



VALLEY CLIMATES

GEOGRAPHY

GRADE 12

F. LAHER



MICROCLIMATE OF VALLEYS

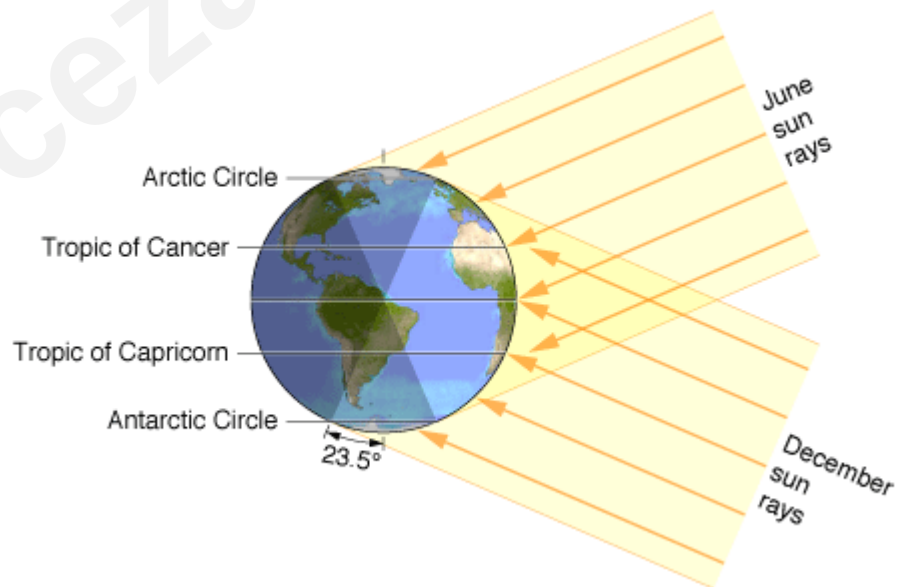
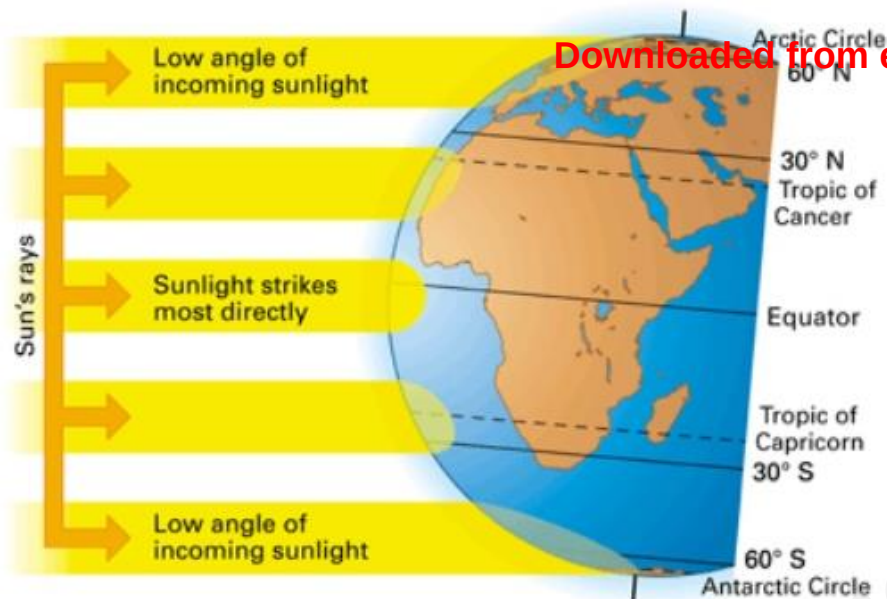
- Microclimate is small scale climate like that of a valley
- They are caused by localised variations in temperature, pressure and wind
- Forms part of tertiary air circulation

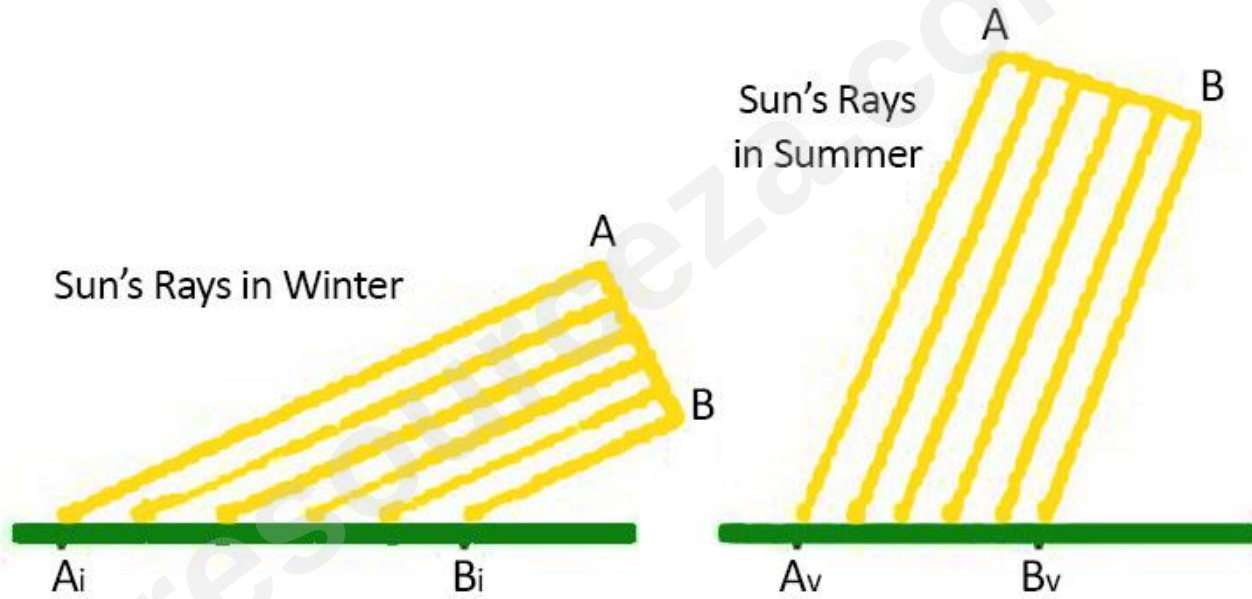


ASPECT

- Aspect or slope orientation is the angle at which the sun's rays strike the slope
- This impacts temperatures in different parts of a valley
- The sun's rays strike Earth differently during different times of the year due to Earth's rotation
 - A more direct angle in summer and an oblique angle in winter







ASPECT

- North facing slopes are warmer than south facing slopes in the SH
 - Angle of sun's rays strike the north facing slopes



ASPECT-SUMMER

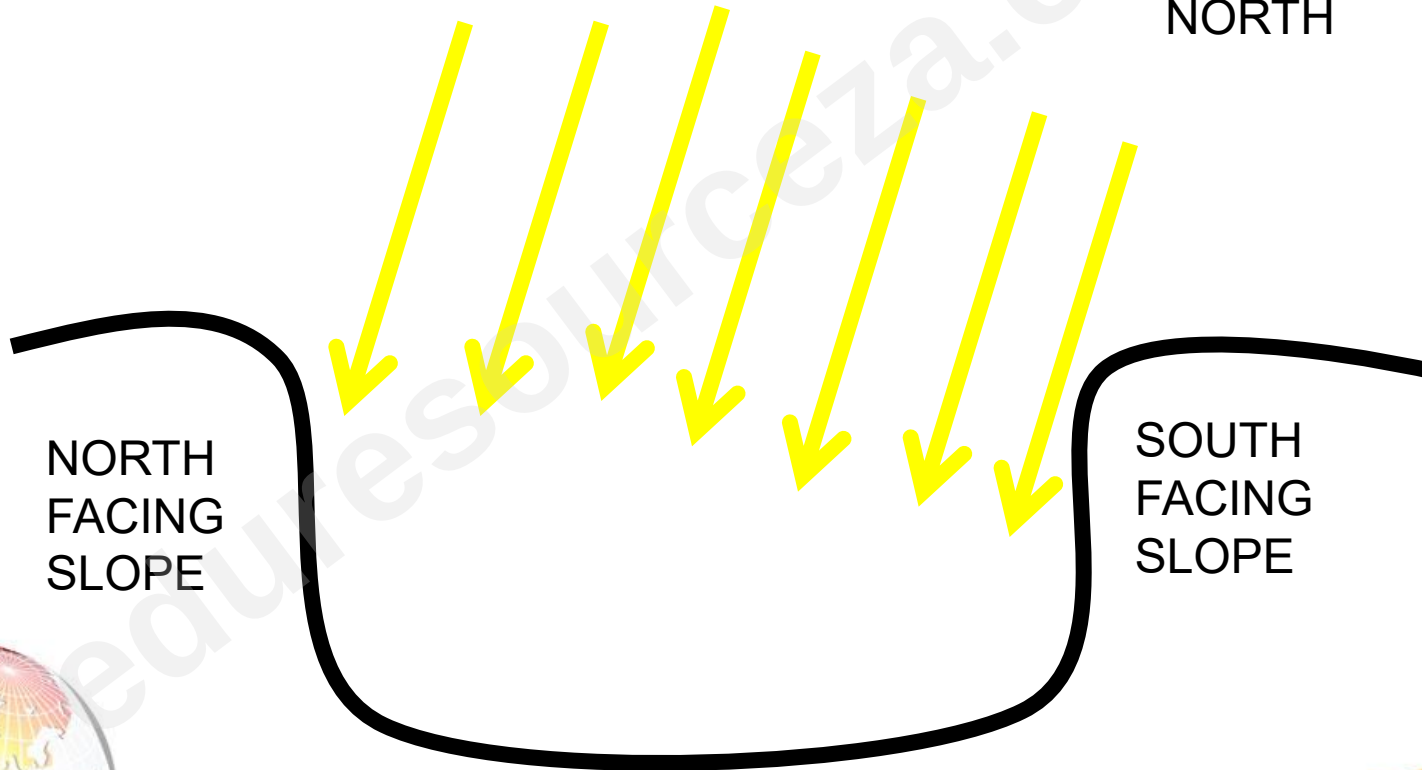
- The sun's rays strike a more direct angle on the valley floor
- North facing slopes are warmer than south facing slopes



ASPECT-SUMMER

SOUTH

NORTH



ASPECT- WINTER

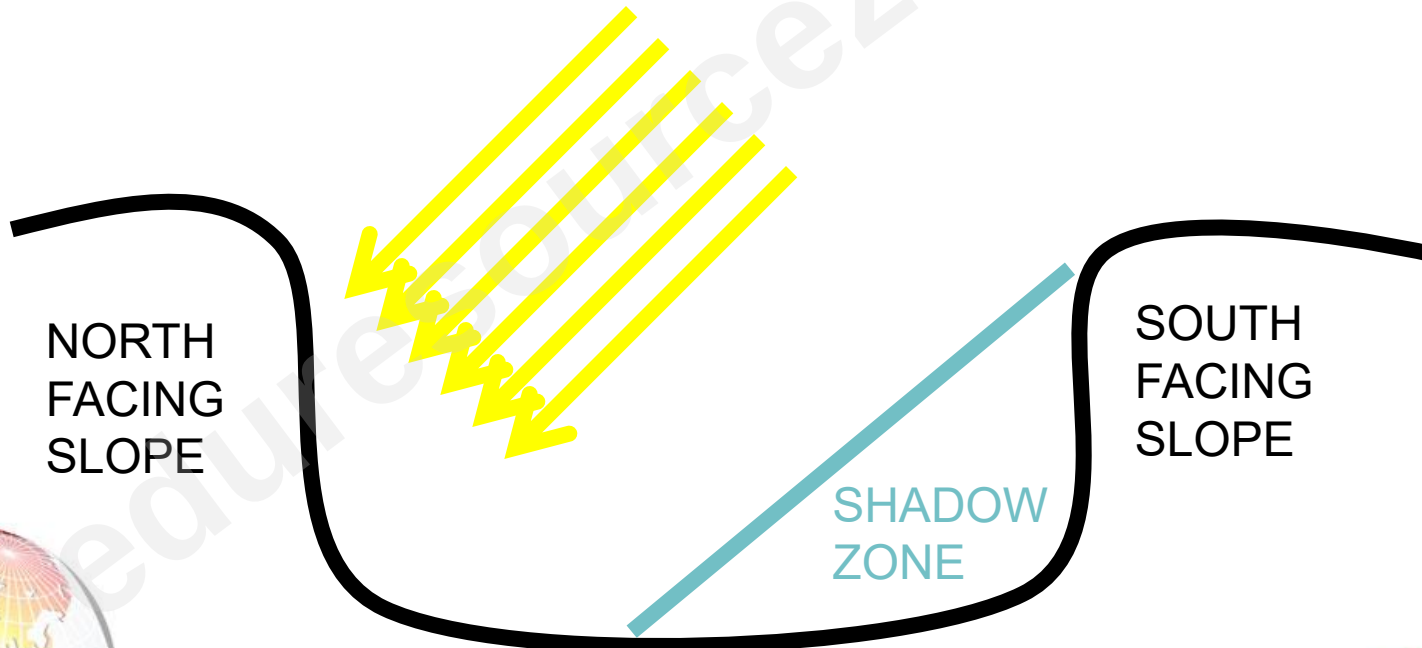
- The sun's rays strike the land at a low angle to the horizontal
- The sun's rays are coming from the North (equator)
- The north facing slope receives most sunlight
- The south facing slope does not receive much sunlight
-Shadow zone



ASPECT-WINTER

SOUTH

NORTH



VALLEY WINDS

- Winds blow from high pressures to low pressures
- Warm air can cause low pressure and cold air can cause high pressures
- These temperature changes causes different winds to blow at different times of the day



VALLEY WINDS

- Anabatic and Katabatic winds are winds that are caused by the heating and cooling of slopes:
 - Katabatic winds are downslope winds
 - Anabatic winds are upslope winds



ANABATIC WINDS

- Occur after noon
- The sun's rays warm the slopes during the day
- The warm light air above the slope rises up

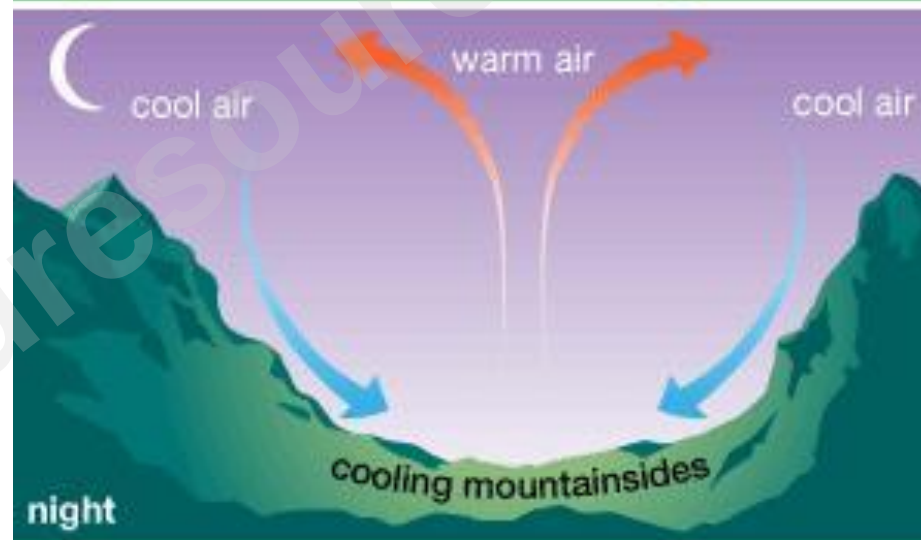
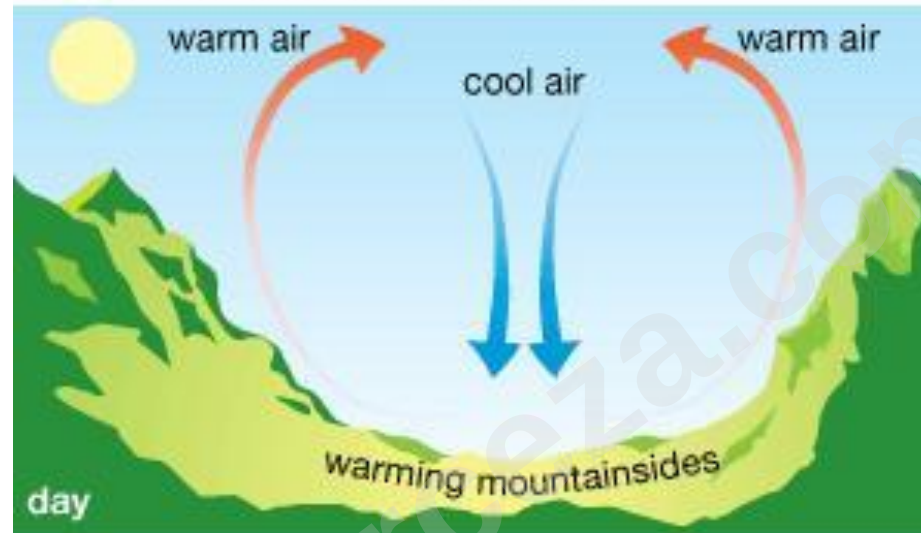


KATABATIC WINDS

- Occur after midnight especially on a cold clear calm night
- The mountain tops cool rapidly at night due to terrestrial radiation
- The air above the slope becomes cold and dense and sinks downslope
- The cold air collects at the valley bottom causing a temperature inversion
- Frost pockets can form on the valley floor



Valley and mountain breezes



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INVERSIONS AND FROST

- On a calm clear winters night the air on the sides of the valley cool down quicker and flows down the valley sides only to collect on the valley floor
- The warm air on the valley floor rises to form a thermal belt creating a temperature inversion
- Frost pockets can form on the valley floor if the air cools and dewpoint temperature is below freezing

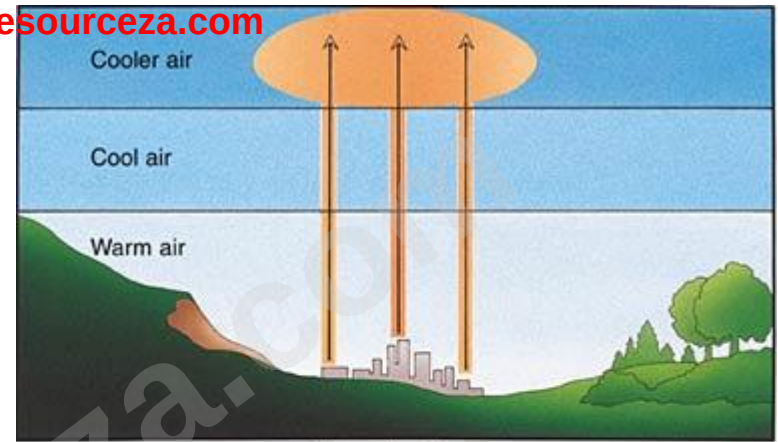
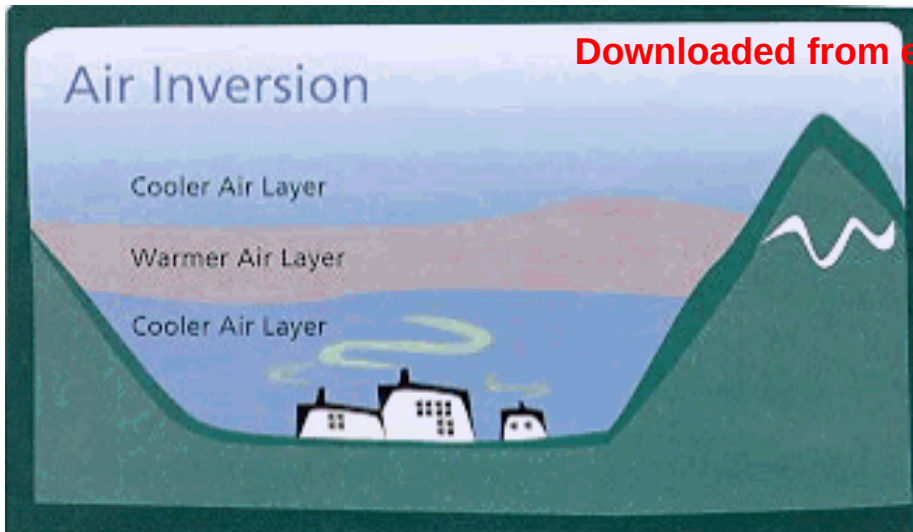


TEMPERATURE INVERSION

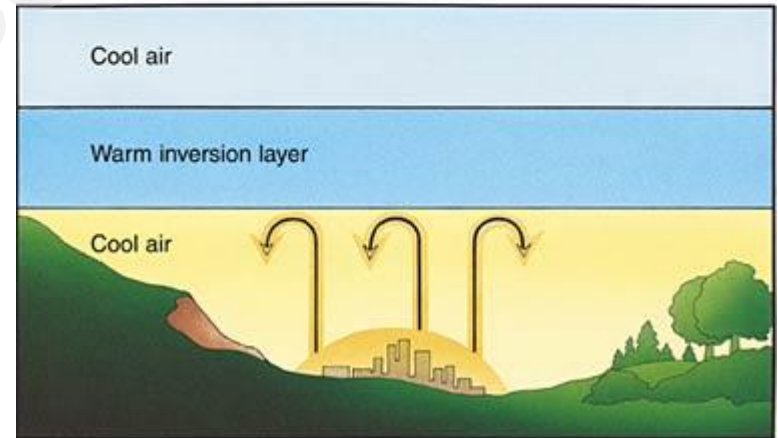
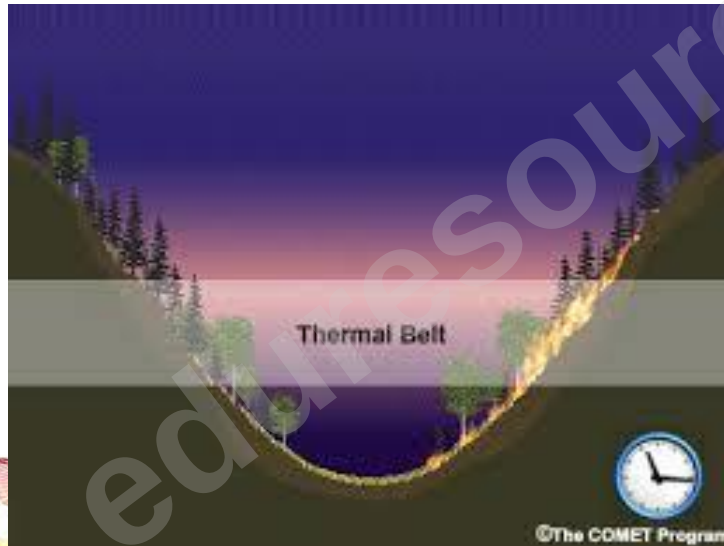
Warm, light air

Cold, heavy, stagnant air
traps pollutants near
the valley floor





Normal pattern



Thermal inversion



RADIATION FOG

- A fog caused by air cooling to dew point temperature as a result of terrestrial radiation
 - When cold air cools to dew point temperature which is above freezing water vapour condenses to form water droplets which are suspended in the air to form fog



VALLEYS AND HUMANS

- Vegetation and farming
 - Vegetation on North facing slopes is different from south facing slopes
 - Certain crops are best suited to specific slopes depending on their soil, water and sun requirements
 - Crops that cannot withstand frost should not be planted on the valley floor



VALLEYS AND HUMANS

- Human settlement
 - People tend to build houses on north facing slopes because it receives more sunshine
 - Cold air in the valley floor make it unpleasant to live there so people build in the thermal belt
 - Industries should not be built on a valley floor as pollution will be trapped below the inversion layer
 - Smog forms

