LAKES

- A lake is a hollow depression/basin on the earth's surface in which water has accumulated
- The water in these basins comes from many sources such as rainfall, rivers, underground water and melting ice.

Factors that determine the permanence of a lake

1. Availability of water drained into the basin from the sources.
2. Nature of the underlying rocks – non-porous rocks limit water loss through seepage.
3. Rate of evaporation: - In areas experiencing high temperatures, much water is lost through evaporation and lakes may become seasonal.
4. Human activities such as diversion of water for irrigation influence a lake's permanence.

- Lakes may contain salts/saline/salty or fresh water. Fresh water lakes include Naivasha, Baringo, Victoria, etc. saline lakes include Magadi (Kenya) and Katwe (Uganda)

Reasons why some lakes are saline

1. Absence/lack of out-flowing rivers/outlets to drain out excess salts. This leads to accumulation of salts in the water in the lake
2. Some lakes lack enough fresh water rivers that drain into/emptying into the lakes or are fed by underground water that may contain high concentration of salt
3. Some lakes are located in arid areas with very high rate of evaporation which leads to increased concentration and accumulation of dissolved mineral salts in the lake
4. The bed of the lake may comprise of soluble rock with mineral salts which dissolve in the lake water
5. Surface run-off and rivers may dissolve a lot of salt from the rocks on which they flow. They eventually deposit this salt solution in the lakes into which they drain

Formation and classification of lakes

- Lakes are classified according to their mode of formation into
  1. Lakes formed due to tectonic movements
  2. Lakes formed as a result of volcanic activity
  3. Lakes formed by glaciation
  4. Lakes formed by deposition
  5. Lakes formed by erosion
  6. Human made lakes

1. <u>Lakes formed due to tectonic movements</u>

- These are Faulted(Rift Valley) lakes and lakes formed by downwarping

(a) Faulted/rift valley lakes: - during faulting and the subsequent formation of a rift valley, some parts of the valley are deeply faulted to form long narrow depressions/hollows. If water from direct rain, rivers/surface run offs or underground water accumulate into such depressions, a faulted or a rift valley lake is formed. Examples include lakes Turkana, Baringo, Bogoria, Nakuru, Elementaita, Naivasha and Magadi

(b) Lakes formed by crustal warping/downwarping: - internal land forming processes due to forces of compression and tension may cause some parts of the crust to warp upwards or downwards. Downwarping can result in the formation of a shallow depression that is eventually filled up with water from rivers or underground to form a lake. Examples include lakes Victoria, Kyoga, Koki & Wamala (All in Uganda), Bangweulu (Zambia), Mweru (Zambia – DRC border)

2. <u>Lakes formed as a result of volcanic activity</u>

- Include crater/caldera lakes and lava dammed lakes

(a) Crater/caldera lakes: - form when water accumulates into a crater/caldera of a volcanic summit/volcano. Such lakes are always saline as they lack outlets. Examples include lakes Paradise (Mt. Marsabit), Simbi (Rachuonyo), Central Island Crater lake (Central Island Volcano), Nkunga (Meru), Shala (Ethiopia) and Nyos (Cameroun)

(b) Lava dammed lakes: - These form when flowing lava block sections of river valleys creating areas where water can accumulate. Lava from an erupting volcano may flow downhill into a river valley. As the lava flows, it may cool and solidify and block the river; forming a dam on its course. Water accumulates behind this dam/barrier and eventually forms a lake.

Examples include lakes Mutanda and Kayumba (Uganda), Ruhondo, Bulera and Kivu in Rwanda, Tana (Ethiopia) and Itasy (Madagascar)

3. <u>Lakes formed by glaciation</u>

- These are cirque/corrie lakes, moraine dammed, ribbon and kettle lakes

(a) Cirque/corrie lakes: - these are formed from glacial erosion. When a glacier erodes, it forms a hollow/depression called a cirque/corrie. When rain or melt water accumulate in the cirque, it forms a lake known as a tarn/corrie/cirque lake. Examples on Mt. Kenya include Hidden, Teleki and Nanyuki tarns

(b) Moraine dammed lakes: - moraine refers to the materials/debris carried down by glacial erosion. When carried downhill and finally deposited by a glacier, it may form a dam in front of the eroded hollow. When ice within the glacier melts, the water accumulates in this blocked/dammed hollow to form a lake. Examples are lakes Ellice, Tydall and Alice on Mt. Kenya

(c) Ribbon lakes: - are found in hollows that have been removed by glacial erosion. They are formed due to depression caused by load of glacier. Examples include Lake Sacred (Mt. Kenya – Meru)

(d) Kettle lakes: - these are circular hollows/depression filled with water in glaciated areas due to previous presence of large masses of detached ice that have progressively melted. Example is Lake Mahoma in Ruwenzori mountains – Uganda

4. <u>Lakes formed by deposition</u>

- Include ox bow lakes and lagoons

(a) Ox bow Lakes: - these develop at the mature/old stage of a river. The river develops pronounced meanders and the deposited materials may block the course of the old river channel to form an ox bow lake. Examples include lakes Shakababo, Bilisa and Gambi on Lower Tana, Kanyaboli in R. Yala

(b) **<u>Lagoon</u>**: - formed by ocean waves that result into the formation of sand bars. These materials carried in a wave may enclose lagoons that are periodically submerged by water from sea or lake. Example is Lake Sare on the mouth of R. Yala

5. <u>Lakes formed by solution</u>

- These are found in areas characterized by limestone/chalk rocks. The earth's crust is dissolved leading to formation of sink holes that may be covered with water when it rains. Example is the Etosha Pan (Namibia)

6. <u>Lakes formed by erosion</u>

- Are found in ASALs through deflation and abrasion processes. This leads to formation of a deflation hollow. If a deflation hollow is deepened by eddy currents up to the point where it reaches water bearing rocks/table, water may seep into the depression from below to form in to a lake. Example Qattara depression between Libya and Egypt

7. <u>Human made lakes</u>

- Are formed as a result of construction of a dam upstream along a river channel.
- Water accumulates behind such dams to form a lake e.g. 7 forks dams on R. Tana, Volta (Ghana), Caborra Bassa (Mozambique), Kainji (R. Niger)

Significance of Lakes

1. Lakes provide water for domestic and industrial use.
2. Fresh water lakes provide water for irrigation farming e.g. L. Naivasha supports the horticultural farming in the area.
3. Some lakes are sources of valuable minerals which are exploited to generate income e.g. Trona mining in Lake Magadi.
4. Human made lakes are harnessed to generate hydro-electric power.
5. Lakes provide natural water ways thus facilitating water transport e.g. lake Victoria
6. Sand harvested from the shores of the lakes is used in construction industry.
7. Lakes attract tourists and encourage water sports hence source of foreign revenue e.g. hot springs of Lake Bogoria.
8. Source of fish, thus providing food/alternative source of protein
9. Modify the climatic conditions of their immediate surrounding through land and sea breezes, increased rainfall etc
10. Lakes may harbor diseases causing pests and micro-organisms.
11. Seasonal flooding of the low lying lake basin displace people
12. Lakes are barriers to road and railway transport.