is overlain by a confining bed, such as an impermeable layer of clay or rock. An unconfined aquifer has no confining bed above it and is usually open to infiltration from the surface.

Notes:

....

....

....

....

....

....

....

....

....

....

....

....

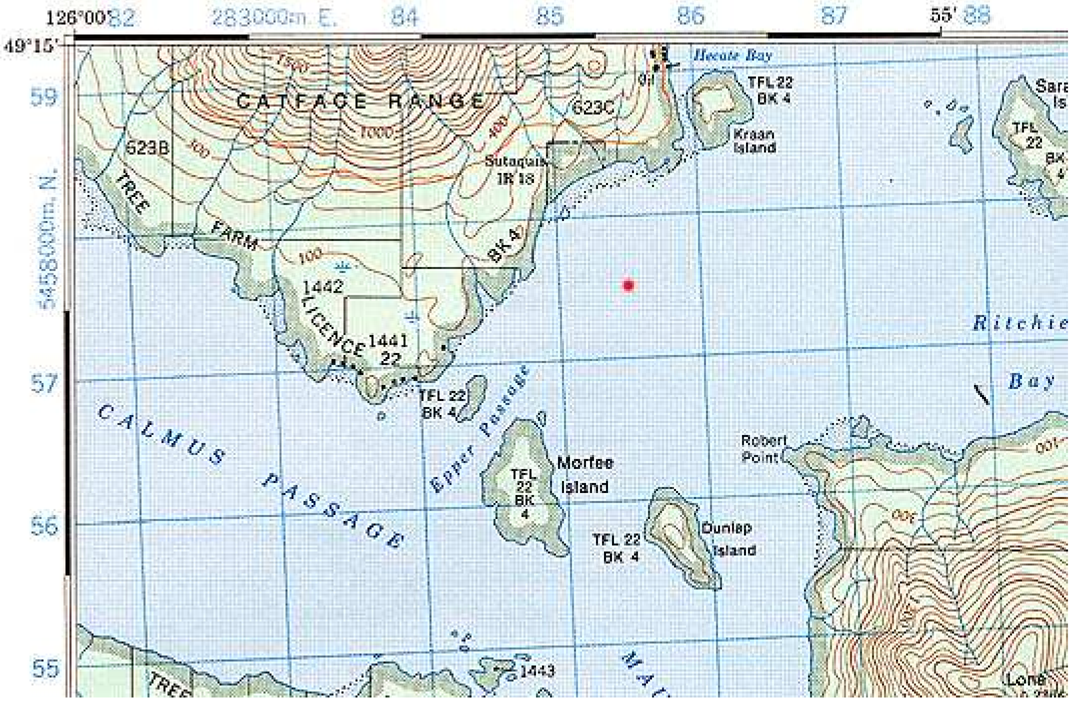
....

....

....

....

30. Topographic maps



Description:

Topographic maps are maps that show locations and elevations of natural and cultural features of a given area. Standard colors and symbols have been designated for use on these maps. Topographic maps are generally oriented to show north at the top. Scales and contour intervals vary on topographic map depending on the series of the map and the relief (the variation in elevation) of the topography.

Notes:

....

....

....

....

....

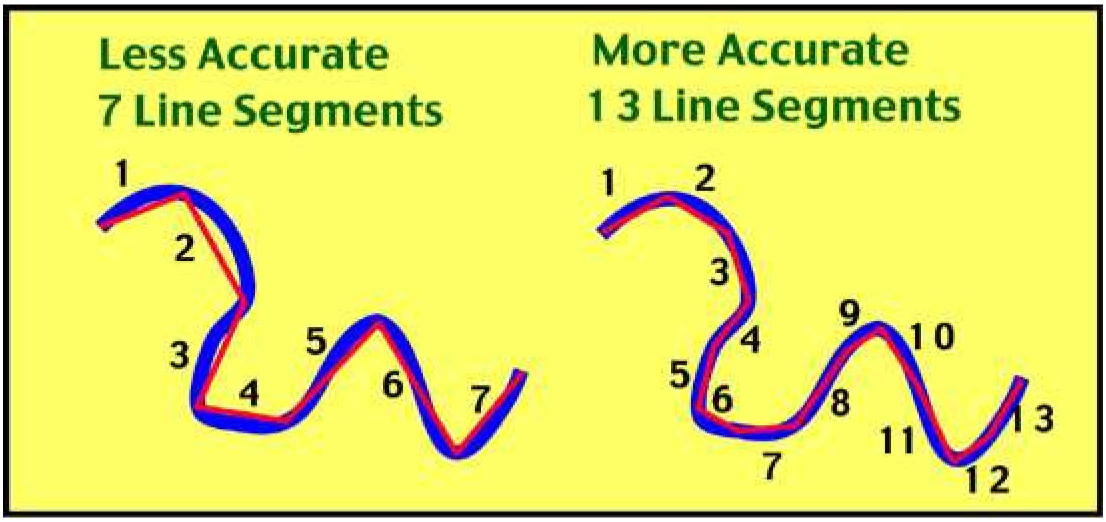
....

....

....

....

31. Measurement on the maps



Description:

Keeping both tick marks together (on paper and map), place the point of the pencil close to the edge of the paper on the tick mark to hold it in place and pivot the paper until another straight portion of the curved line is aligned with the edge of the paper. Continue in this manner until the measurement is completed. When you have completed measuring the distance, move the paper to the graphic scale to determine the ground distance. The only tick marks you will be measuring the distance between are tick marks (a) and (b). The tick marks in between are not used.

Notes:

....

....

....

....

....

....

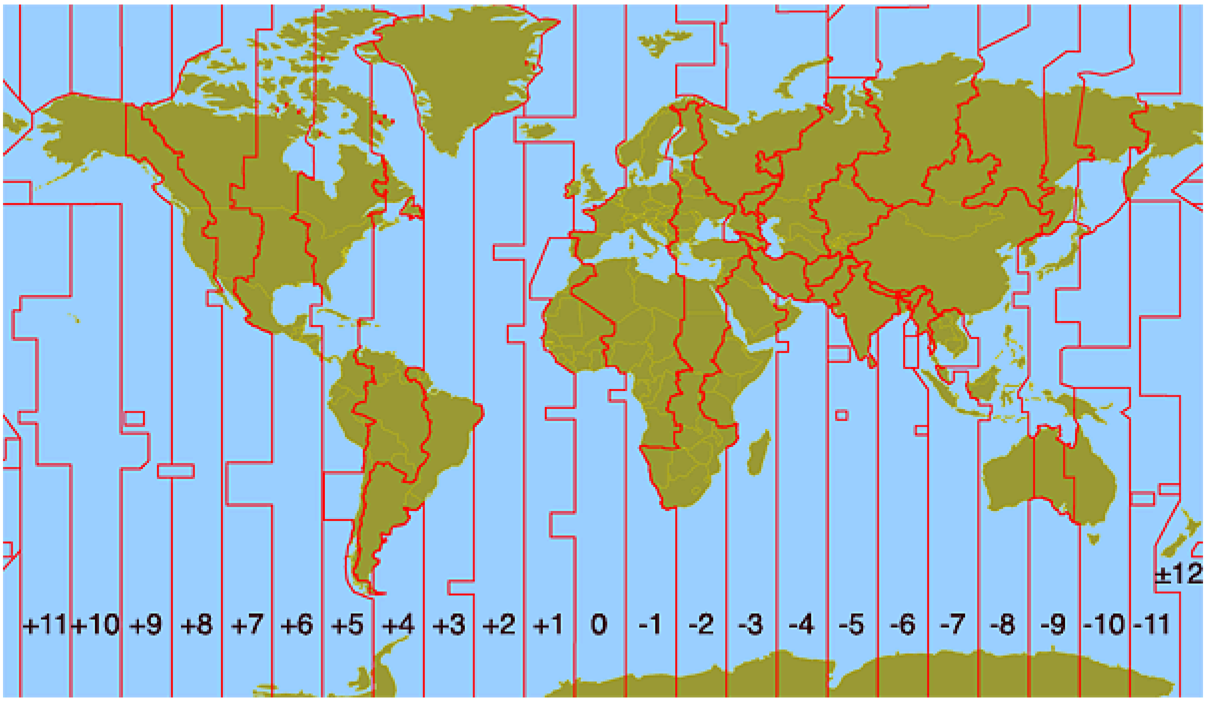
....

....

....

....

32. Coordinated Universal Time



Description:

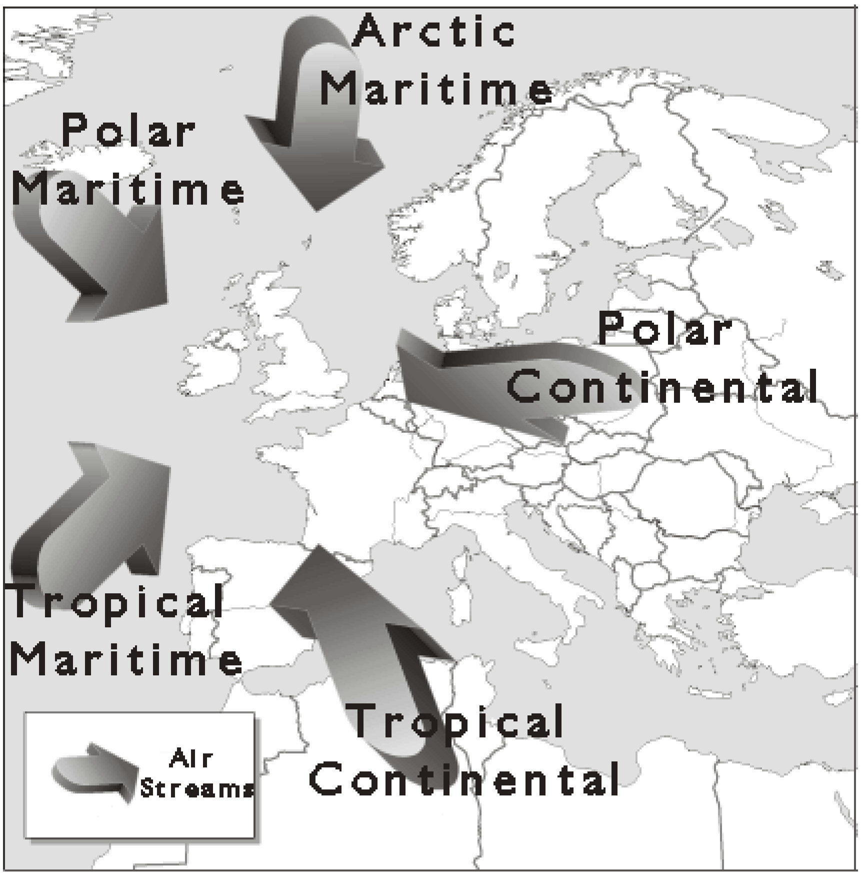
Coordinated Universal Time (abbreviated as UTC, and therefore often spelled out as Universal Time Coordinated and sometimes as Universal Coordinated Time) is the standard time common to every place in the world. Formerly and still widely called Greenwich Mean Time (GMT) and also World Time, UTC nominally reflects the mean solar time along the Earth's prime meridian. (The prime meridian is 0° longitude in the 360 lines of longitude on Earth. There are 179 meridians toward the East and 179 toward the West. The 180th meridian is also called the International Date Line.) The prime meridian is arbitrarily based on the meridian that runs through the Greenwich Observatory outside of London, where the present system originated. The UTC is based on an atomic clock to which adjustments of a second (called a *leap second*) are sometimes made to allow for variations in the solar cycle.

Coordinated Universal Time is expressed using a 24-hour clock but can be converted into a 12-hour clock (AM and PM). UTC is used in plane and ship navigation, where it also sometimes known as Zulu. UTC uses the Gregorian calendar calendar.

Notes:

....

33. Different air masses



Description:

Maritime Arctic (mA) and Maritime Polar (mP): These are cold air masses which form over the Arctic and acquire moisture as they move south over the cold waters of the North Atlantic and North Pacific oceans. The Maritime Polar air mass is air, which has moved farther out and over the ocean and, through contact with the ocean surface, has become more warm and moist than Maritime Arctic air.

Maritime Tropical (mT): Because the continent of North America narrows down towards its southern extremity, most of the tropical air in the southern latitudes is in contact with the warm ocean surface and becomes hot and moist. Source regions for Maritime Tropical air are: The Gulf of Mexico, the Caribbean Sea, and the Tropic of Cancer regions of the North Atlantic and North Pacific oceans.

In winter, the most common air masses that form over North America are Maritime Polar, Maritime Arctic and Continental Arctic Continental Polar seldom appears over this continent. In most cases, Maritime Arctic and Maritime Polar air masses found over the continent have entered from the west. Maritime air masses found over the

Atlantic Ocean affect only the East Coast. The air mass in the southern portion of the continent is Maritime Tropical.

In summer, snow and ice melt, leaving numerous small lakes in the northern reaches of Canada and Alaska. These lakes provide moisture that affects the forming air masses. In summer, therefore Maritime Arctic is the principal air mass and Continental Arctic rarely appears. Maritime Polar which enters from the Pacific Ocean and Maritime Tropical are the other common summer air masses.

Notes:

....

....

....

....

....

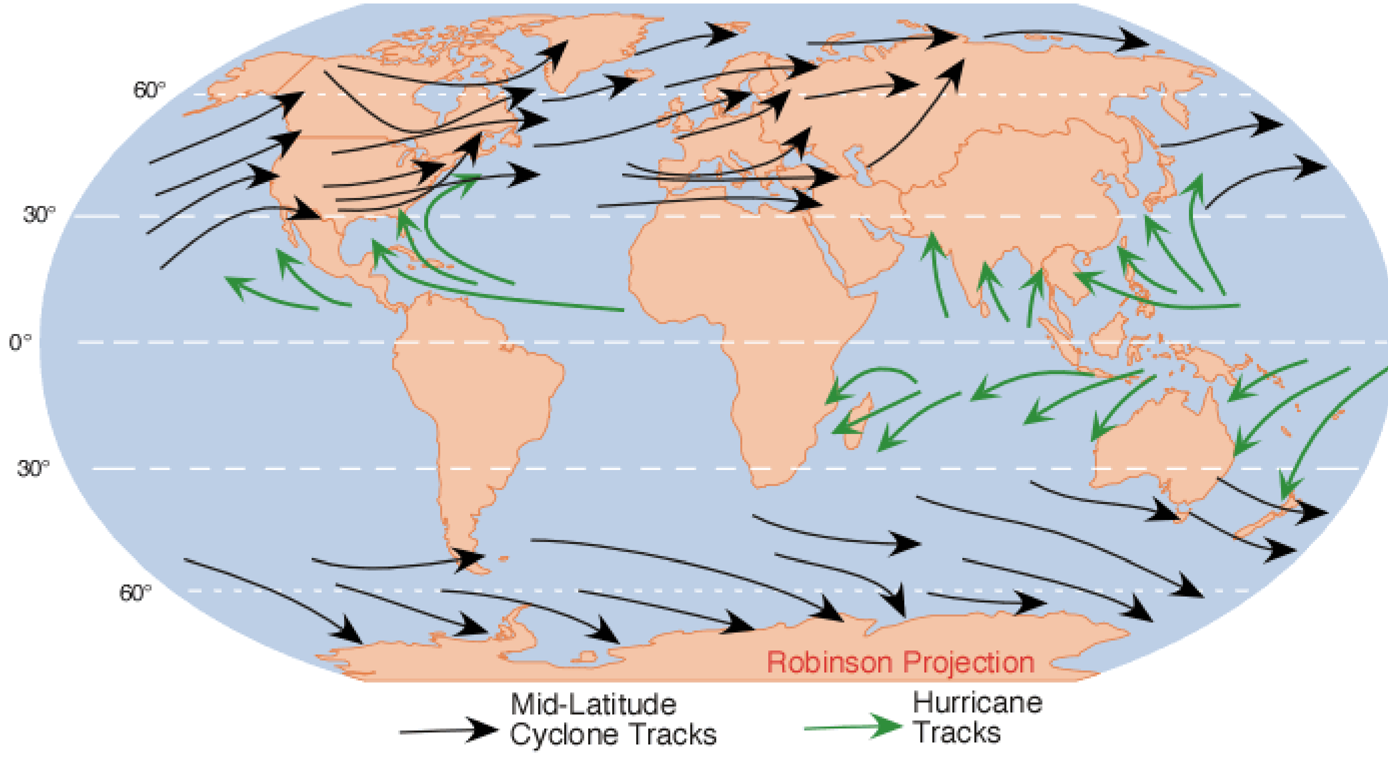
....

....

....

....

34. The mid-latitude cyclones and subtropical hurricanes



Description:

Hurricanes are intense storms that originate in the Tropics. Hurricanes begin life as a small gathering of unorganized, clouds storms which gain energy from the heat of the ocean water. If certain conditions in the atmosphere are present, the gathering of individual clouds will begin to organize into a single storm. If the storm continues to feed off of the heat supplied by the ocean, the organization of the cloud clusters will intensify and the winds will increase and will circulate around a specific center, the eye. As a matter of fact, meteorologists place hurricanes in a category called cyclones. Cyclones are characterized by a circular wind pattern or circulation. Tornadoes, waterspouts, and dust devils are also members of this category.

Meteorologists identify the growth phase of hurricanes into three categories of development:

Tropical Depression -- wind speeds less than 36 mph

Tropical Storm -- wind speeds between 36 mph and 74 mph

Hurricane -- wind speeds greater than 74 mph

The hurricanes that affect the United States are "born" in the Atlantic Ocean, the Gulf of Mexico, or the Caribbean Sea and travel to the northwest at a speed near 15 mph. As these storms travel, the wind, rain, and storm surge destroy the shoreline, villages, and cities in their path. Storm surge is a rise of the ocean caused by the winds of the storm. The highest surge is typically to the right of the hurricane and has been known to exceed 25 feet. This is due to the combination of the strong winds and the forward movement of the hurricane. Tornadoes have also been known to originate from the severe atmospheric conditions associated with hurricanes. When hurricanes make landfall, they begin to decrease in strength because they no longer have the ocean water from which to gain energy. However, they are still dangerous and can cause much damage.

Different areas of the world have different names for what is called a "hurricane":

Australia -- "willy-willy"

Caribbean Sea, North Atlantic Ocean, Gulf of Mexico --"hurricane"

Haiti -- "taino"

Indian Ocean -- "cyclone"

Philipines -- "baguio" or "baruio"

West coast of Mexico -- "cordonazo"

Western North Pacific Ocean and the South Pacific -- "typhoon"

Notes:

....

....

....

....

....

....

....

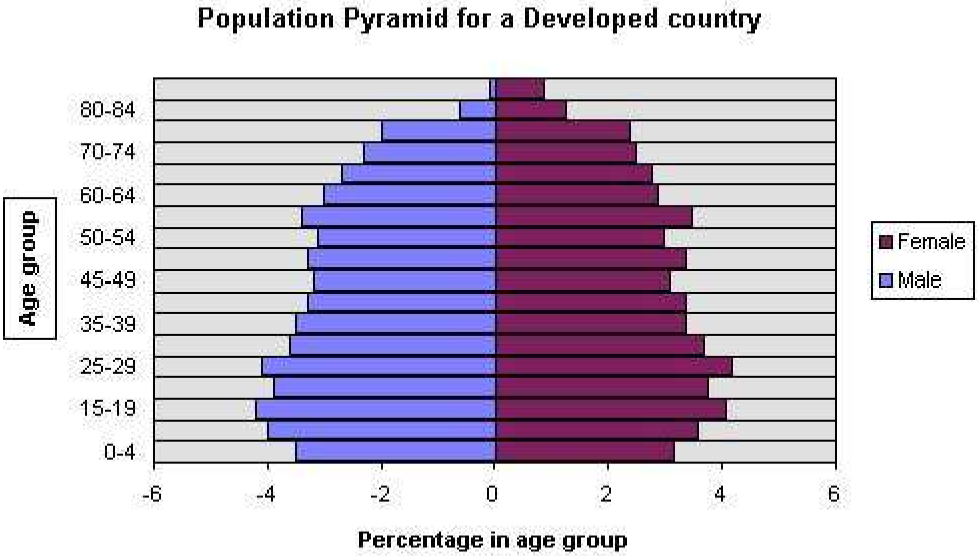
....

....

....

....

35. Population Pyramid for a Developed country



Description:

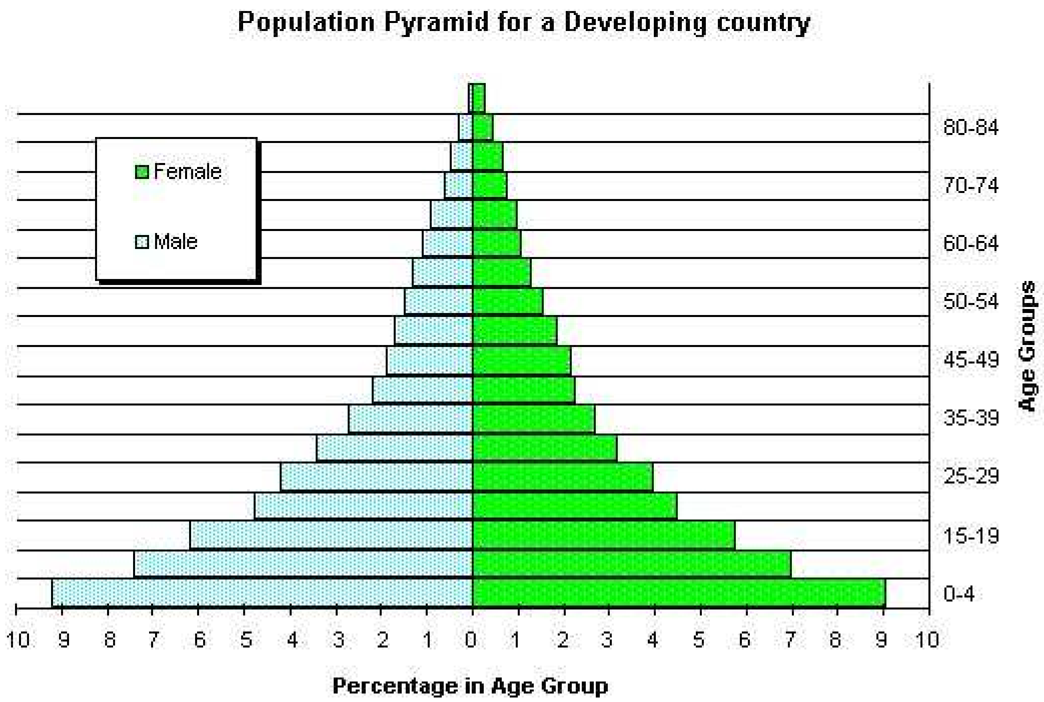
This shape is typical of a dveloped country. It is narrow at the base, wider in the middle, and stays quite wide until the very top, as there is a sizable percentage of older people. Note that there are more old women than men. Italy and Japan have population structures that are of this shape.

Notes:

....

....

36. Population Pyramid for a Developing country



Description:

The population structure of a country is how it is made up of people of different ages, and of males and females. The common method to show the structure is by population pyramid. This diagram is made up by putting two bar graphs (one for male, one for female) side by side. This population pyramid is wide at the base, which means there are a large proportion of young people in the country. It tapers very quickly as you go up into older age groups, and is narrow at the top. This shows that very small proportion of people are elderly. In the example above 4% of the population are females aged betwen 25 and 29.

Notes:

....

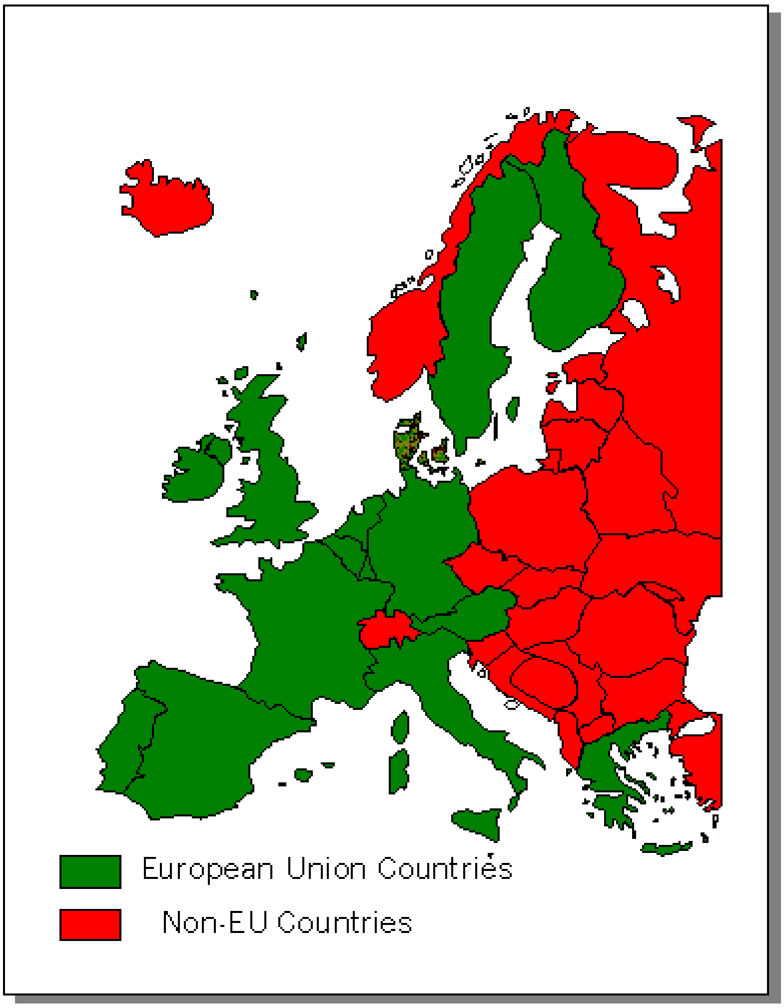
....

....

....

....

37. European Union before 2004



Description:

Although primarily a trade alliace the European Union also a social alliance. It was set up in 1951, and was originally a group of six countries. These countries could see the benefits of greater cooperation and did not want the repetition of the counditions that lead to the second world war. It has grown into an alliance of 15 countries with other counries applying to join.

People who are in favour of the EU put forward the following advantages.

- Free trade (no tariffs or quotas) benefits industries as they have larger market to sell their goods to
- Greater cooperation between countries should prevent the outbreak of war between members
- Greater cultural understandingresults from freedom to travel within EU.
- The EU has a greater influence on world events than the individual countries could have

- European Union regional developement funding has improved conditions in the poorer countries and areas
- On July 16, 1997, the European Commission released it opinions on eleven applications forEU membership from Central and Eastern Europe and Cyprus with documents outlining the Agenda 2000 program. TheEU later expanded this accession process to include Malta and Turkey. The December 2000 Copenhagen European Council declared that Cyprus, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, should become Eu member states as of 1 May 2004. A Threaty of Accession was signed in Athens on April 16, 2003. Bulgaria and Romania are slated for 2007 membership.

Notes:

....

....

....

....

....

....

....

....

....

....

....

....

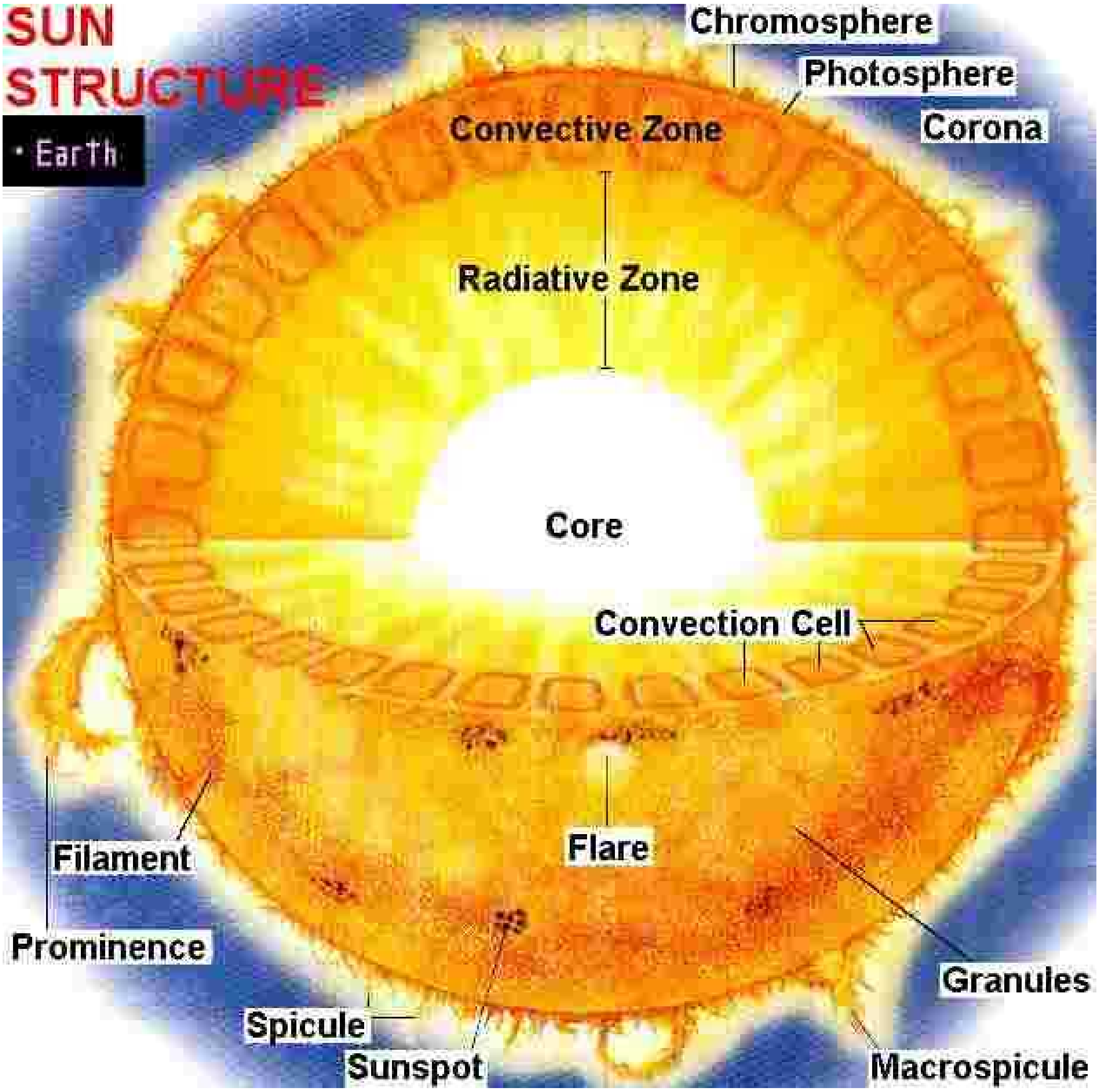
....

....

....

....

38. Structure of the Sun



Description:

The Sun is a star, a huge ball of burning gas that sends heat far into the solar system. It plays very important part in our everyday lives. Its heat supports life on Earth, powers photosyntesis in plants, and is the source of all food and fossil fuels. It causes seasons, climate, currents in oceans, circulation in air and th weather in our atmosphere. The Sun has been around for about 4.6 billion years and is expected to keep burning bright for another 5 billion years.The Sun is considered to be a medium sized star, has a diameter of about 1.35 million km (100 x the diametre of Earth) and is about 333,400 x more massive than the Earth. It contains about 99.86% of all the matter in the entire solar system. It is composed of roughly 75% hydrogen, 25% helium, and less than 1% oxygen and other elements.

Sun layers:

The outermost layer of the Sun's atmosphere is the corona. The corona extends outward from the Sun to the edge of tha solar system in the form of „solar wind". The temperature of the particles in the corona can reach temperature of up to 1.700000°C.These particles, however, are spread very far apart from each other.The process that heeats the coronais not known very well, for the laws of thermodynamics state that heat flows from hotter to cooler areas, which does not necessarily happen in the corona.

Benath the corona is the cromosphere. It is several kilometers thick (up to 16.000 with solar flares) and can reach temperatures of around 27.800°C. The cromosphere may be seen briefly as a reddish rim during a solar eclipse.

The photosphere is known as the „surface" of the Sun, the innermost layer of the Sun's atmosphere. It is about 500km thick and is where most of the Sun's radiation and light escape into the solar system. The temperature of the photosphere is about 6000°C and is the place on the Sun where sunspots are found.

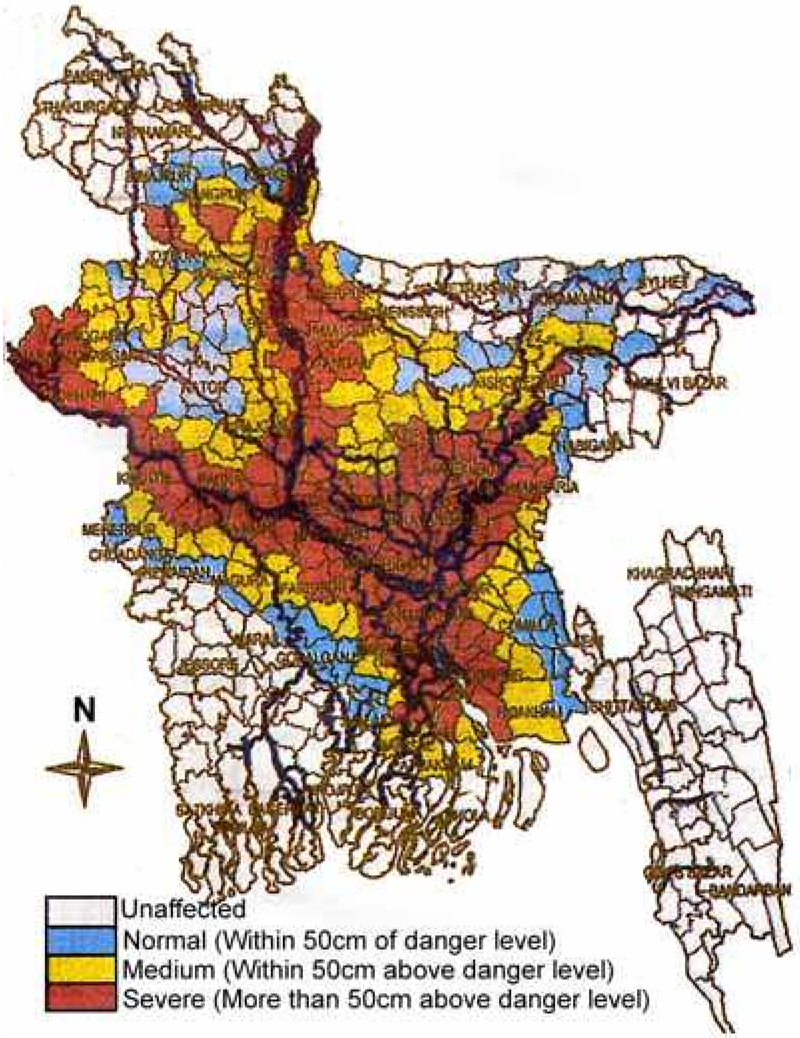
The interior of the Sun is called the core. It is here where the hydrogen atoms are fused into helium, releasing heat and light that take around 10 million yaers to reach the surface. This energy that is released prevents the collapse of the Sun and keeps it in gaseous form. The total energy radiated is equivalent to that generated by 100 billion tons of TNT exploding every second.

Death of the Sun

In about 5 billion years from now, the Sun will begin to die. As the Sun grows old, it will expand. As the core runs out of hydrogen and then hekium, the core will contact and the outer layers will expand, cool, and become less bright. It will become a red giant star. After this phase, the outer layers of the Sun will continue to expand. As this happens, the core will contract, the helium atoms in the core will fuse together, forming carbon atoms and releasing energy. The core will then be stable since the carbon atoms are not further compressible. Then the outer layers of the Sun drift off into space, forming a planetary nebula, exposing the core. Most of its mass will go to the nebula. The remaining sun will cool and shrink, it will eventually be only a few thousand miles in diameter. The star now a white dwarf, a stable star with no nuclear fuel. It radiates its left-over for billions of years. When its heat is all dispersed, it will be a cold, dark black dwarf, essentially a dead star.

Notes:

39. Flood in Bangladesh



Description:

The country lies on the northern end of the Bay of Bengal and at the mouth of several large rivers. About 80% of Bangladesh consists of the flat low lying floodplain and deltas of the rivers Ganges, Brahmaputra (called the Jamuna in India) and Megna (see map above). These rivers play a major role in Bangladesh and bring severe flooding every year, although they are not the only source of flooding.

There are five reasons for flooding such as:

1) Heavy monsoon rainfall
2) Snowmelt from Himalayas
3) Deforestation in the Himilayas
4) The failure of river management
5) Excessive urbanization
6) Coastal flooding

Monsoon downpour

The major monsoon occurs in South East Asia. The summer monsoon was responsible for the excessive rainfall of 1987 and 1988 in Bangladesh.

An increased amount of precipitation can cause flooding. An above normal monsoon downpour in the Ganges-Brahmaputra-Megna drainage system is thought to be the primary cause of the 1988 flood in Bangladesh. It is not known, however, if the heavy precipitation is actually an effect of other processes such as the greenhouse effect or destruction of forests in the upstream region.

Snowmelt in the Himalayas

The Himilayas are one of the few places in the world that retain permanent glaciers. In the warmer summer season however glacial ice goes through a period of melt The source of the Brahmaputra starts in the Himilayas and an increase in meltwater flowing through its drainage basin will increase channel flow, saturate soils and cause massive overland flow – a major cause of flooding.

Deforstation

Increasingly frequent flooding in Bangladesh is attributed to the removal of trees in the forests of Nepal and other Himilayan areas. A rapid increase in population in the Indian Subcontinent over the course of the present century has resulted in a acceleration of deforestation in the hills of Nepal to meet the increasing demand for food and fuel wood . Deforestation of steep slopes is assumed to lead to accelerated soil erosion and landslides during monsoon precipitations. This in turn is believed to contribute to devastating floods in the downstream regions such as in Bangladesh.

Failed river management

Before the floods of 1987-8 the Bangladesh government proposed and carried out the ‘Flood Action Plan’ which used embankments (man-made levees) along the length of the main rivers. The aim was to have controlled the distribution and speed of flooding. However the embankments were not designed to cope with the amount of flood water in the 1987-8 floods. Breaches in the embankments resulted causing wide spread flooding. Rivers naturally change the shape of their channels and are never still. Critics argue that by trying to control them can lead to worse affects than if they were never built at all.

Excessive developement

Rapid population growth creates extra pressure on the land of already overcrowded Bangladesh. Agricultural lands give way to housing developments and roads. This rapid development and urbanization must have aggravated the flooding problem in Bangladesh. Prior to urbanization there is a greater lag time between intense rainfall and peak stream flow. After urbanization the lag time is shortened, peak flow is greatly increased, and total run-off is compressed into a shorter time interval favorable conditions for intense flooding. For example, in a city that is totally served by storm drains and where 60% of the land surface is covered by roads and buildings, floods are almost six times more numerous than before.

Notes:

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

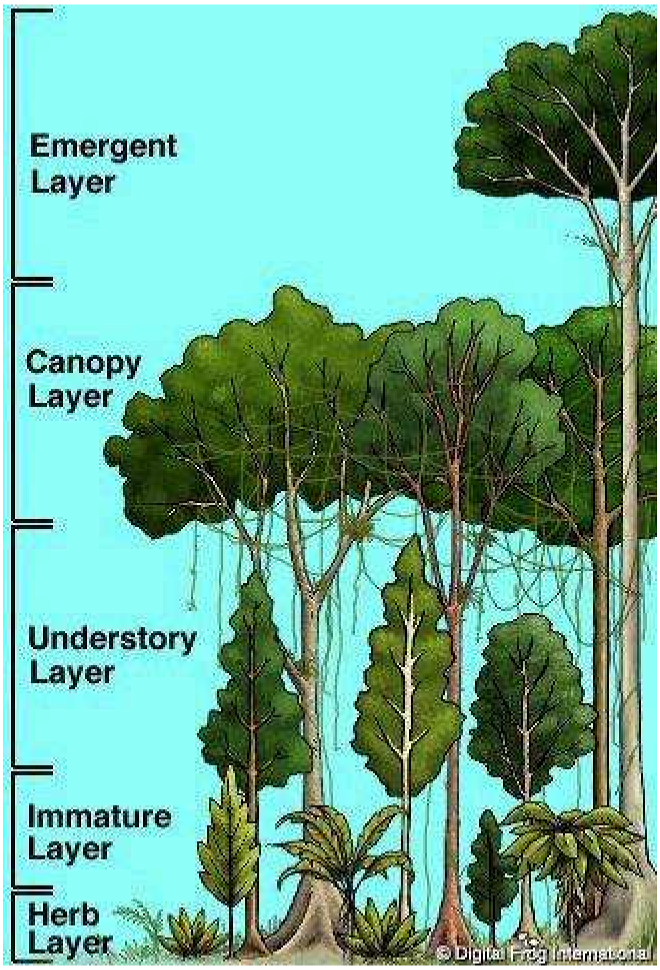
……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

……………………………………………………………………………………………………

40. Layers of the Rainforest



Description:

Tropical rainforests have four layers:

Emergent layer

These giant trees thrust above the dense canopy layer and have huge mushroom-shaped crowns. These trees enjoy the greatest amount of sunlight but also must endure high temperatures, low humidity, and strong winds.

Canopy layer

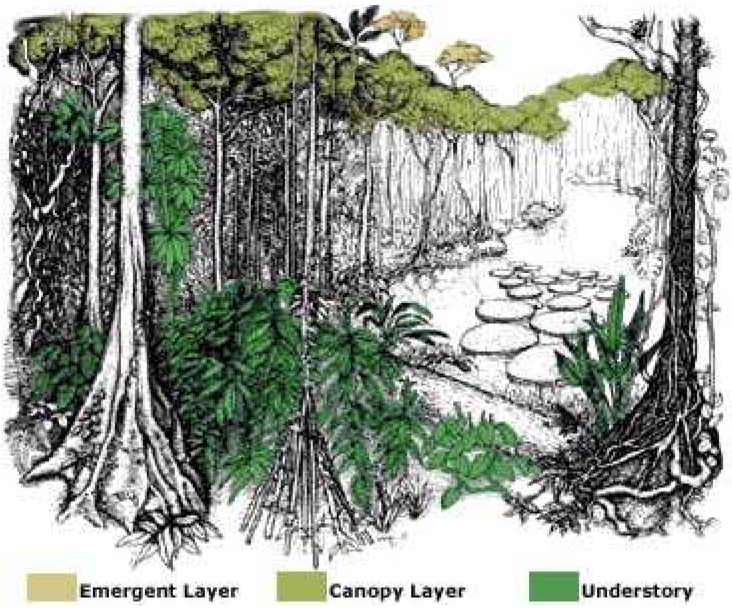
The broad, irregular crowns of these trees form a tight, continuous canopy 60 to 90 feet above the ground. The branches are often densely covered with other plants (epiphytes) and tied together with vines (lianas). The canopy is home to 90% of the organisms found in the rain forest; many seeking the brighter light in the treetops.

Understory

Receiving only 2-15% of the sunlight that falls on the canopy, the understory is a dark place. It is relatively open and contains young trees and leafy herbaceous plants that tolerate low light. Many popular house plants come from this layer. Only along rivers and roadways and in treefall and cut areas is sunlight sufficient to allow growth to become thick and impenetrable.

Forest floor

The forest floor receives less than 2% of the sunlight and consequently, little grows here except plants adapted to very low light. On the floor is a thin layer of fallen leaves, seeds, fruits, and branches that very quickly decomposes. Only a thin layer of decaying organic matter is found, unlike in temperate deciduous forests.



Notes:

………

………

………

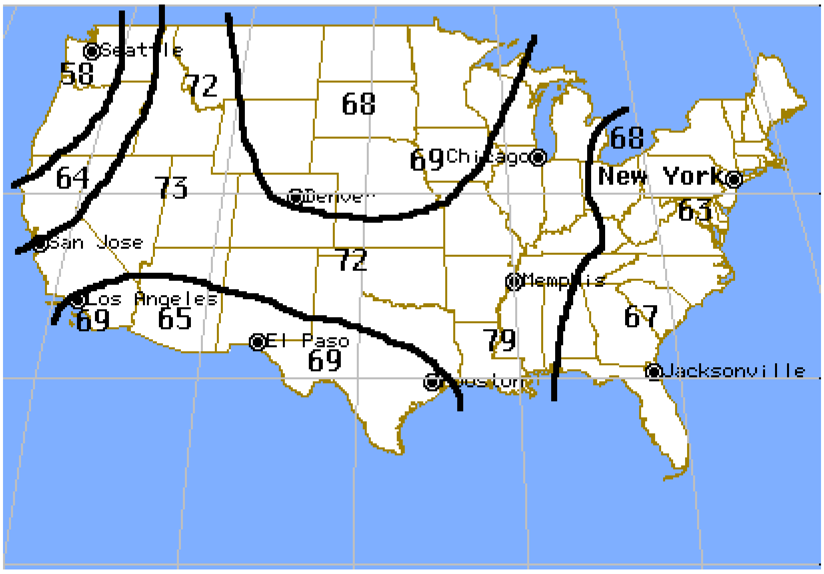
………

………

………

………

41. Isotherm map



Description:

Certain weather maps allow us to view warm and cold areas in an easy fashion. One helpful weather map contains isotherms. An isotherm is a line connecting locations with equal temperature. Isotherm maps show where temperatures are relatively high and low, and also where temperature changes are gradual or dramatic over a distance. This image shows an example of a weather map containing 60° and 70° isotherms. The large black lines are called isotherms. They are typically placed at intervals of 10 degrees Fahrenheit.

Notes:

....

....

....

....

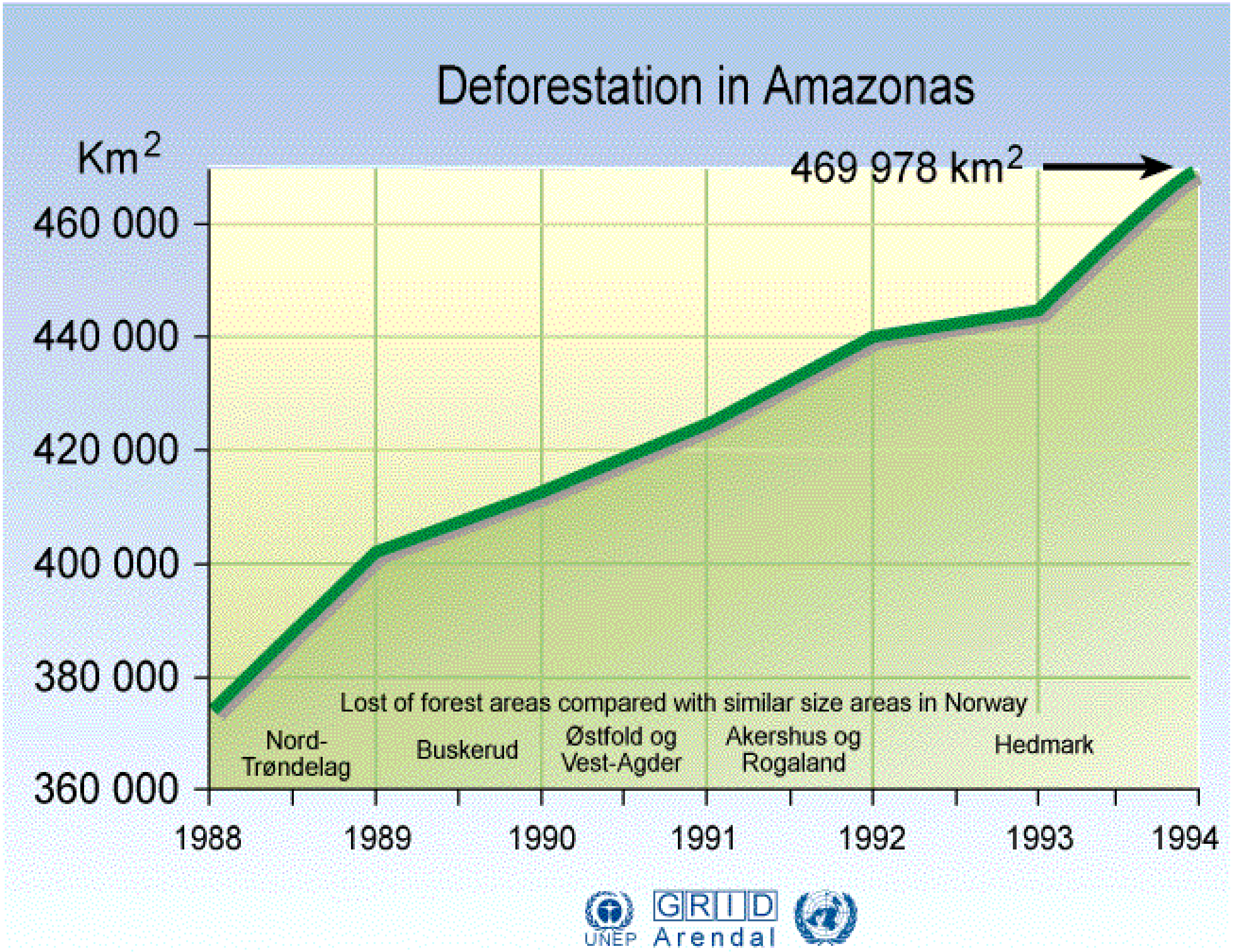
....

....

....

....

42. Deforestation in Amazonas



Deforestation in Amazonas

Description:

Tropical rainforests are found in the Amazon basin of South America, (eg. Brazil) Central Africa (eg. Congo) and South-East Asia (eg. Indonesia) There are economic reasons for countries to cut down their rainforests.

Farmland is made. This is both arable land which is used for tropical crops such as cassava and bananas, and grass land which is used for livestock farming, maily cattle ranching. This farmland, as well as providing food, gives employment and earns money in export earnings for the country.

The wood cut down is sold as timber and used as fuel. Tropical hardwoods are much in demand for use in building and furniture. The main markets for the tropical hardwoods are in the developed world.

It will allow the mining of minerals. Many important ores such as bauxite and iron ore have been found in tropical forest areas. The most economical way to remove the rocks is often by opencast mining, which means that the trees have to be cut down.

The produce power and water supplies. Rivers have been dammed to make large reservoirs for Hodro-Electric Power schames. An example is the Sobrandino Dam on the San Francisco River in Brazil.

There are social reasons for cutting down trees.

Transport links. Roads and railways are needed to moves goods and people.

Settlements. Modern cities such as Manaus in Brazil and jakarta in Indonesia have been developed in areas that were once tropical rainforest.

The effects of destroying the tropical rainforests

Native people

When the trees are cut down it takes away the habitat of the plants and animals. It also reduces the space for the indigenous people who have lived there for thousands of years.

Flora and fauna

Deforestation has led to the loss of thousands of species of insects, animals and plants. It means that important chemicals that could be used for medical purposes have not been found and will be lost.

The soil

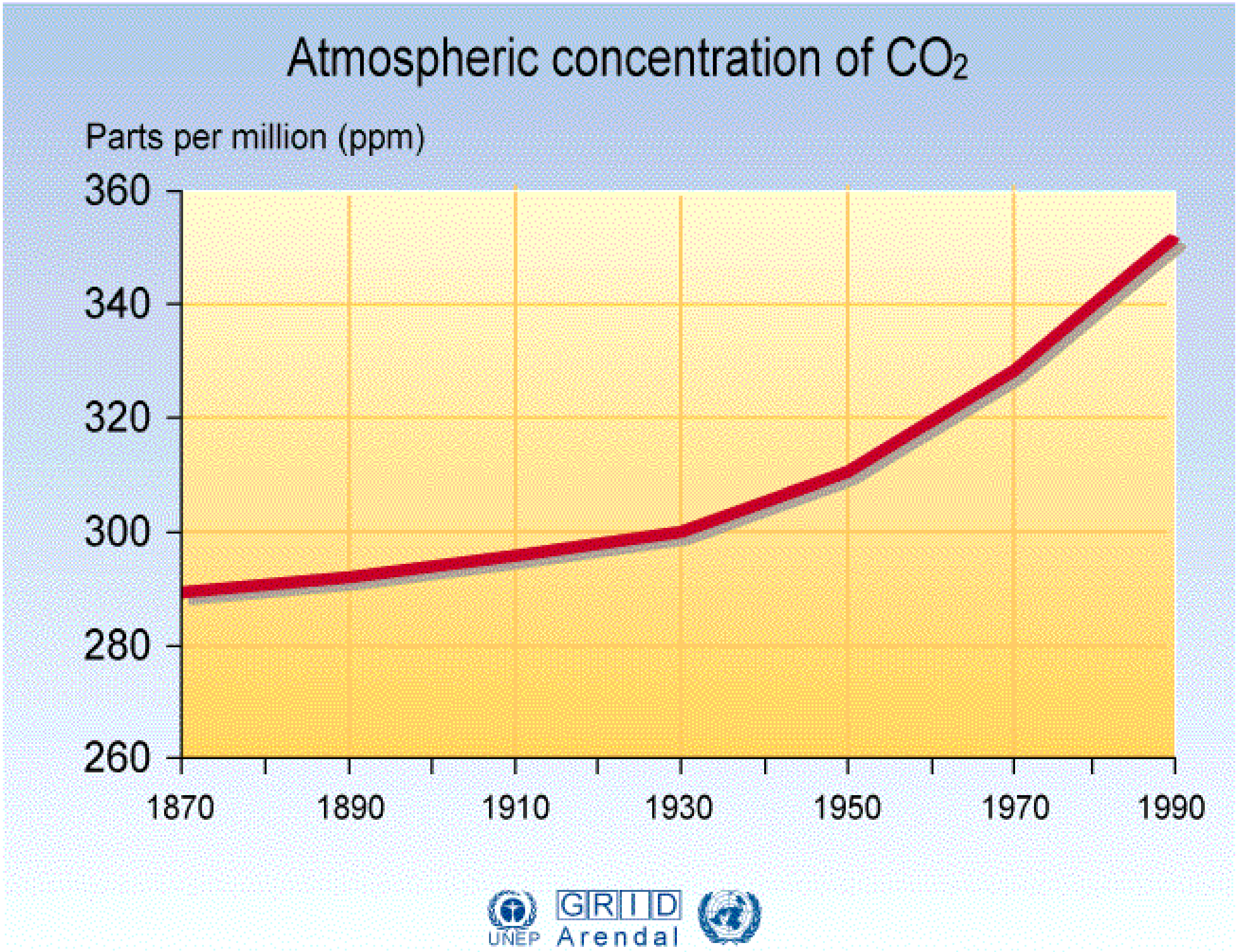
Heavy tropical storms can quickly wash the soil from the gentle slope. The soil can quickly silt up rivers and lake.

The climate

The climate of the area becomes drier with the loss of the vegetation which acts as a sponge to hold on to the moisture. Having less cloud cover means the increase in temperatures. Both the burning of the trees and their reduced number increases the concentration of carbon dioxide. The extra carbon dioxide is believed to contribute to global warming, which in turn is blamed for the rise in sea level.

Notes:

43. Atmospheric concentration of CO2



Description:

There is an important difference between the CO2 produced by nature and that emitted by human activities. While nature produces about 30 times more CO2 than human activity, the carbon emitted by nature is part of a finely balanced cycle. The emissions by humans are over and above the natural balance, and consequently result in a net increase in the concentrations of atmospheric CO2.

Since the industrial revolution about 850 billion tonnes of CO2 have been emitted due to combustion of fossil fuels, oil, coal and natural gas. An additional 370 billion tonnes have been added through changes in land use and deforestation.

Every year humans emit around 25 billion tonnes of CO2 into the atmosphere, which equals approximately 48,000 tonnes every minute.

Some estimates show that a reservoir of 37, 000 billion tonnes of CO_2 is buried in the ground as oil, coal and gas. The largest portion of this CO_2 reservoir is in coal, and the second largest is in natural gas. This is a chilling reminder of what is in store for the planet, should we decide to continue to burn fossil fuels without any restrictions. Experts estimate that emission of 2,500 billion tonnes of CO_2 - a mere 7% of the existing stock of fossil fuels - will result in a doubling of pre-industrial concentrations of CO_2.

Global warming and climate change result from the greenhouse effect. The consequences of global warming and climate change could well include:

- the eradication of entire ecosystems
- increased frequency and intensity of storms, hurricanes, floods and droughts
- melting glaciers and polar ice
- rising sea levels resulting in the permanent flooding of vast areas of heavily
- populated lands and the creation of hundreds of millions of environmental refugees
- increased frequency of forest fires
- spread of tropical diseases due to insect proliferation

Notes:

....

....

....

....

....

....

....

....

....

....

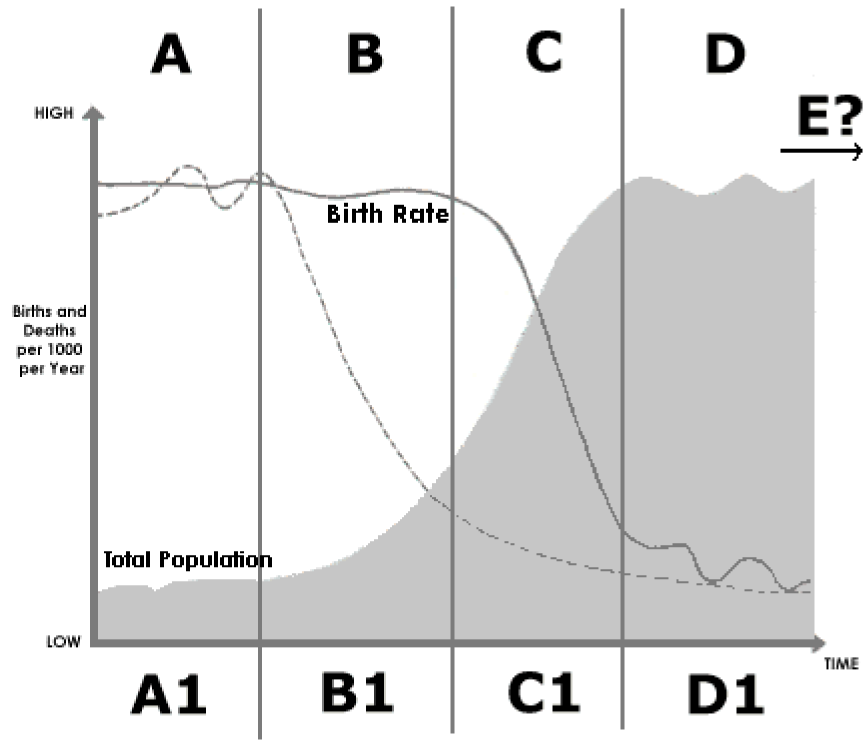
....

....

....

....

44. Demographic Transition Model



Description:

The demographic model as you may guess is a model, in other words it is a certain amount of data taken raw and transformed into something which people may understand. In other words it is an oversimplification of reality. The demographic transition model has taken data from industrialised countries such as England, France and many more in order to see what similarities there are between countries and deciding what stage other countries are going through at this moment in time. It is divided into 4 stages. The first being the most primitive and fourth as being the most developed even though there may be a fifth stage.

What are the main stages of the Demographic transition model?

Stage 1

Stage one of the demographic transition model is the most primitive of the stages where there is a high fluctuating birth and death rate. Because of this there is no great population growth. These countries or even tribes have very basic living standards such as those in the Amazon rainforest where they hardly have any education, medicaments or birth rates such that population is based on food supply, health of tribe members etc. Other factors involved are no family planning therefore many children or because of the faith of the people which may look at large families as a sign of verility etc.

Stage 2

In this stage of the demographic transition model there are a lot of births, however the death rate has gone down to about 20/1000 infants who die. This results in a rise in population due to the fact that more infants are surviving. Reasons for which more people may be surviving may be better health care, improved sanitation such as water etc, more transport and medical care as well as inventions relating to this. In other words this stage involves a slight modernisation in health care raising people's living standards as well as there life expectancy.

Stage 3

Stage three is the stage at which there is already a low death rate as well as a declining birth rate therefore leading to a slight increase in population. The reason for the fall in births may be due to family planning, better education, lower infant mortality rate, a more industrialised way of life and the want for more material possesions as well as women being able to go out to work. In other words these countries are in the final stages of becoming like the western countries such as the states and those in Europe.

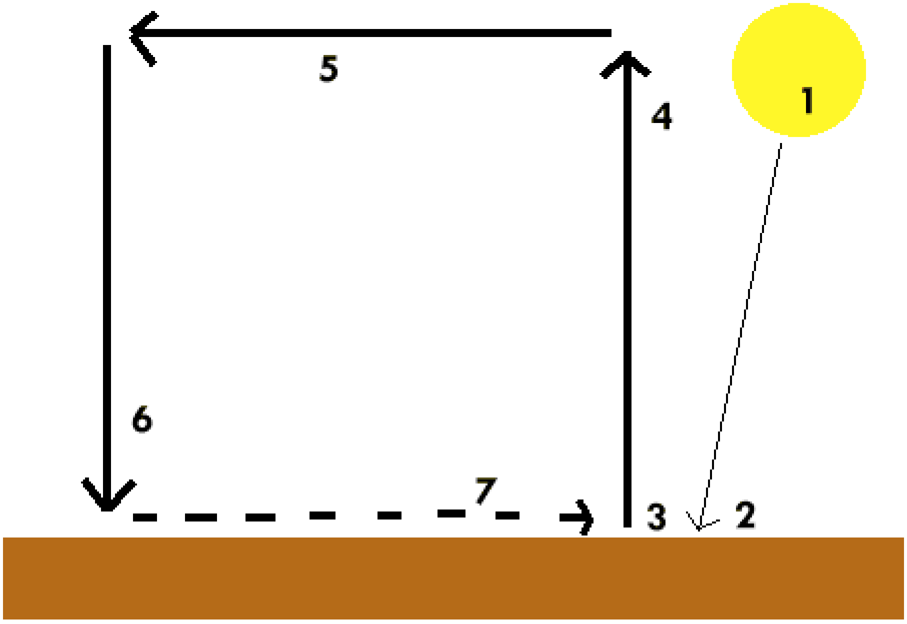
Stage 4

Stage four is the one at which Switzerland is. There is a stable population whithout much change because both the death and birth rate are low and in some cases there are more deaths than births therefore leading to a possible stage five.

Possibly a stage five?

A country such as Sweden is currently entering into the negative growth rate meaning that there are less births than deaths so that the country's population size is decreasing leading to problems which will be discussed later on this page. To quote "Geography: An Integrated Approach by David Waugh "Will there be a **stage 5** where birth rates fall below death rates to give a declining population?"

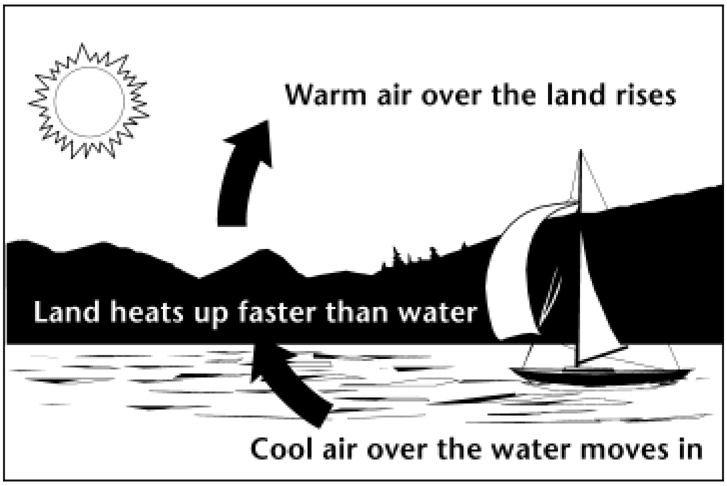
45. How is wind formed ?



Description:

What is wind?

Wind is air in motion. It is produced by the uneven heating of the earth's surface by the sun. Since the earth's surface is made of various land and water formations, it absorbs the sun's radiation unevenly. When the sun is shining during the day, the air over landmasses heats more quickly than the air over water. The warm air over the land expands and rises, and the heavier, cooler air over water moves in to take its place, creating local winds. At night, the winds are reversed because the air cools more rapidly over land than over water.



Similarly, the large atmospheric winds that circle the earth are created because the surface air near the equator is warmed more by the sun than the air over the North and South Poles. Wind is called a renewable energy source because wind will continually be produced as long as the sun shines on the earth. Today, wind energy is mainly used to generate electricity.

Beaufort wind scale

Force	Wind Knots	WMO Description	Estimating Wind Speed		
			Effects At Sea	**Effects Near Land**	**Effects On Land**
0	**0-1**	**Flat Calm**	**Sea like a mirror**	**Calm**	**Calm; smoke rises vertically**
1	**1-3**	**Light Air**	**Ripples with appearance of scales; no foam crests**	**Small sailboat just has steerage way**	**Smoke drift indicates wind direction; vanes do not move**
2	**4-6**	**Light Breeze**	**Small wavelets; crests of glassy appearance; not breaking**	**Wind fills the sails of small boats which then travel at about 1-2 knots**	**Wind felt on face; leaves rustle; vanes begin to move**
3	**7-10**	**Gentle Breeze**	**Large wavelets; crests begin to break, scattered whitecaps**	**Sailboats begin to heel and travel at about 3-4 knots**	**Leaves and small twigs in constant motion; light flags extended**
4	**11-16**	**Moderate Breeze**	**Small waves 1-4 ft., becoming longer; numerous whitecaps**	**Good working breeze, sailboats carry all sail with good heel**	**Dust, leaves, and loose paper raised up; small branches move.**
5	**17-21**	**Fresh Breeze**	**Moderate waves 4-8 ft taking longer form; many whitecaps; some spray**	**Sailboats shorten sail**	**Small trees in leaf begin to sway**
6	**22-27**	**Strong Breeze**	**Larger waves 8-13 ft forming white caps everywhere; more spray**	**Sailboats have double reefed mainsails**	**Larger branches of trees in motion; whistling heard in wires**
7	**28-33**	**Near Gale**	**Sea heaps up, waves 13-20 ft; white foam**	**Boats head for harbor;**	**Whole trees in motion;**

			from breaking waves begins to be blown in streaks	those at sea heave-to	resistance felt in walking against wind
8	34-40	Gale	Moderately high (13-20 ft) waves of greater length; edges of crests begin to break into spindrift; foam is blown in wellmarked streaks	Boats remain in harbor; those at sea heave-to	Whole trees in violent motion; difficulty walking against wind
9	41-47	Strong Gale	High waves (20 ft); sea begins to roll; dense streaks of foam; spray may reduce visibility	Slight structural damage occurs; slate blows from roofs	
10	48-55	Storm	Very high waves (20-30 ft) with overhanging crests;sea takes a white apperance as foam is blown in very dense streaks; rolling is heavy and visibility is reduced		Seldom experienced on land; trees broken or uprooted; considerable structural damage occurs
11	56-63	Violent Storm	Exceptionally high (30-45 ft) waves; sea covered with white foam patches; visibility still more reduced		
12	64 - up	Hurricane	Air filled with foam; waves over 45 ft; sea completely white with driving spray; visibility greatly reduced		

Notes:

……

……

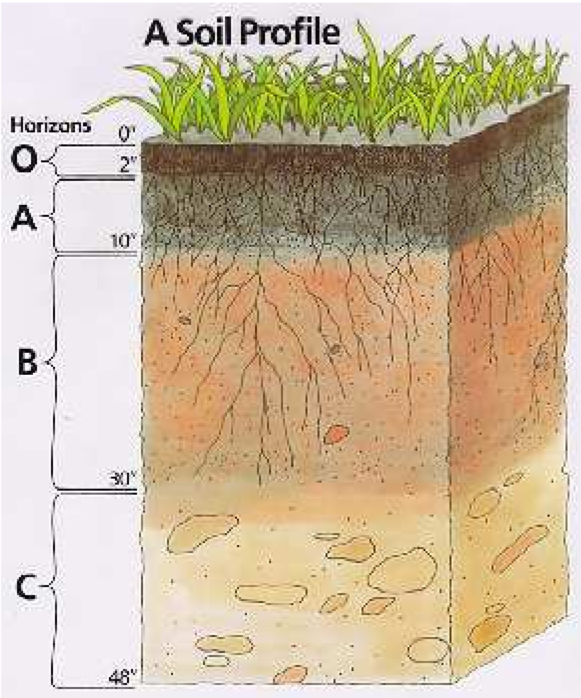
……

……

46. Soil profile

What is a soil profile?

If you took a chunk of soil from the ground, say about a foot or two deep, you will see a change in the colors and texture as you go deeper into the ground. You might be able to see some of the same things shown in the soil profile below. Most soil has about four layers.



How is soil formed ?

Soil is formed in several ways. The break down, or weathering of rocks, is one way soil is formed. Water, wind, and ice also help to create soil. Earth materials are carried by water, wind, and ice and are eventually dropped in places where they settle and mix with other materials to become soil. But the key ingredient to the making of soil is the living and once-living things that are found in it. These living and dead organisms are called organic matter. They turn the sand, silt, and rock pieces into a mixture that is good for more life to live and grow.

What is in soil?

Soil is a mixture of four main ingredients: weathered rock, organic matter, air, and water. The weathered rock can be in the form of sand, silt, clay, pebbles, or other size rocks. Organic matter can be anything from old leaves, dead animals and plants, or tiny living things. The last two ingredients in soil are from the nonliving world. These two ingredients are air and water. Without air and water, the tiny organisms found in soil cannot live, grow, and help dead matter to decay.

What are the four layers of soil like?

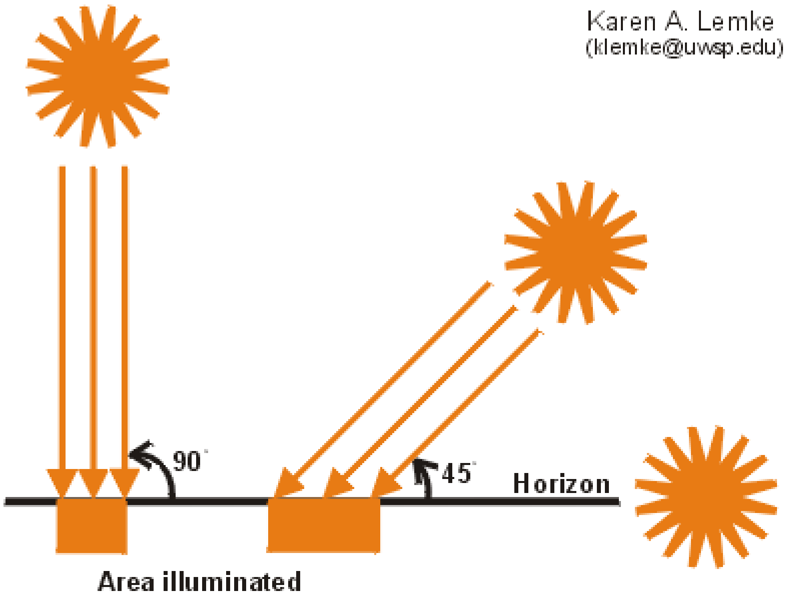
The top layer is called the organic layer. This layer is about an inch thick and takes from 100 to 600 years to form. Within this layer, living things carry on with their life activities. Also in this layer are millions of dead plant and animal organisms that are slowly decomposing, or rotting, away. As these once-living things decay, the organic layer becomes rich in nutrients. If you dig more than an inch or two deep, you might be past this layer already!

Section A in the diagram above is called the upper soil layer. This is where you will find many plant roots, different types of fungus, and other very tiny living things. This soil is dark in color because there is are so many chemical reactions taking place as living things grow and die. A great deal of bacteria is found in this layer. The bacteria help make chemical reactions happen so that materials of the earth can be recycled. This layer is usually about a foot deep.

Section B in the diagram above is the middle soil layer. It has less living and once-living things and less of the darker topsoil. The soil here has less air, too. Because of these characteristics, plants do not grow well here. You will find fewer roots and fewer signs of life. At about two to three feet deep, you are digging into the subsoil. Often, you might find signs of human activity in the upper soil layer and the subsoil. A broken piece of pottery, or an arrowhead may have been buried this deeply.

The last layer in the diagram, **section C**, is lowest layer. In this layer you will find that the soil may have an orangish or yellowish color. It may be more sandy or have more gray clay. In this layer you will see that there are many pebbles and rocks. This layer has the least amount of living and once-living things. If you are digging a hole and you get more than two or three feet deep, your shovel may begin to hit many rocks. If this happens, then you are probably in the lowest soil layer. One important thing to know, though, is that this layer might still have a lot of water. It depends on how much water is in the environment from where the soil sample was taken.

48. Solar radiation



Description:

Yearly changes in the position of the Earth's axis cause the location of the sun to wander 47° across our skies. Changes in the locatio n of the sun have a direct effect on the intensity of solar radiation. The intensity of solar radiation is largely a function of the angle of incidence, the angle at which the sun's rays strike the Earth's surface. If the sun is positioned directly overhead or 90° f rom the horizon, the incoming insolation strikes the surface of the Earth at right angles and is most intense. If the sun is 45° above the horizon, the incoming insolati on strikes the Earth's surface at an angle. This causes the rays to be spread out over a larger surface area reducing the intensity of the radiation. **Figure 6i-1** models the effect of changing the angle of incidence from 90 to 45°. As illustrated, the lower sun angle (45°) causes the radiation to be received over a much larger surface area. This surface area is approximately 40 % greater than the area covered by an angle of 90°. The lower angle also reduces the intensity of the incoming rays by 30 %. (See the diagram above)

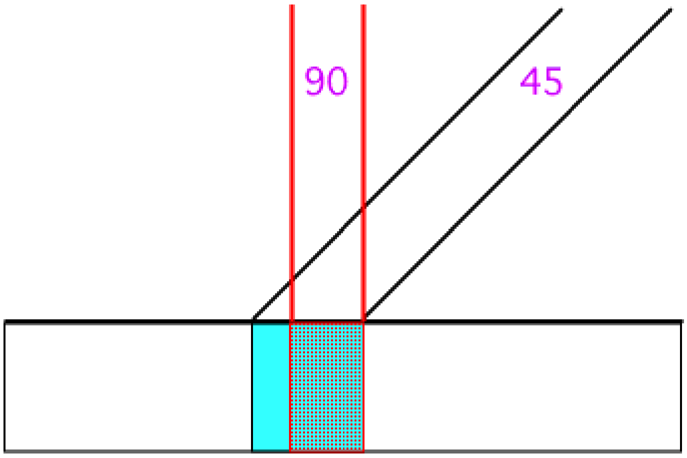
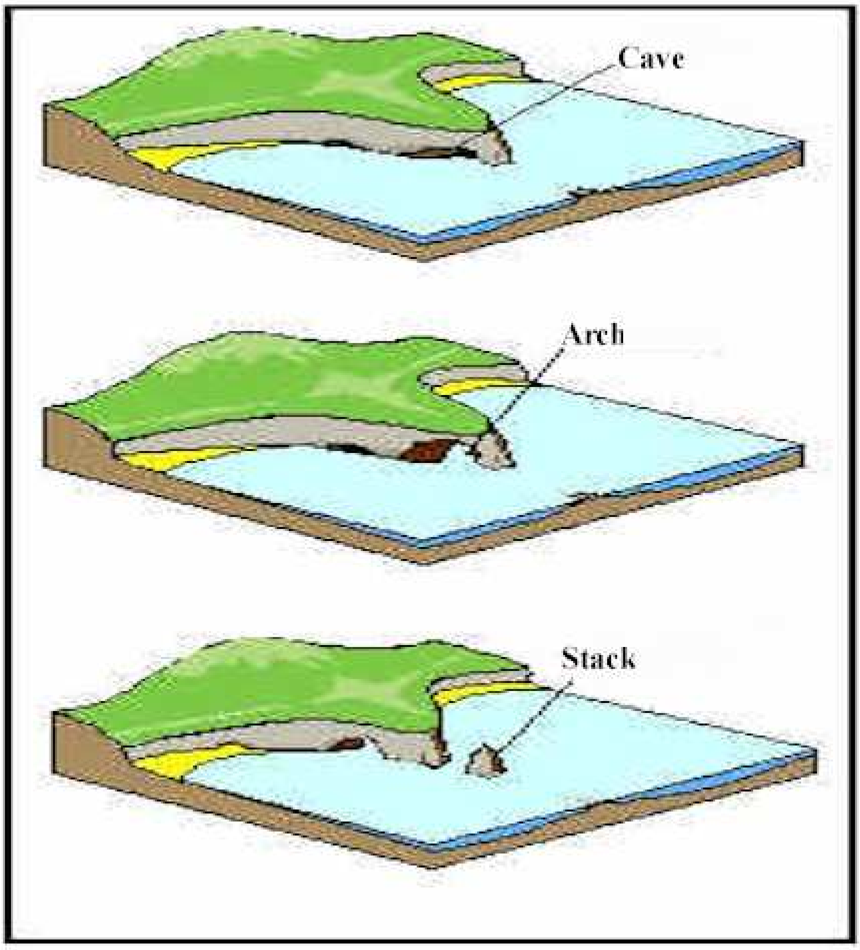


Figure 6i-1 : Effect of angle on the area

Notes:

....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....

49. Coastal landforms



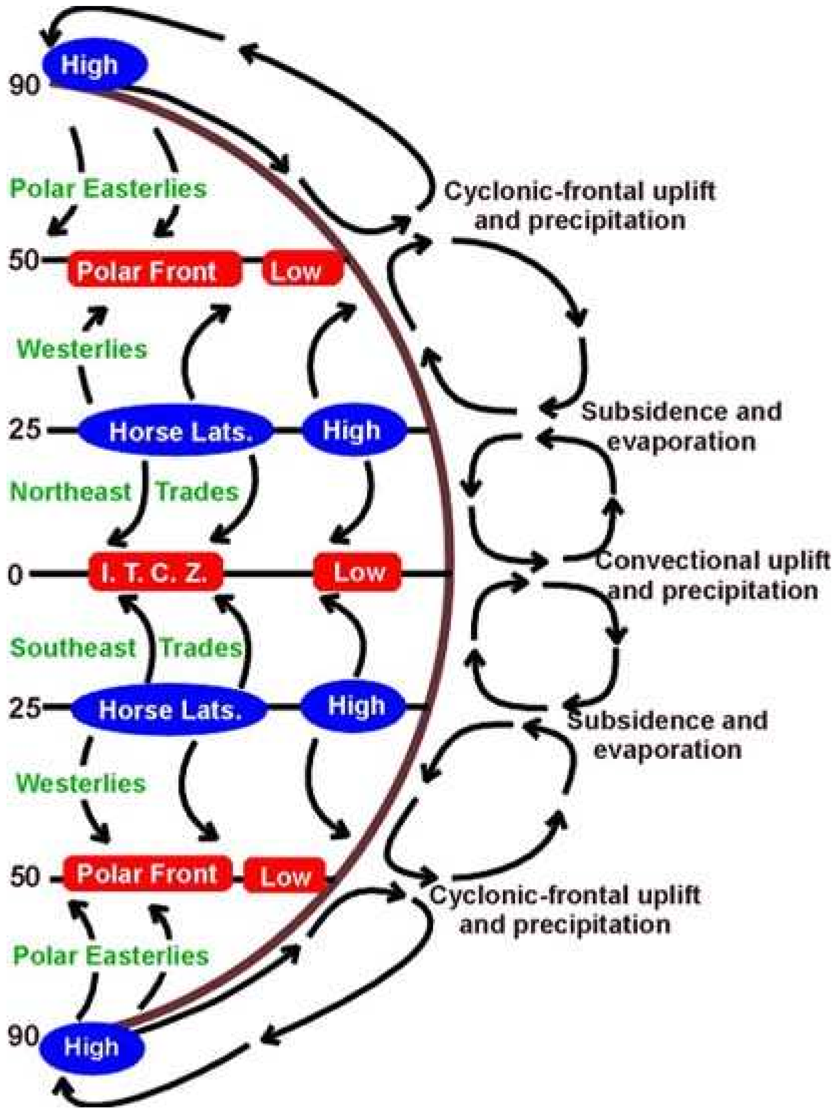
Description:

Two processes are responsible for formation of coastal landforms. The first process is erosion, the wearing away of the earth's surface by the physical action of water and wind. The second process is deposition, where eroded material transported and then deposited by wave action to produce features such as sand bars, and spits, mud flats, beaches, and eventually dunes.

Arch: when caves, which have developed on either side of a headland join together they form a natural arch.

Stack: when a natural arch collapses, the remaining upright sections form stacks, isolated rocks sticking up out of the sea.

50. Global air circulation



Description:

General Circulation

The worldwide system of winds, which transports warm air from the equator where solar heating is greatest towards the higher latitudes, is called the general circulation of the atmosphere, and it gives rise to the Earth's climate zones.

The general circulation of air is broken up into a number of cells, the most common of which is called the Hadley cell. Sunlight is strongest nearer the equator. Air heated there rises and spreads out north and south. After cooling the air sinks back to the Earth's surface within the subtropical climate zone between latitudes 25° and 40°. This cool descending air stabilises the atmosphere, preventing much cloud formation and rainfall. Consequently, many of the world's desert climates can be found in the subtropical climate zone. Surface air from subtropical regions returns towards the equator to replace the rising air, so completing the cycle of air circulation within the Hadley cell.

Although the physical reality of Hadley Cells has been questioned, they provide an excellent means for describing the way in which heat is transported across the Earth by the movement of air. Other circulation cells exist in the mid-latitudes and polar regions. The general circulation serves to transport heat energy from warm equatorial regions to colder temperate and polar regions. Without such latitudinal redistribution of heat, the equator would be much hotter than it is whilst the poles would be much colder.

Without the Earth's rotation, air would flow north and south directly across the temperature difference between low and high latitudes. The effect of the Coriolis force as a consequence of the Earth's rotation however, is to cause winds to swing to their right in the Northern Hemisphere, and to their left in the Southern Hemisphere. Thus the movement of air towards the equator swings to form the northeast and southeast trade winds of tropical regions. Air flowing towards the poles forms the westerlies associated with the belt of cyclonic low pressure systems at about 50 to 60° north and south. In general, where air is found to descend, high pressure develops, for example at the subtropical latitudes and again near the poles. Where air is rising, atmospheric pressure is low, as at the equator and in the mid-latitudes where storms or frontal systems develop.

Notes:

....

....

....

....

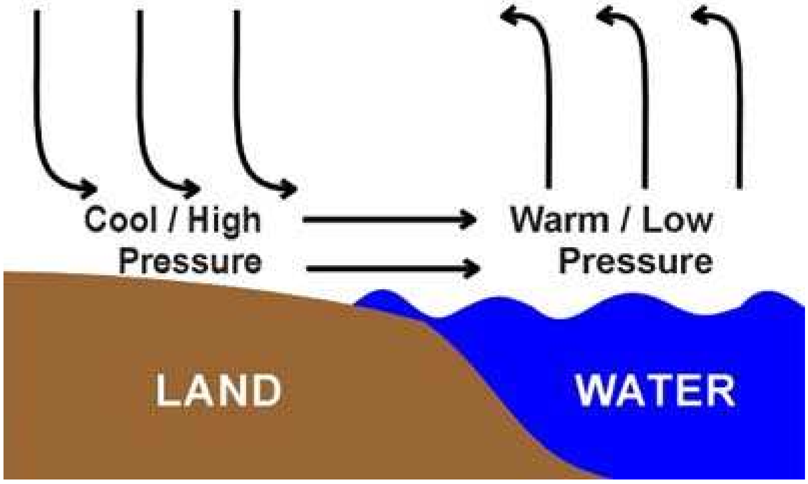
....

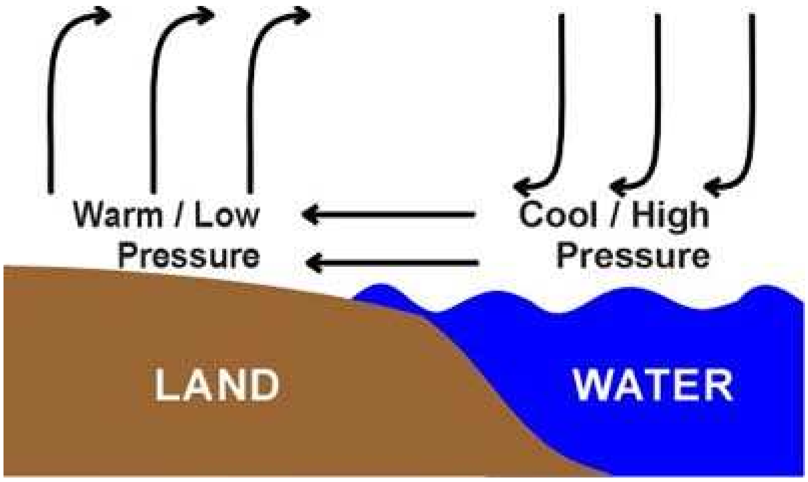
....

....

....

51. Land and sea breeze





<u>Description:</u>

Sea Breeze

A sea breeze and its nighttime counterpart, a land breeze, occur where the land meets the water. They exist because land and water absorb heat at different rates. Land heats up and cools down more quickly than water. During the day, solar radiation warms the air over land by conduction. The heated air becomes less dense and creates an imbalance of both temperature and pressure between the air over the land and the air over the water. You might suspect that something will happen to relieve this imbalance, and you're right. Recall that air moves from areas of high pressure to areas of low pressure, and that cooler air tends to displace warmer air. The cool, dense air over the water moves inland, forcing up the warm, less-dense air over land. A convection current results. This is a sea breeze.

Land Breeze

At night, the convection current reverses. Air over land cools down more quickly than air over water. The cooler, denser air moves toward the sea, forcing the air over the water to rise. This is a land breeze.

During a land breeze, the temperature difference between the air over the land and the air over the water is relatively small. During a sea breeze, however, the temperature of the air along the coast might be as much as 20℃ higher than the temperature of the air over the water. The extreme temperature gradients that accompany sea breezes often help spark seabreeze thunderstorms. As the leading edge of the cool sea breeze moves inland, it forces the warm air to rise quickly. This can produce the necessary updrafts that transform a cumulus cloud into a thunderous cumulonimbus cloud.

Notes:

……

……

……

……

……

……

……

……

……

……

……

……

……

……

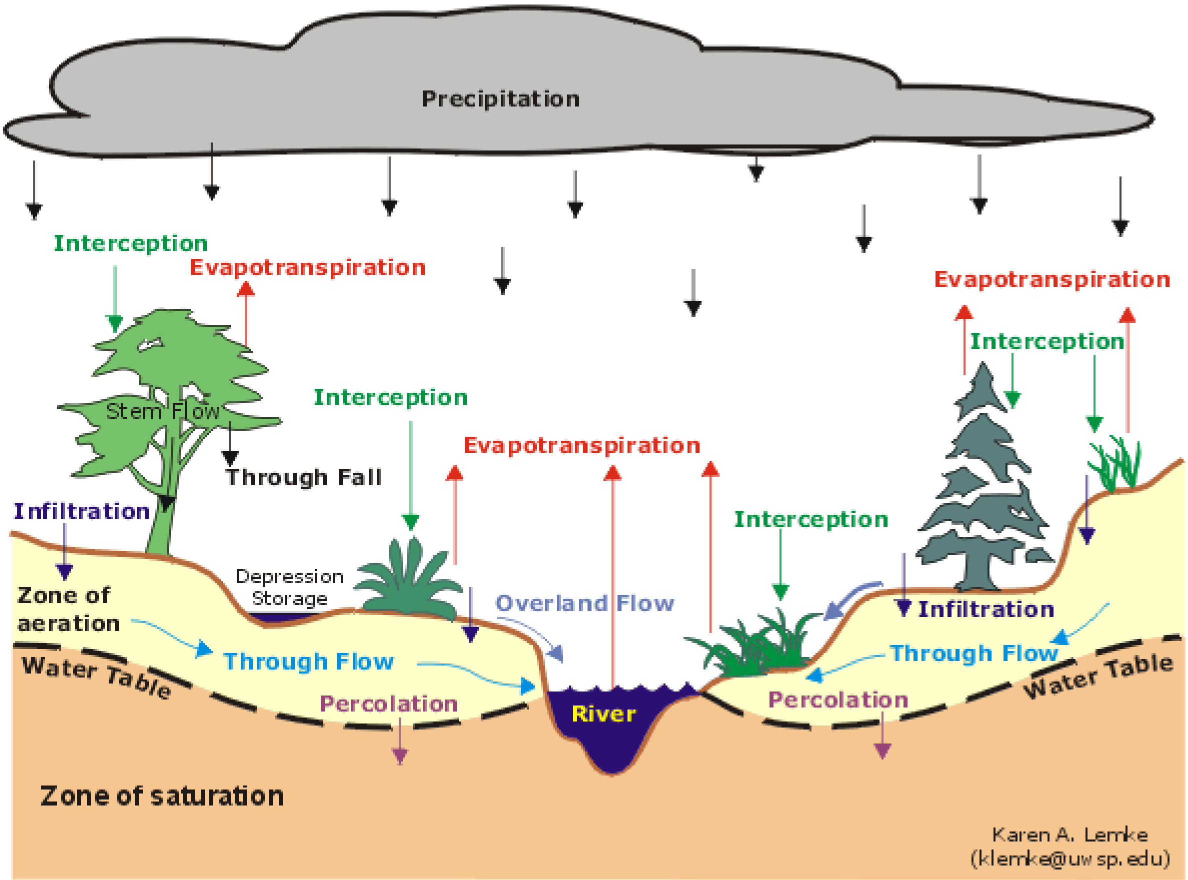
……

……

……

……

52. Hydrologic cycle



Description:

Water is the source of all life on earth. The distribution of water, however, is quite varied; many locations have plenty of it while others have very little. Water exists on earth as a solid (ice), liquid or gas (water vapor). Oceans, rivers, clouds, and rain, all of which contain water, are in a frequent state of change (surface water evaporates, cloud water precipitates, rainfall infiltrates the ground, etc.). However, the total amount of the earth's water does not change. The circulation and conservation of earth's water is called the "hydrologic cycle".

Accumulation: the process in which water pools in large bodies （like oceans, seas and lakes）

Condensation: the process in which water vapor in the air turns into liquid water. Condensing water forms clouds in the sky.

Evaporation: the process in which liquid water becomes water wapor. Water vaporizes from the surface of oceans and lakes, from the surface of the land, and melts in snow fields.

Precipitation: the process in which water (in the form of rain, snow, sleet or hail) falls from the clouds in the sky.

Subsurface runoff: rain, snow melt or other awter that flows in underground streams, drains, or sewers.

Surface runoff: rain, snow melt, or other water that flows in surface streams, rivers, or canals.

Transpiration: the process in which some water within plants evaporates into the atmosphere. Water is first absorbed by plant's roots, then later exists by evaporating through pores in plant.

Notes:

....

....

....

....

....

....

....

....

....

....

....

....

....

....

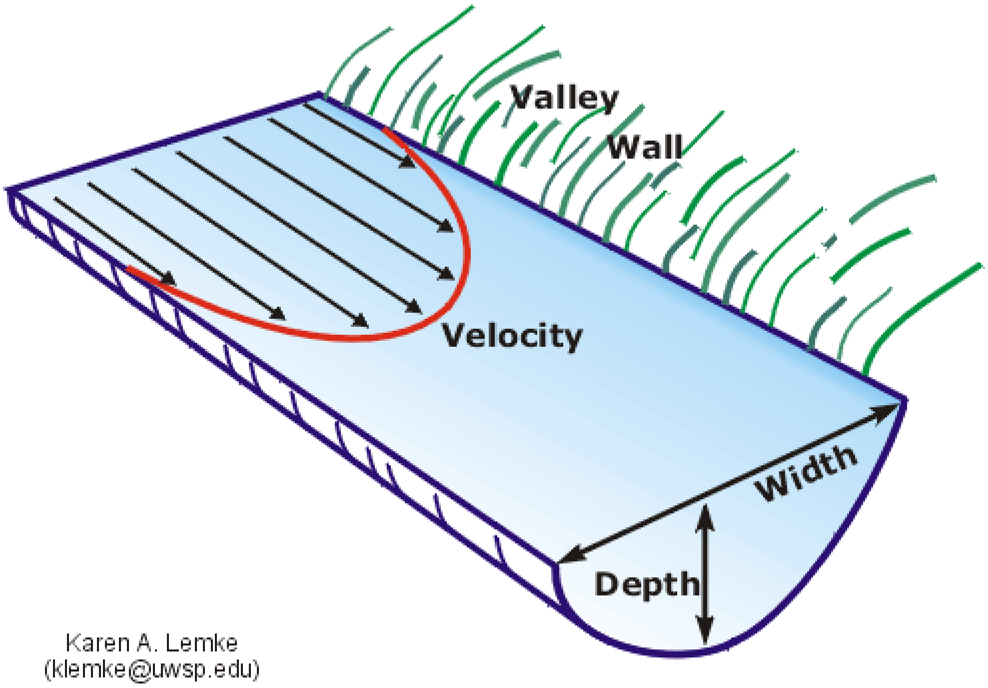
....

....

....

....

53. River profile



Description:

A river, which is a body of flowing water in a natural channel, is a part of the water or hydrological circle.

River energy
The energy of a river is dependent on two factors: velocity and volume of the river. A river that has a high velocity and high volume has a high energy level.

River velocity
Velocity of a river refers to the speed of the flow of river water and is influenced by three factors: gradient of the river, roughness of the channel, and shape of the channel.

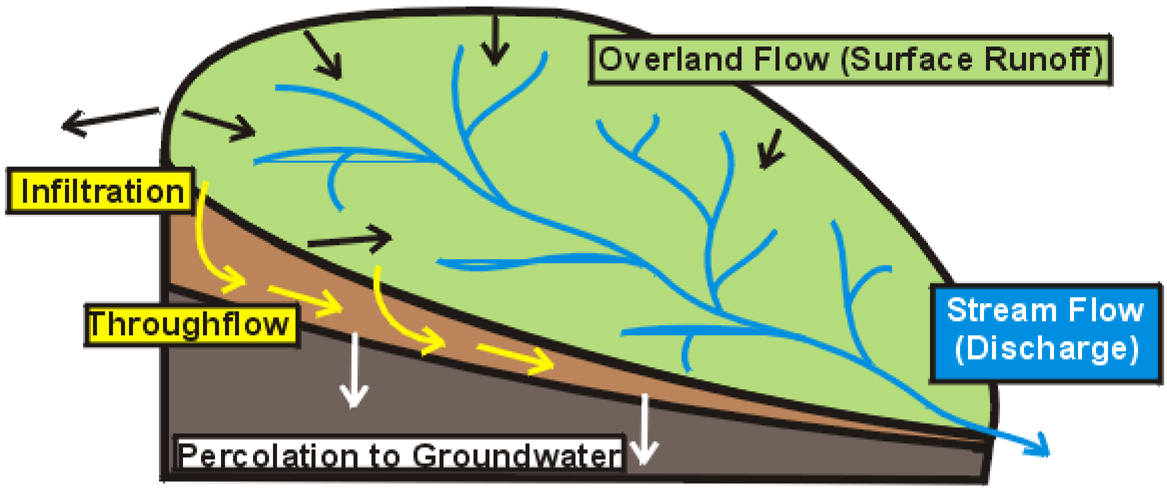
Volume of river
The volume of the river refers to the amount of water it carries and it is dependent on a few factors: size of drainage basin, prescence of vegetation, permeability of rocks, railfall, temperature.

Notes:

....

....

54. Drainage basin



Description:

A catchment area or basin is land which is bounded by natural features such as hills or mountains, from which all runoff water flows to a low point - like water in a bathtub flowing to the plug hole, or water that falls on a roof flowing to a downpipe. In the case of a natural catchment area, the low point could be a dam, a location on a river, or the mouth of a river where it enters the ocean.

Catchment areas vary in size and make-up. Large catchment areas such as those drained by the Fitzroy and Burdekin Rivers are bordered by mountain ranges and include major drainage networks of creeks and rivers. Large catchment areas are made up of hundreds of smaller 'sub-catchment areas'. These may be bordered by low hills and ridges and drained by only a small creek or gully.

Notes:

....

....

....

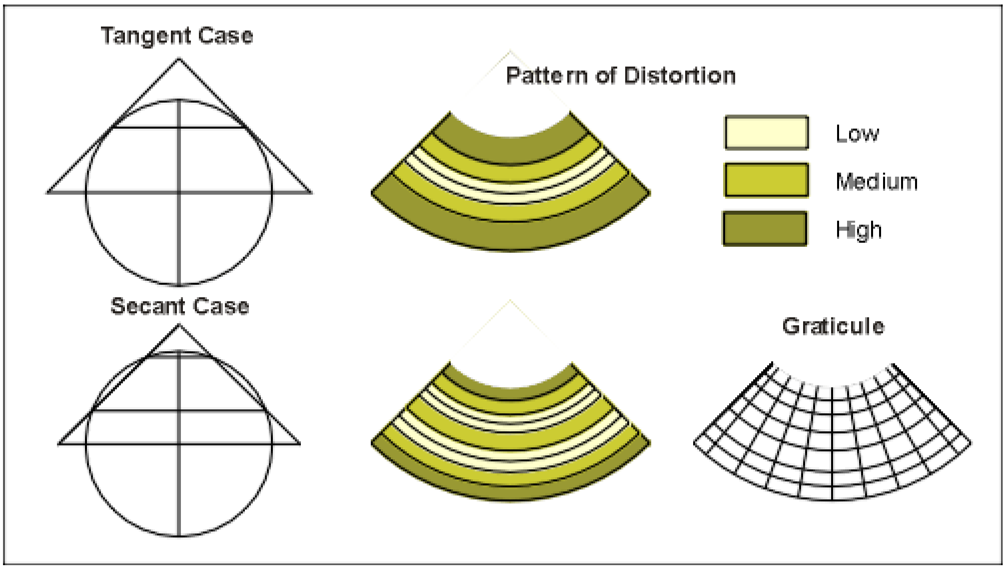
....

....

....

55. Map projections

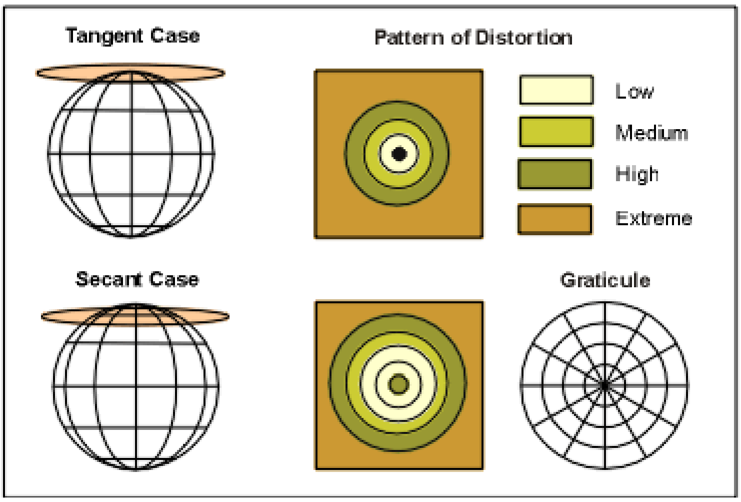
normal conical projection



Description:

A conic projection can be made as if a cone were placed on a globe with its point directly above the North Pole. This type of map projection is useful for mapping regions in the mid-latitudes.

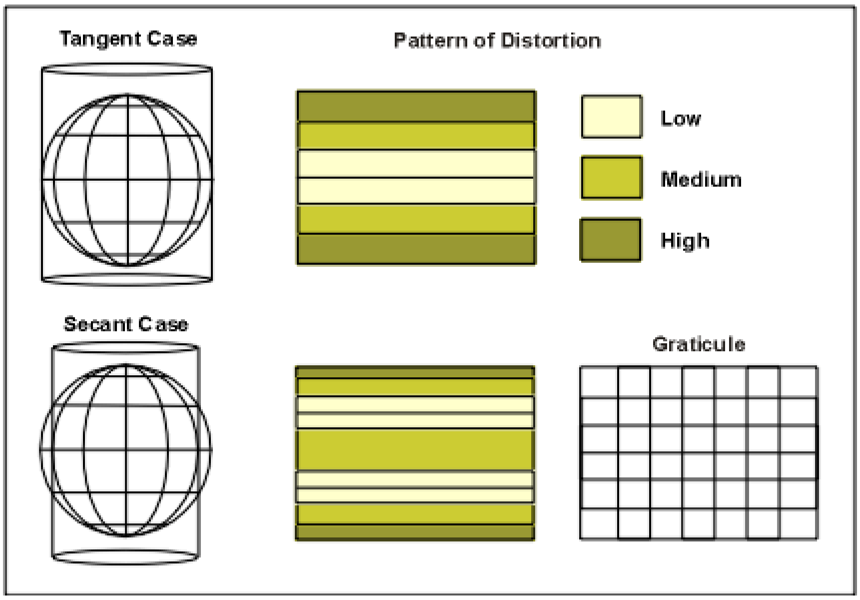
normal azimuthal projection



Description:

An azimuthal projection can be made by projecting the globe onto a plane surface that touches the globe at one point, in this case at the North Pole.

normal cylindrical projection



Description:

The well-known Mercator map is based on the projection of the globe onto a cylinder. This type of projection greatly distorts the sizes of land masses in the high latitudes.

Notes:

....

....

....

....

....

....

....

....

....

....

....

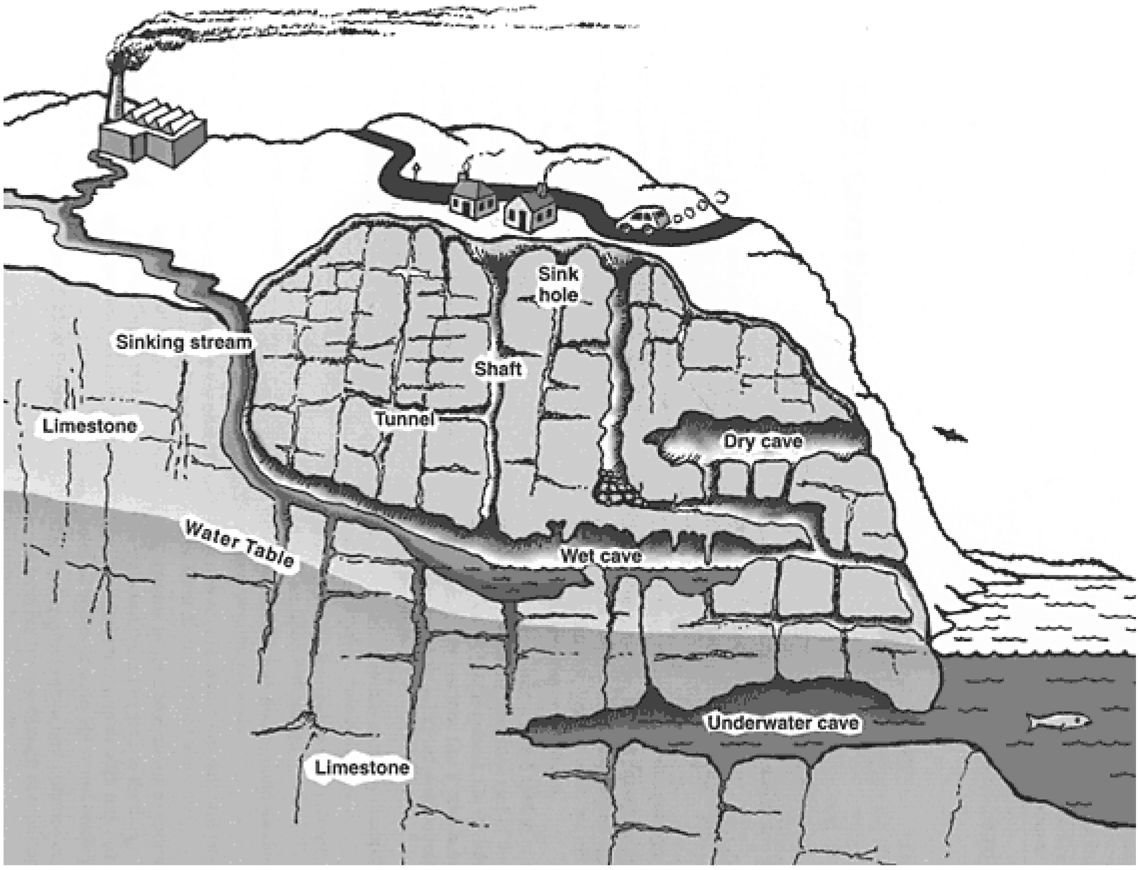
....

....

....

....

56. Limestone features



Description:

The word "karst" refers to a type of terrain, usually formed on carbonate rock (limestone and dolomite) where groundwater has solutionally- enlarged openings to form a subsurface drainage system. A mild carbonic acid produced from carbon dioxide in the atmosphere, particularly the soil atmosphere, is primarily responsible for the solvent power of groundwater on carbonate rocks. Over millions of years, as flow routes are enlarged, carbonate aquifers change from diffuse-flow aquifers with water moving as laminar flow through small openings, to conduit-flow aquifers with water moving primarily as turbulent flow through well-developed conduit systems to discharge points at springs. As the water table lowers below the level of surface streams, the streams begin to lose water to developing cave systems below. As more and more of the surface drainage is diverted underground, stream valleys virtually disappear and are replaced by closed basins called sinkholes. Sinkholes vary from small cylindrical pits to large conical or parabolic basins that collect and funnel runoff into karst aquifers. Groundwater flow in karst aquifers is significantly different from that of other aquifers because of the solutionally enlarged conduits. In porous media aquifers, groundwater moves very slowly as laminar flow, (usually only a few feet per year), but in karst aquifers, turbulently flowing underground streams have velocities approaching those of surface streams. The nature of the groundwater flow system causes karst areas to be extremely vulnerable to groundwater contamination. Other serious hydrogeologic problems include sinkhole flooding and sinkhole collapse.

Notes: