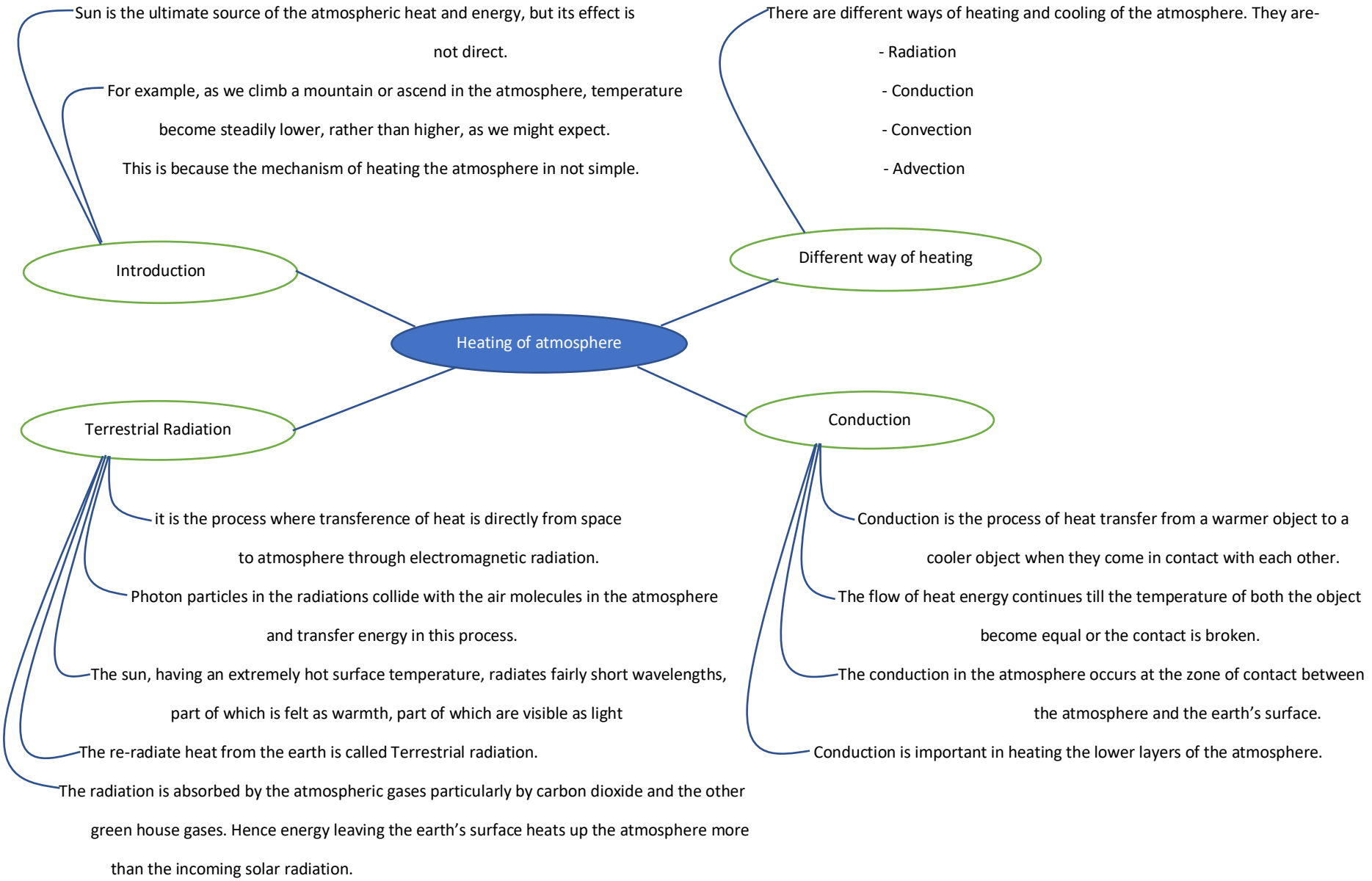
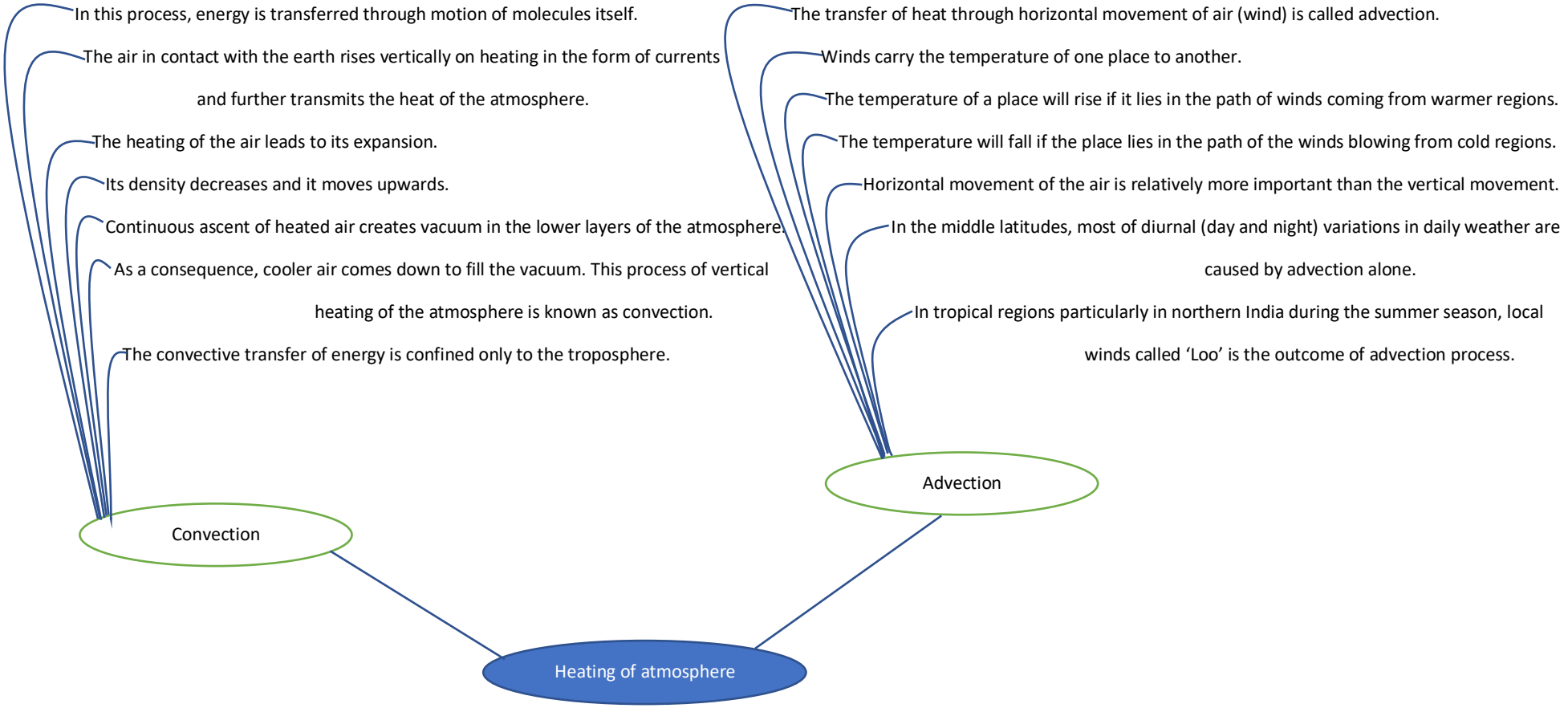

Heating of atmosphere
Introduction
Sun is the ultimate source of the atmospheric heat and energy, but its effect is not direct.
For example, as we climb a mountain or ascend in the atmosphere, temperature become steadily lower, rather than higher, as we might expect.
This is because the mechanism of heating the atmosphere in not simple.
Different way of heating
There are different ways of heating and cooling of the atmosphere. They are-
- Radiation
- Conduction
- Convection
- Advection
Terrestrial Radiation
it is the process where transference of heat is directly from space to atmosphere through electromagnetic radiation.
Photon particles in the radiations collide with the air molecules in the atmosphere and transfer energy in this process.
The sun, having an extremely hot surface temperature, radiates fairly short wavelengths, part of which is felt as warmth, part of which are visible as light
The re-radiate heat from the earth is called Terrestrial radiation.
The radiation is absorbed by the atmospheric gases particularly by carbon dioxide and the other green house gases. Hence energy leaving the earth's surface heats up the atmosphere more than the incoming solar radiation.
Conduction
Conduction is the process of heat transfer from a warmer object to a cooler object when they come in contact with each other.
The flow of heat energy continues till the temperature of both the object become equal or the contact is broken.
The conduction in the atmosphere occurs at the zone of contact between the atmosphere and the earth's surface.
Conduction is important in heating the lower layers of the atmosphere.


In this process, energy is transferred through motion of molecules itself.
The air in contact with the earth rises vertically on heating in the form of currents and further transmits the heat of the atmosphere.
The heating of the air leads to its expansion.
Its density decreases and it moves upwards.
Continuous ascent of heated air creates vacuum in the lower layers of the atmosphere.
As a consequence, cooler air comes down to fill the vacuum. This process of vertical heating of the atmosphere is known as convection.
The convective transfer of energy is confined only to the troposphere.
Convection
The transfer of heat through horizontal movement of air (wind) is called advection.
Winds carry the temperature of one place to another.
The temperature of a place will rise if it lies in the path of winds coming from warmer regions.
The temperature will fall if the place lies in the path of the winds blowing from cold regions.
Horizontal movement of the air is relatively more important than the vertical movement.
In the middle latitudes, most of diurnal (day and night) variations in daily weather are caused by advection alone.
In tropical regions particularly in northern India during the summer season, local winds called 'Loo' is the outcome of advection process.
Advection
Heating of atmosphere