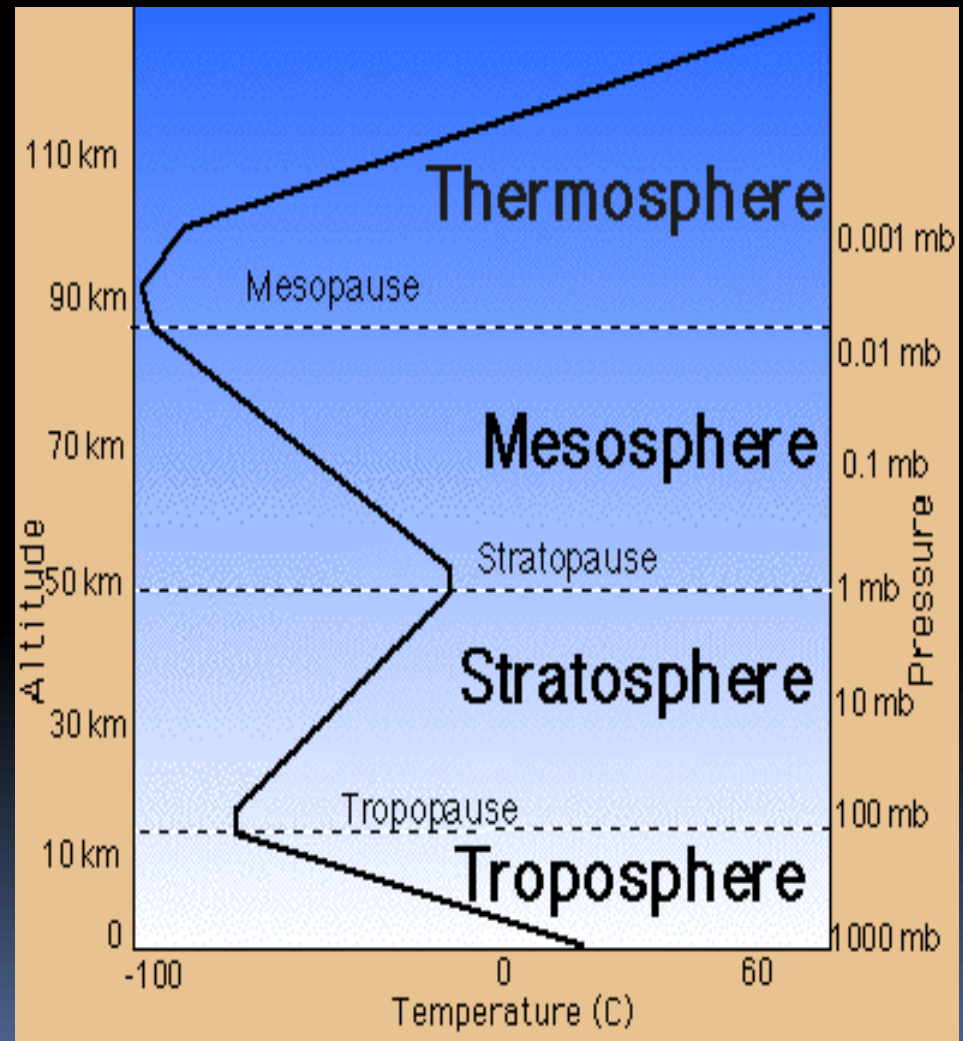
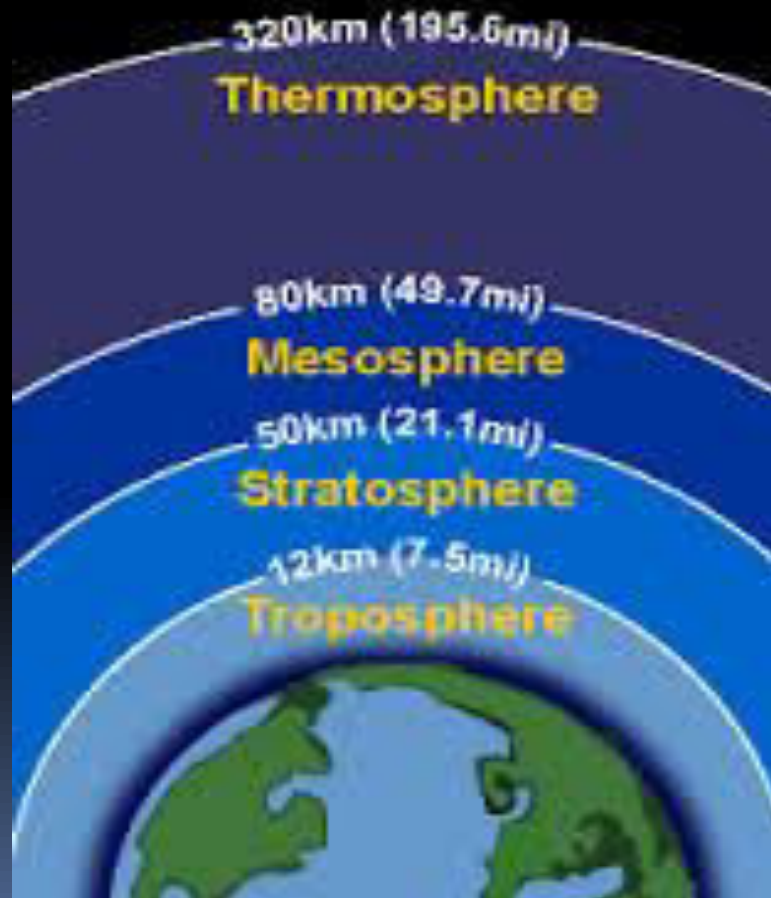


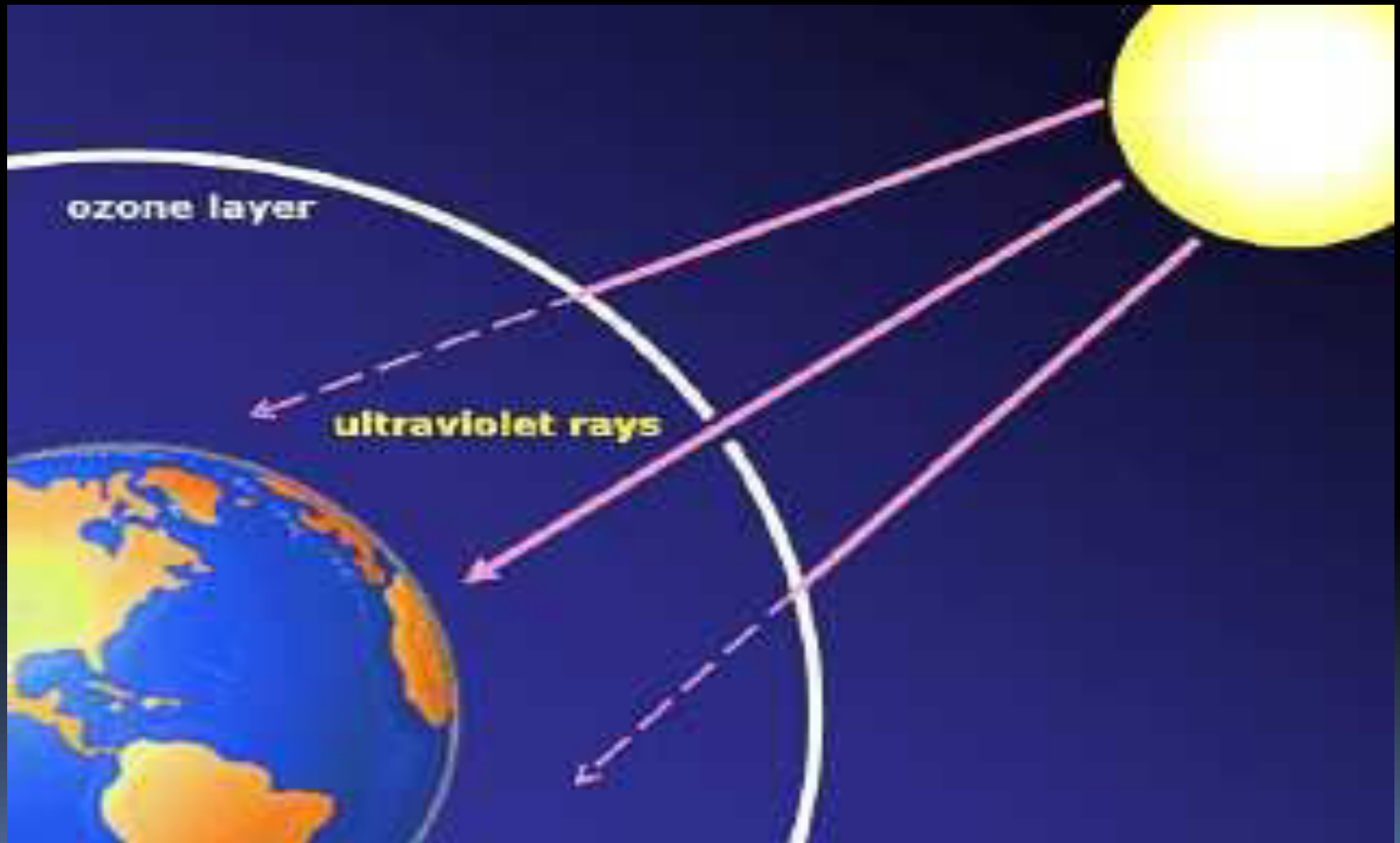


ECOLOGY

ATMOSPHERE



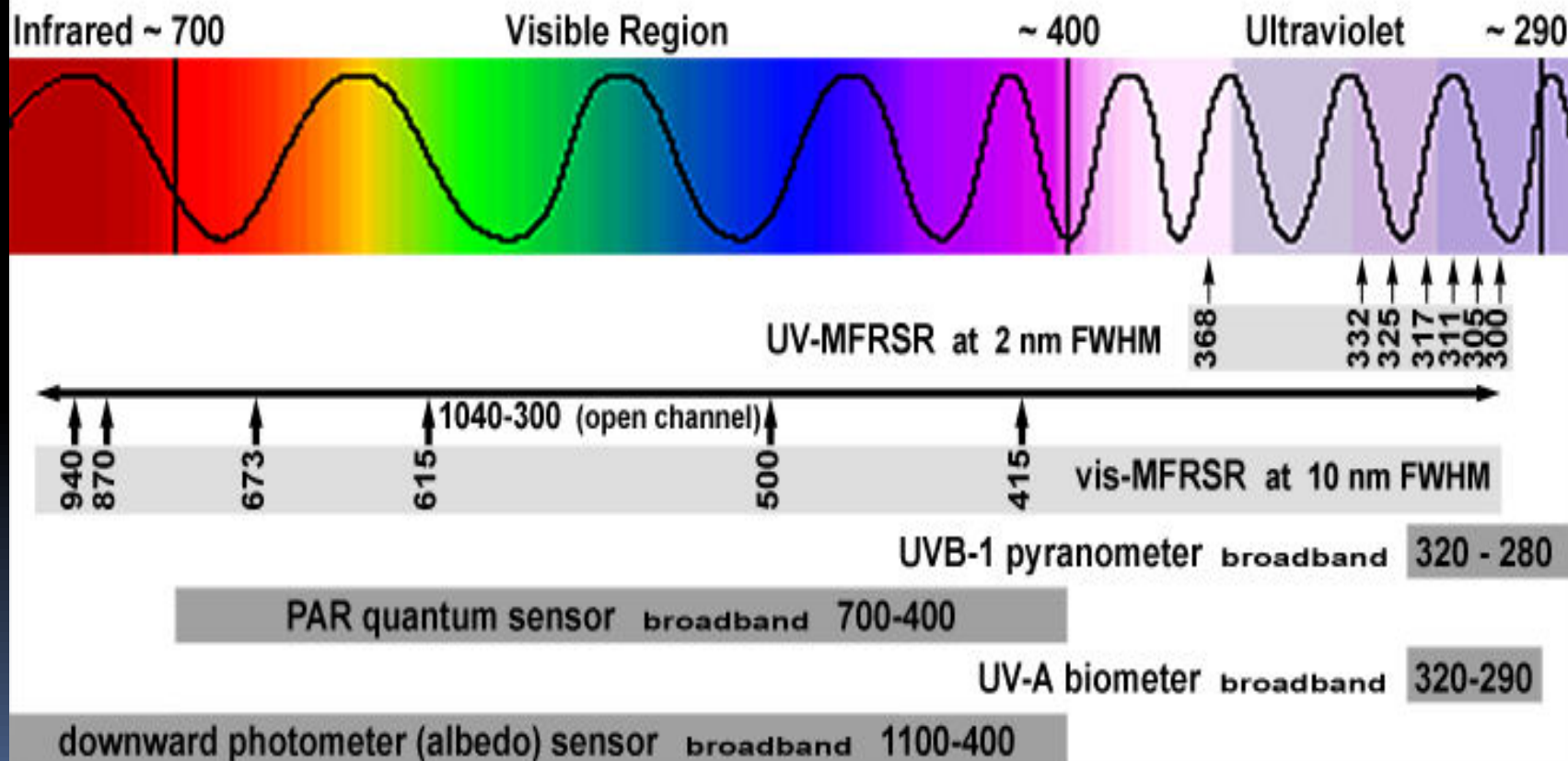
STRATOSPHERE



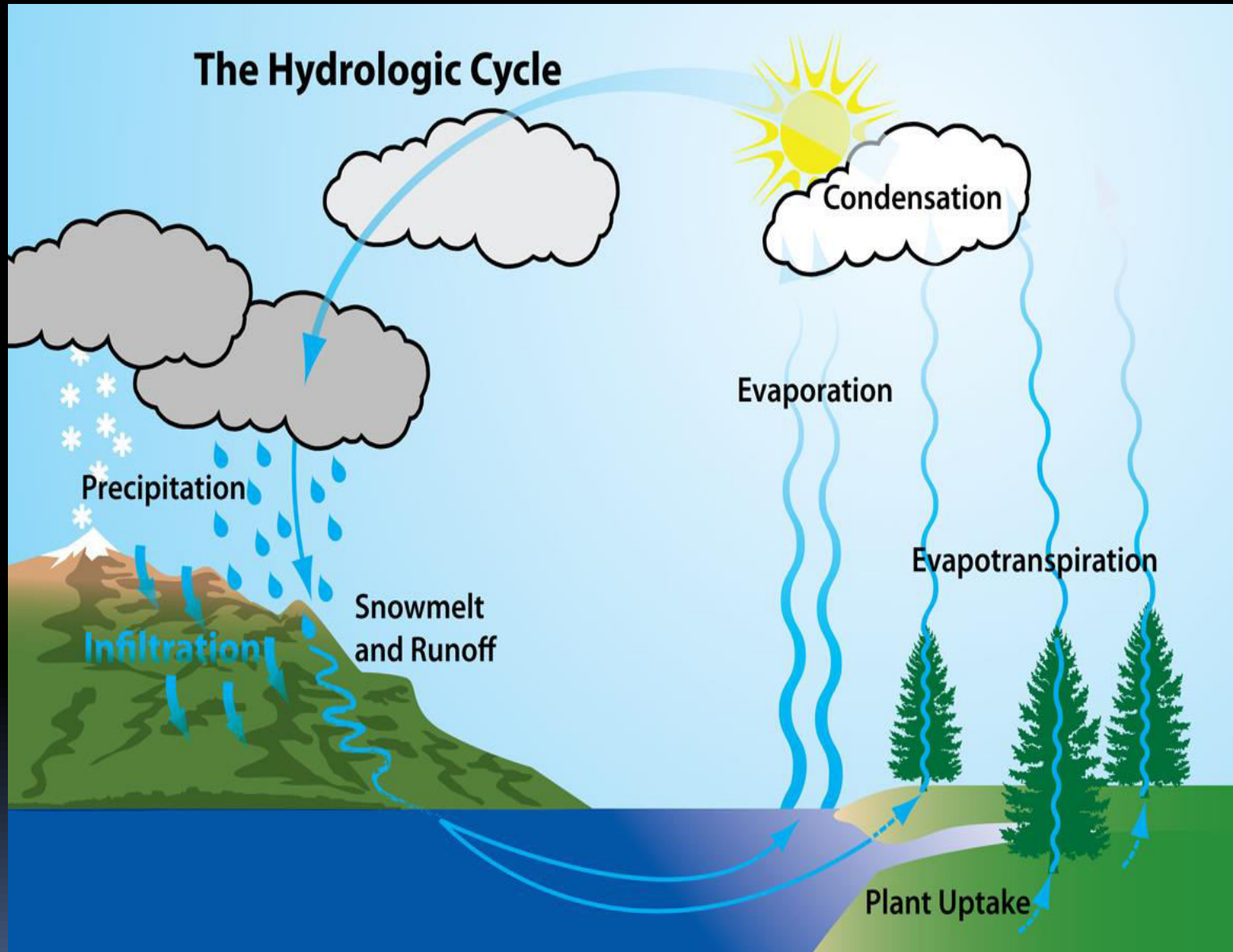
LIGHT AND TEMPERATURE

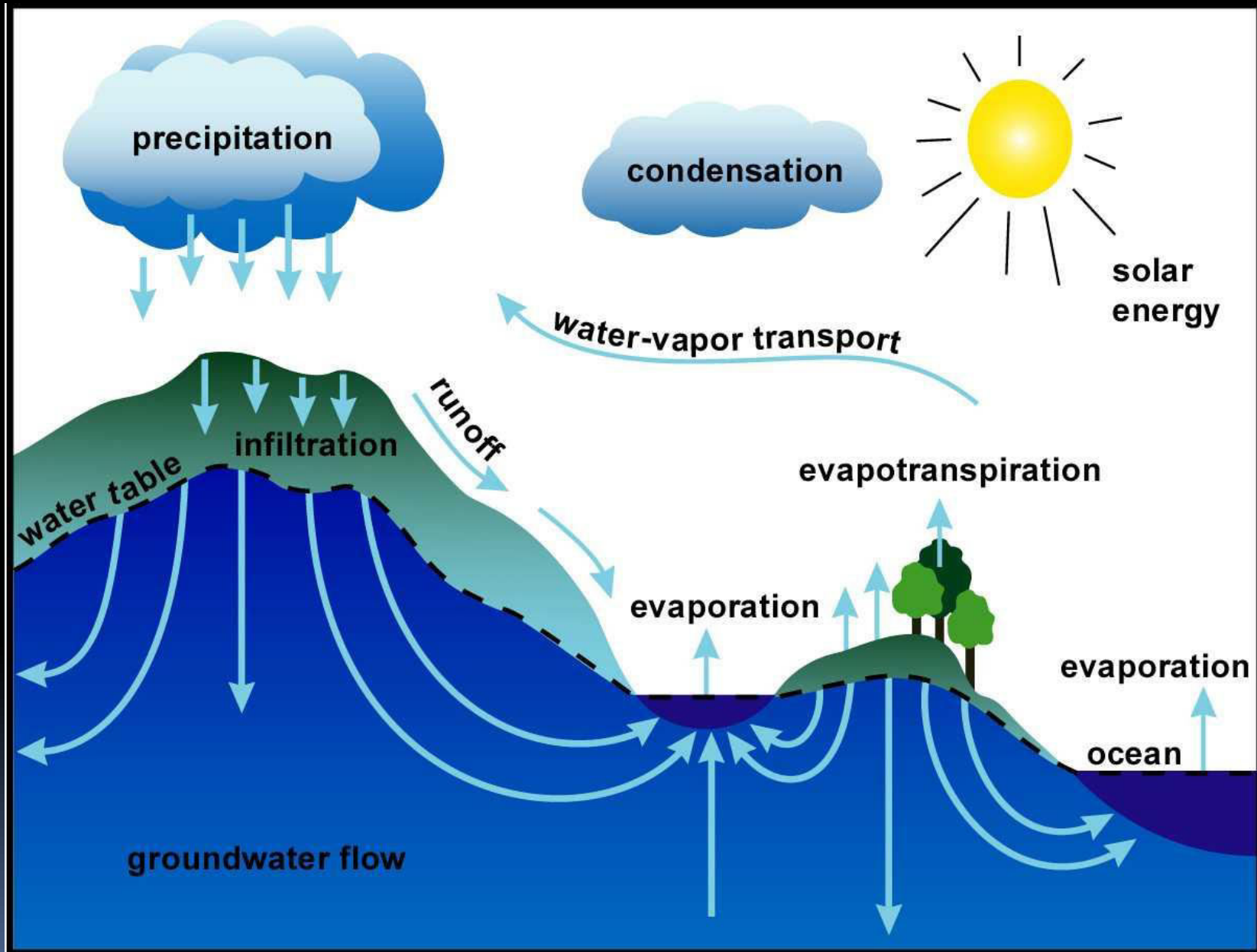
ELECTROMAGNETIC SPECTRUM

range of broad and discrete wavelengths (nanometers) as measured by UVMRP instruments

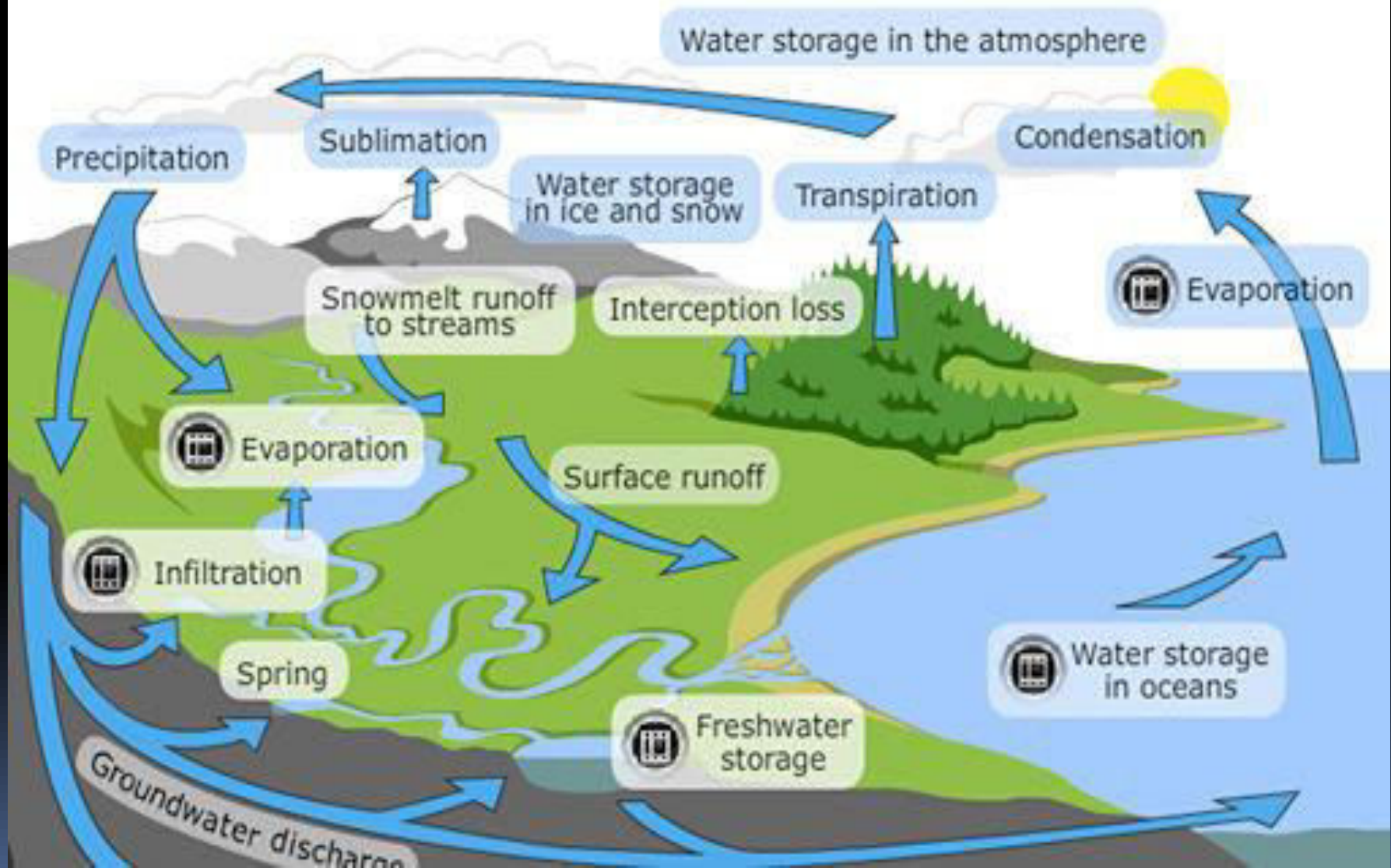


The Hydrologic Cycle

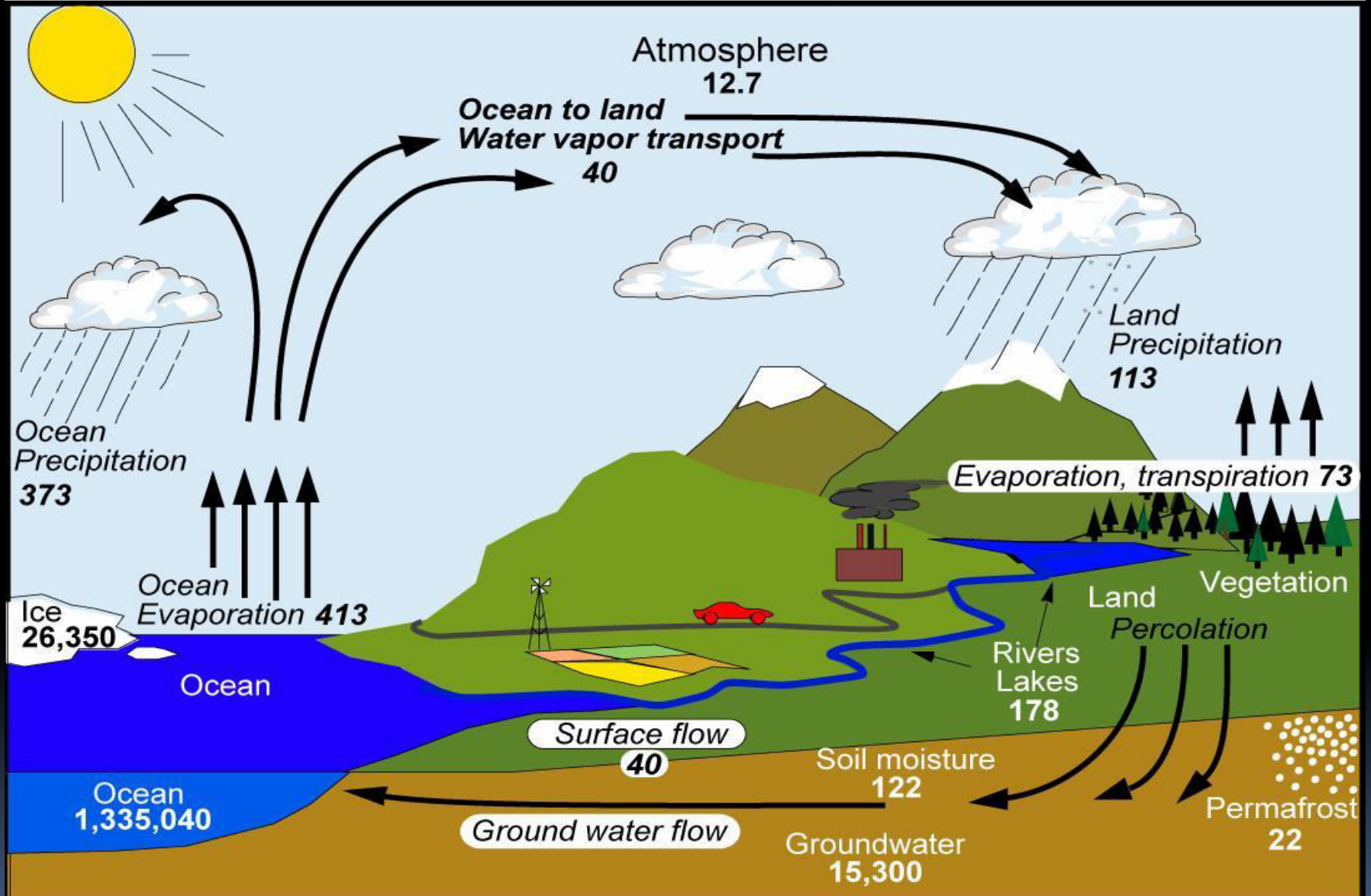




DYNAMIC AND COMPLEX: THE GLOBAL WATER CYCLE



Hydrological Cycle

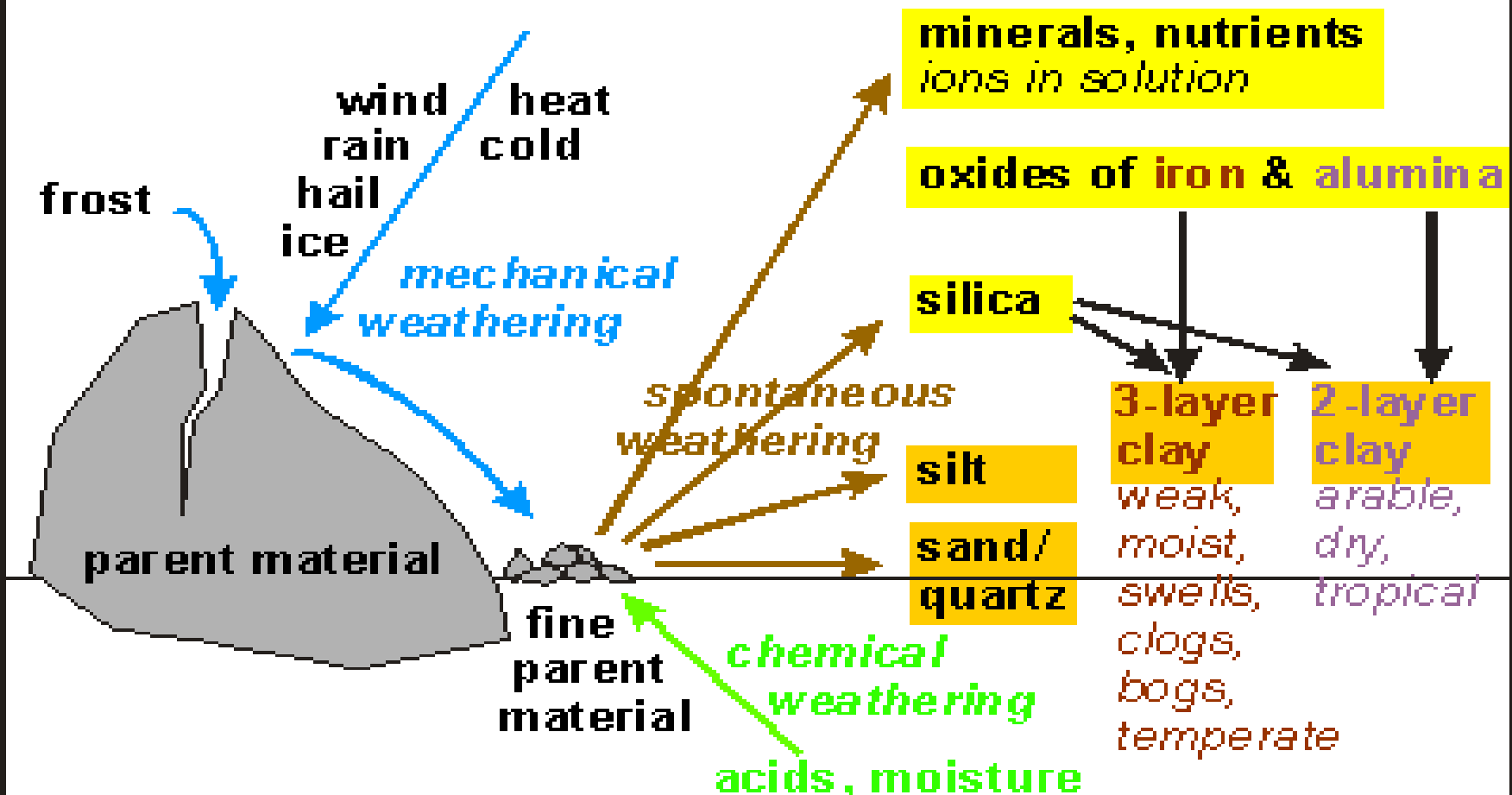


Units: Thousand cubic km for storage, and *thousand cubic km/yr* for exchanges

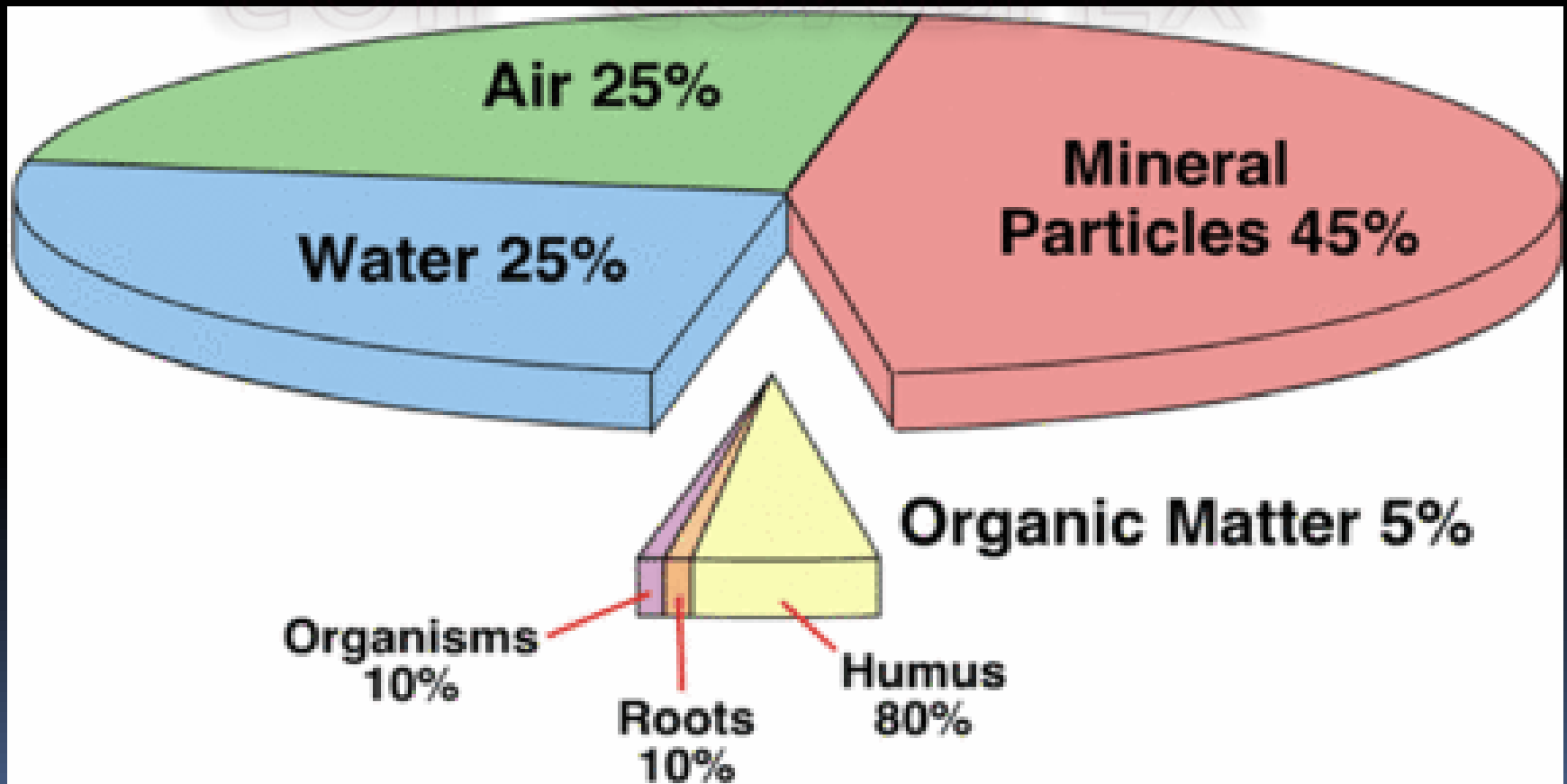


PEDOGENESIS

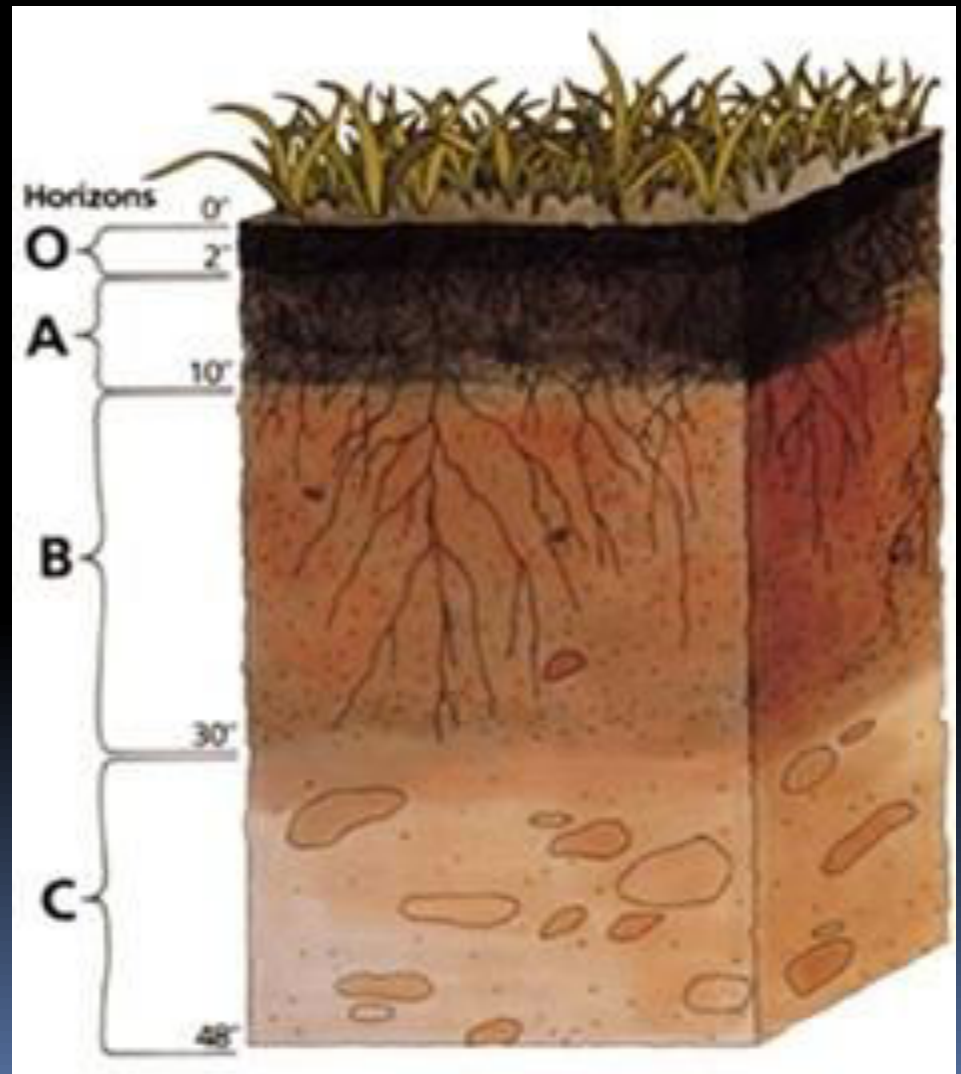
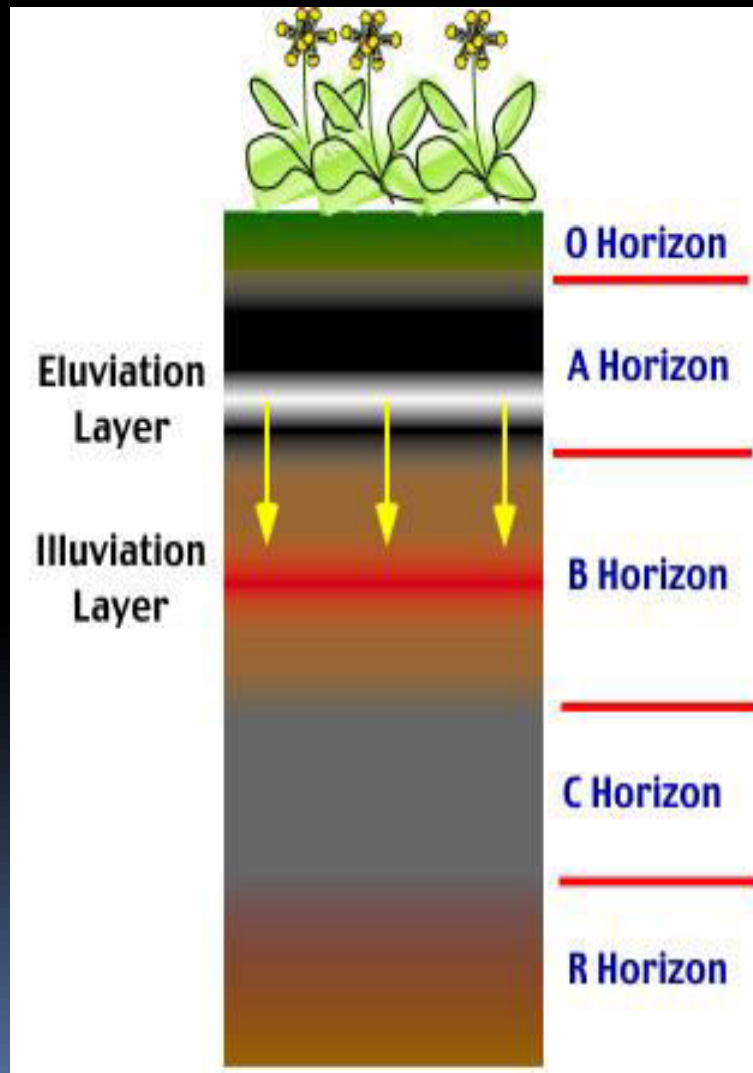
How is soil made? - weathering



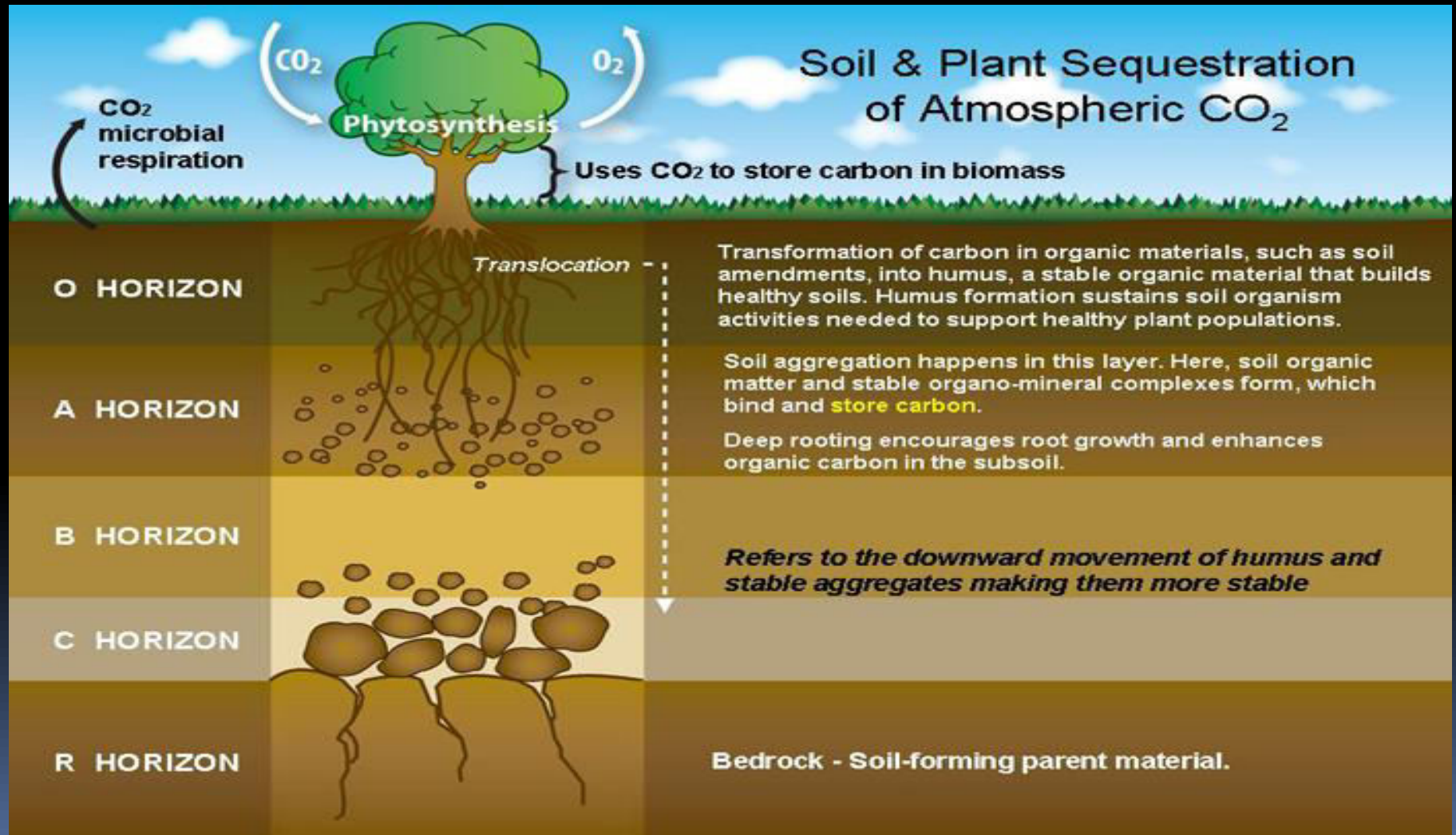
SOIL-COMPLEX



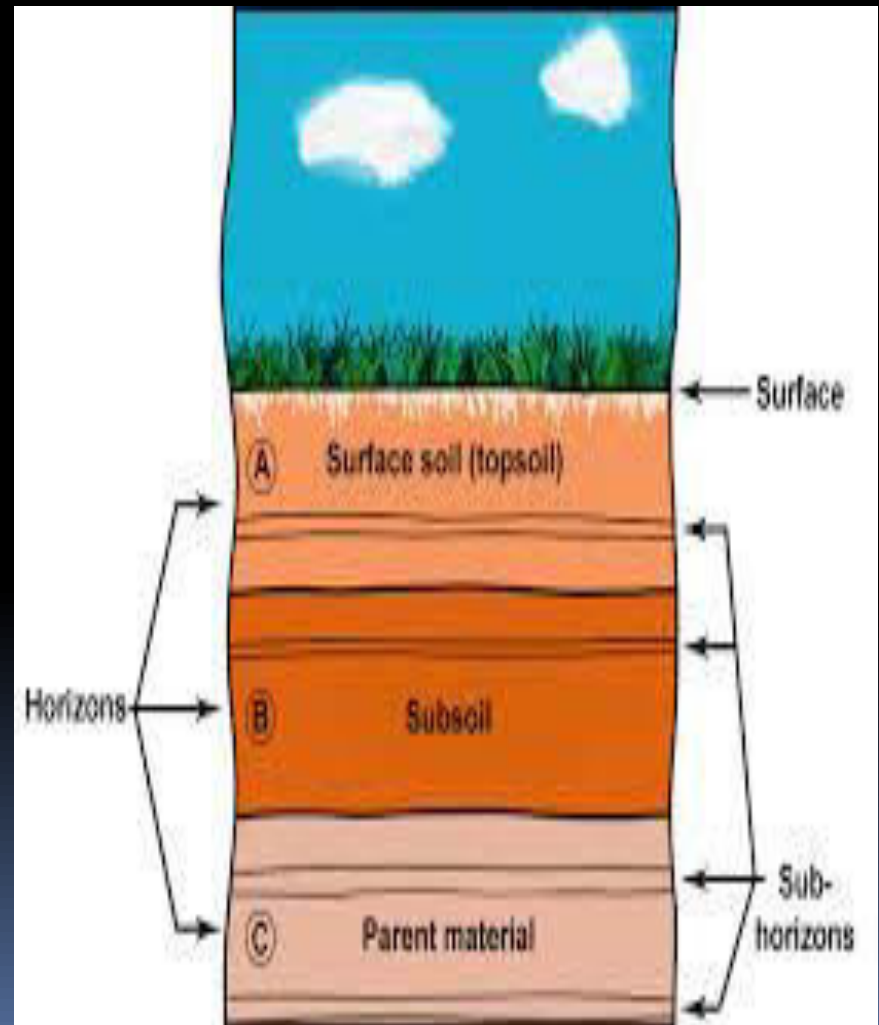
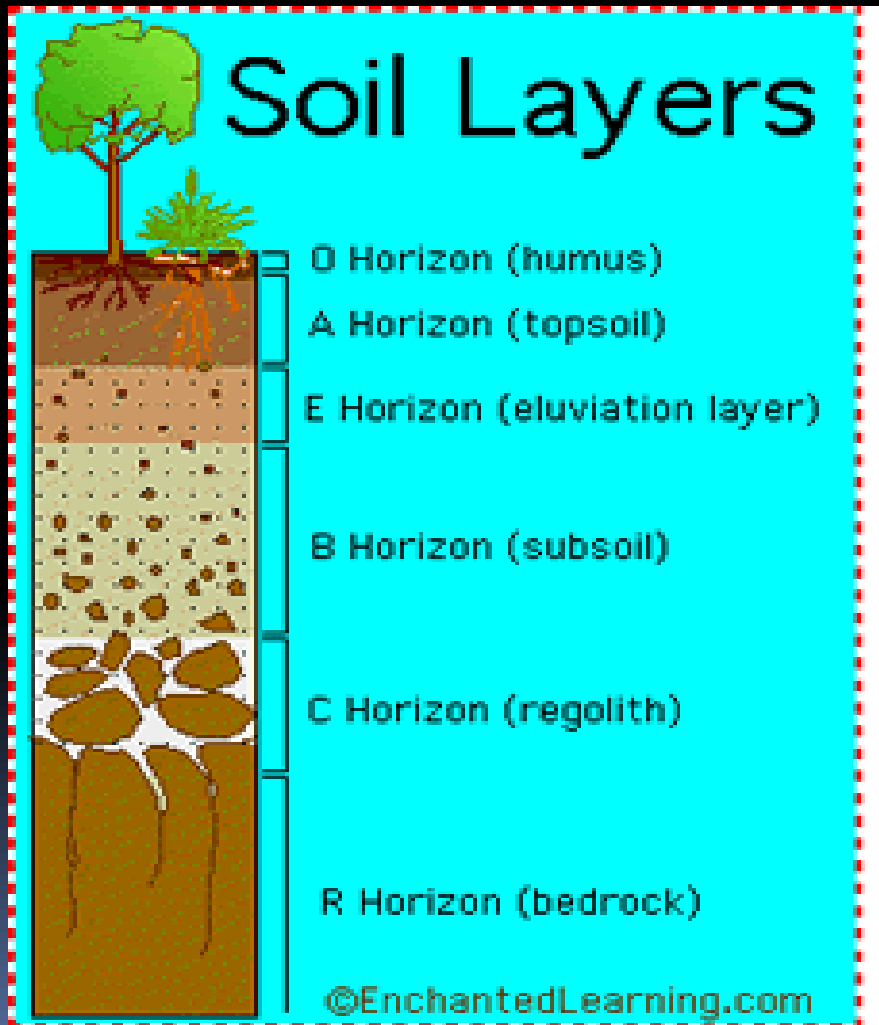
SOIL PROFILE



SOIL PROFILE



SOIL PROFILE



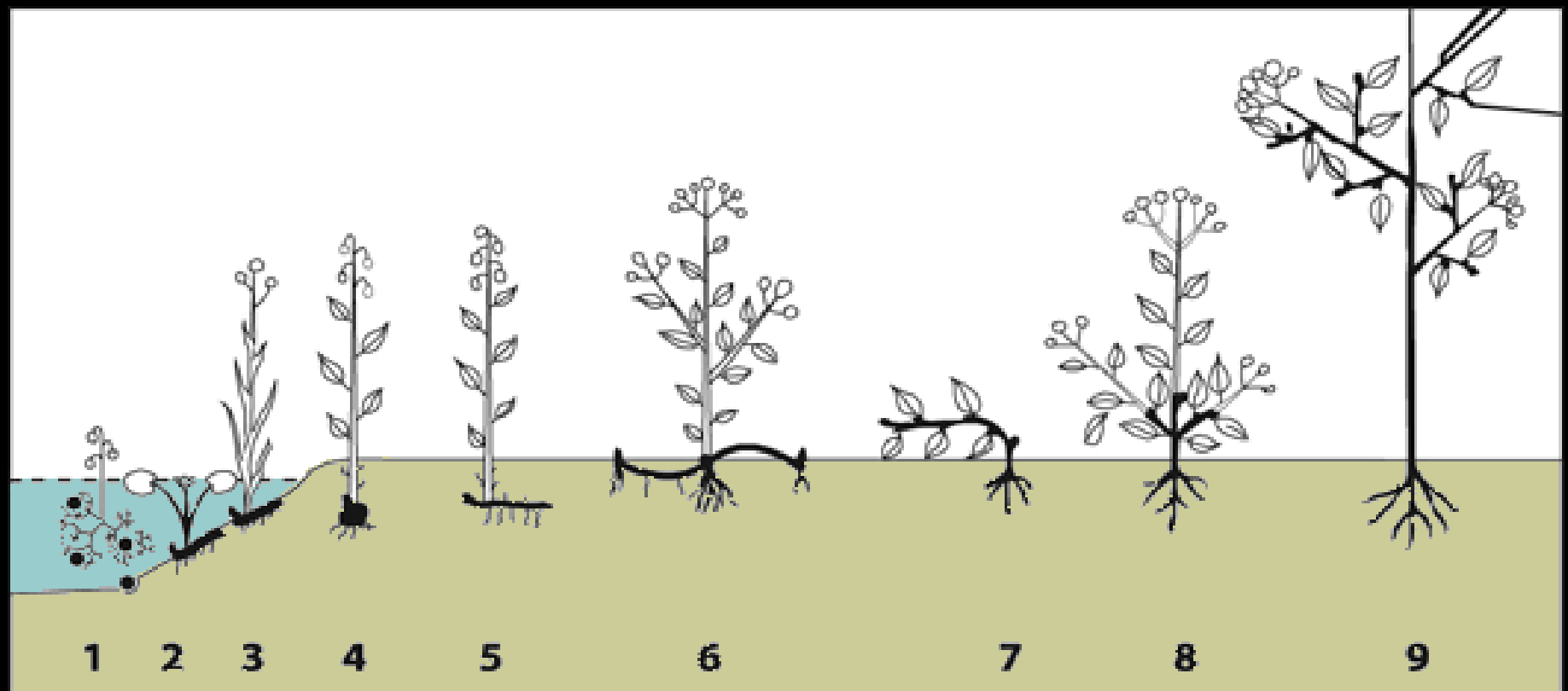


Diagram of the most important life forms based on the classification by Raunkiaer (1934)

1 + 2 3	Hydrophytes Helophytes	<i>(Hydr.)</i> <i>(Helo.)</i>	water plants winter buds under water flowering plants above water
4 + 5 6	Cryptophytes or geophytes Hemicryptophytes	<i>(Geof.)</i> <i>(Hemi.)</i>	winter buds below ground winter buds above or just below ground
7 + 8 9	Chamaephytes Phanerophytes	<i>(Cham.)</i> <i>(Phan.)</i>	winter buds up to 50 cm above ground winter buds at least 50 cm above ground (i.e. trees, shrubs and lianes)

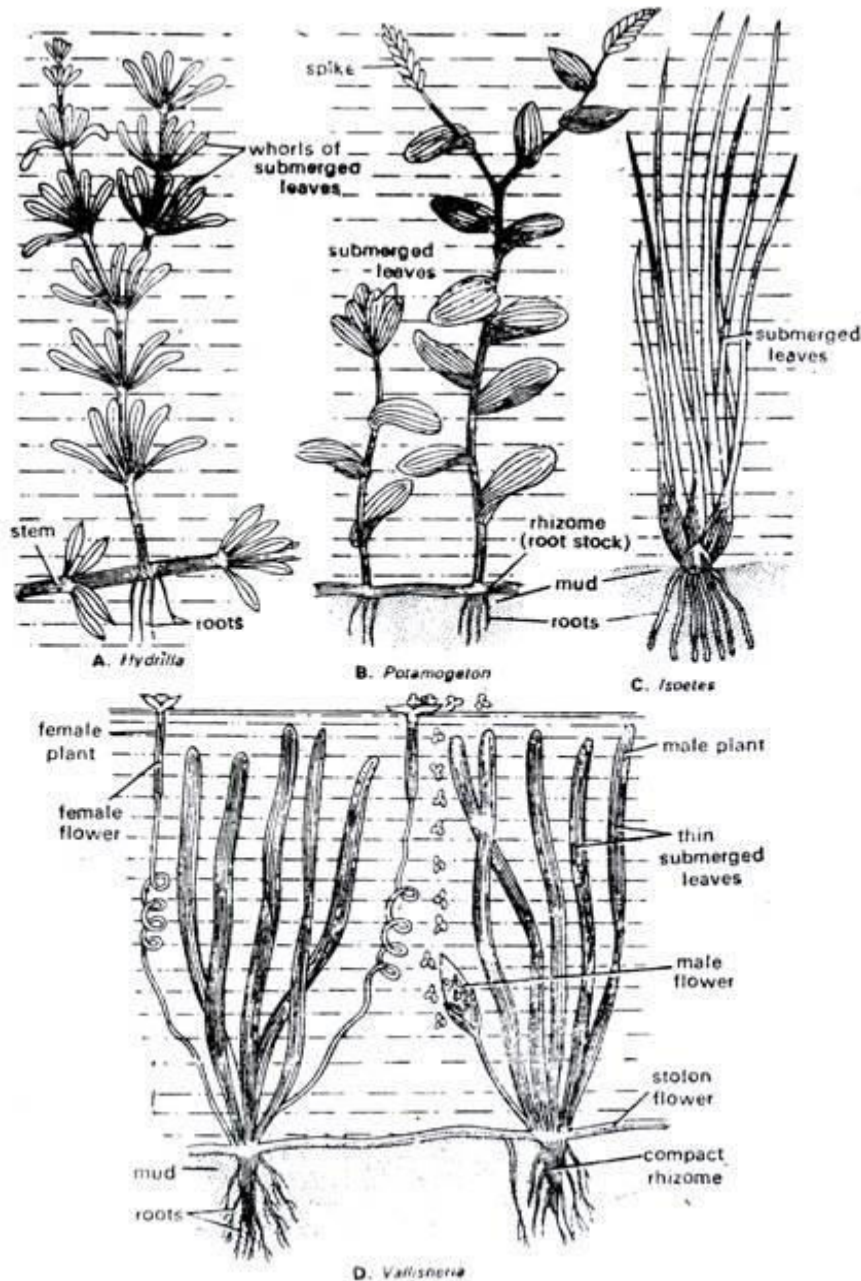


Fig. 10.9. Rooted submerged hydrophytes

Rooted
submerged
hydrophytes;
Hydrilla,
Potamogeton,
Isoetes,
Vallisneria

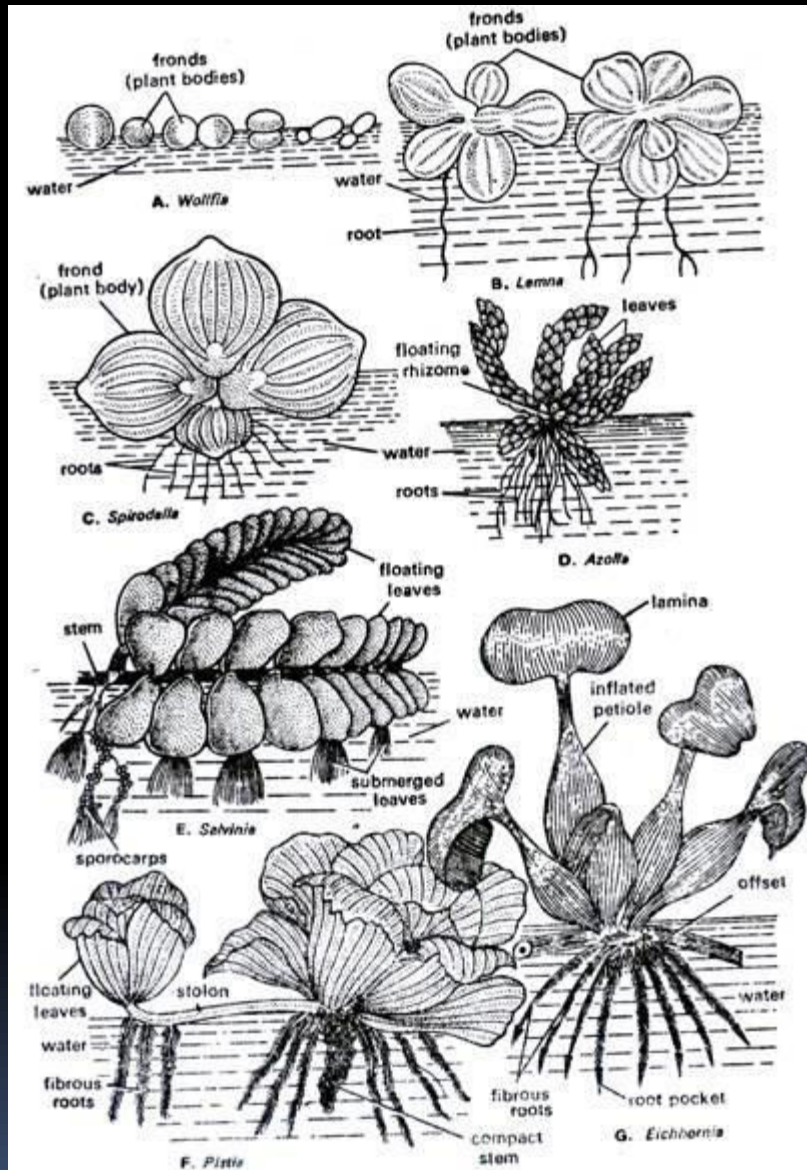
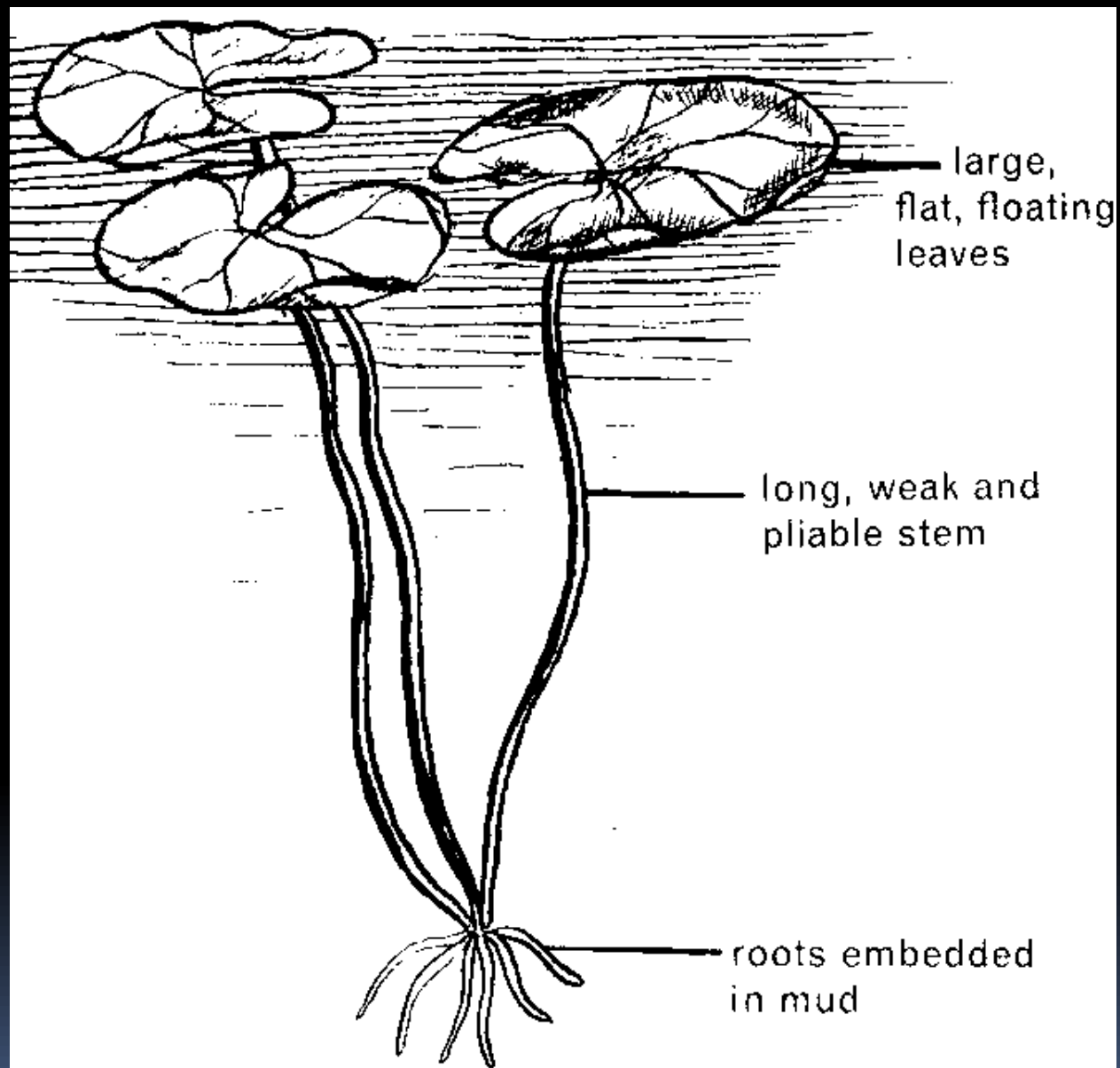
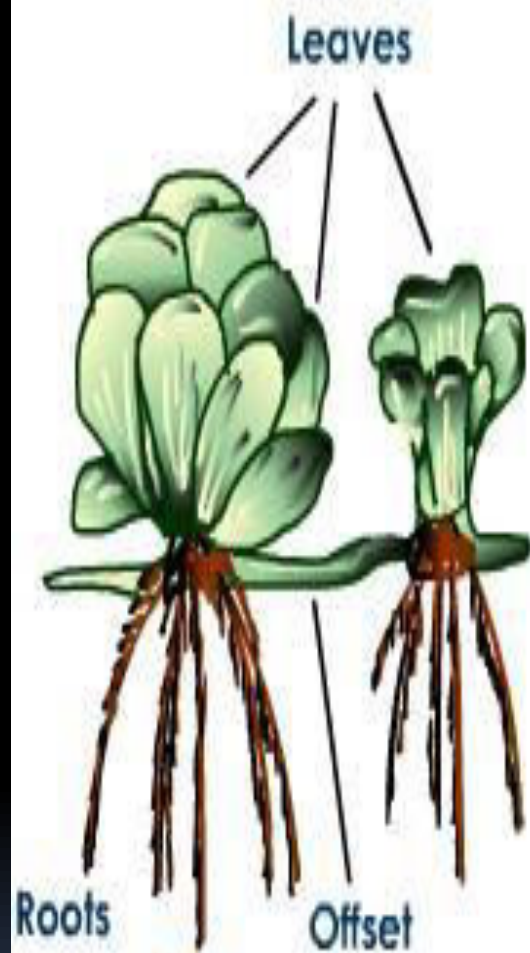


Fig. 10-6. Free-floating hydrophytes.

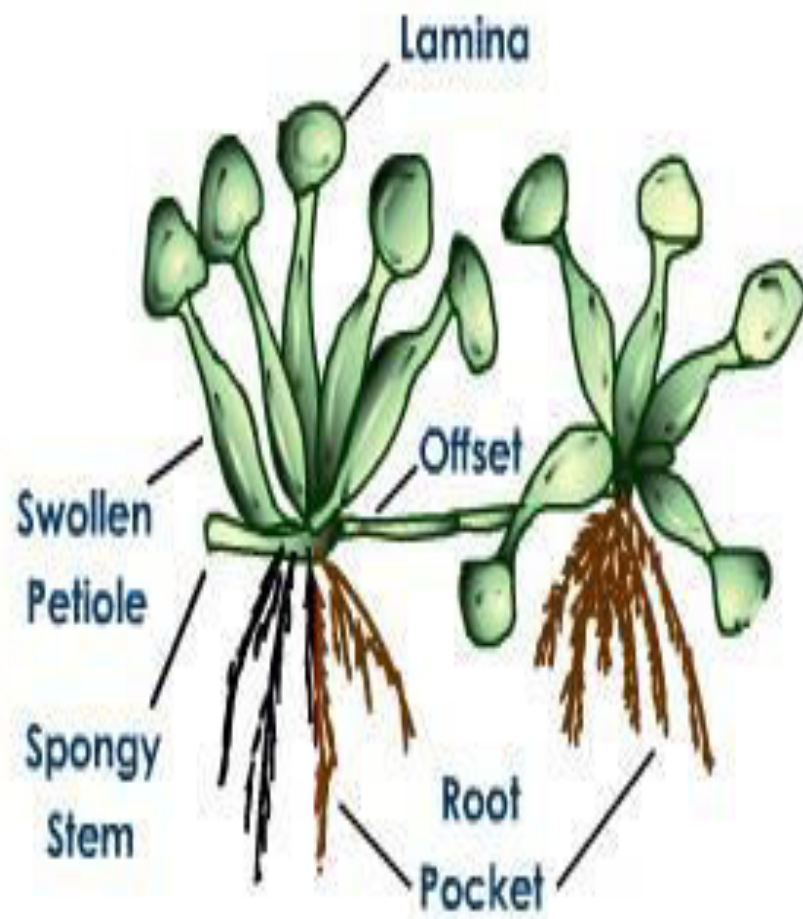
Free floating
hydrophytes
Wolffia, Lemna,
Spirodella,
Azolla, Salvinia, Pistia
Eichhornia



FLOATING LEAVES OF WATER-LILY



Pistia



Eichhornia

Victoria amazonica- giant amazon water lily



xerophytes

Adaptation

1. Thick, waxy cuticle on leaves
2. Reduced number of stomata
3. Stomata sunken in pits
Leaf surface covered with fine hairs
4. Stomata close during day, open at night
5. Leaves reduced and stem photosynthetic
Leaves curled or folded when flaccid
6. Fleshy or succulent stems
7. Deep root system



Effect

- Reduces water loss through the cuticle
- Reduces the number of stomata through which water loss can occur
- Moist air is trapped reducing the diffusion gradient and the rate of water loss
- CAM metabolism: CO₂ fixing at night, water loss during days minimized
- Reduced surface area from which transpiration can occur
- Water is stored in tissues for times of low availability
- Roots tap into the lower water table

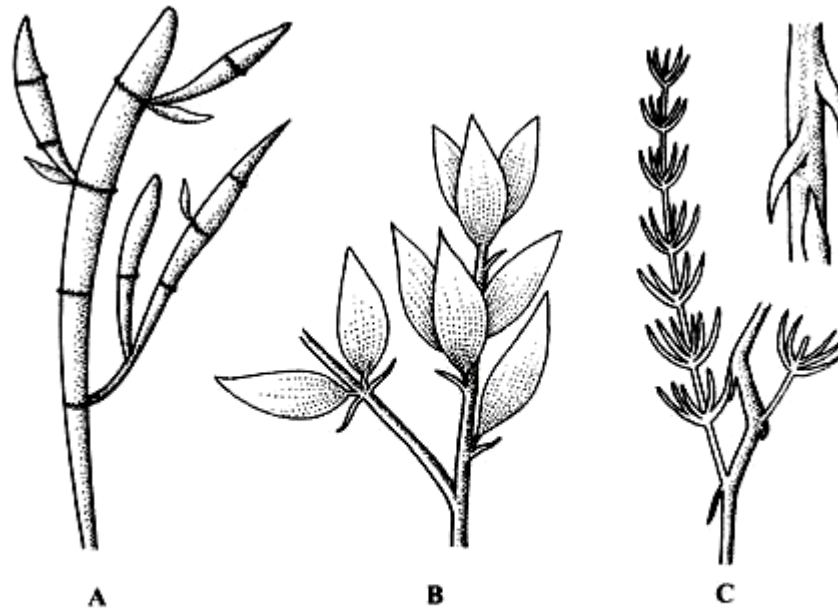
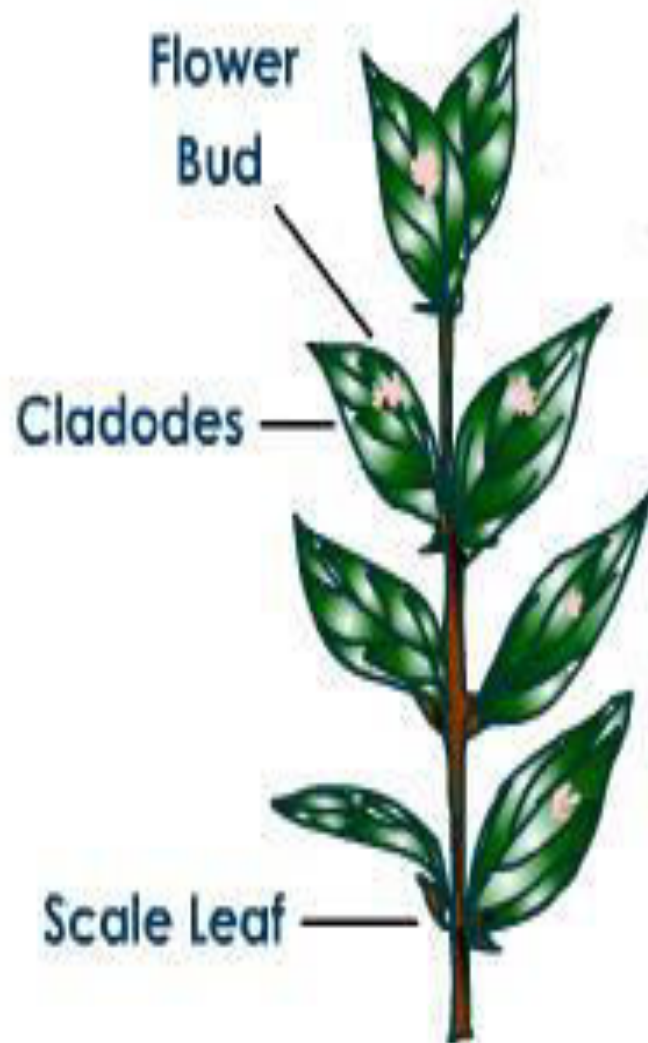
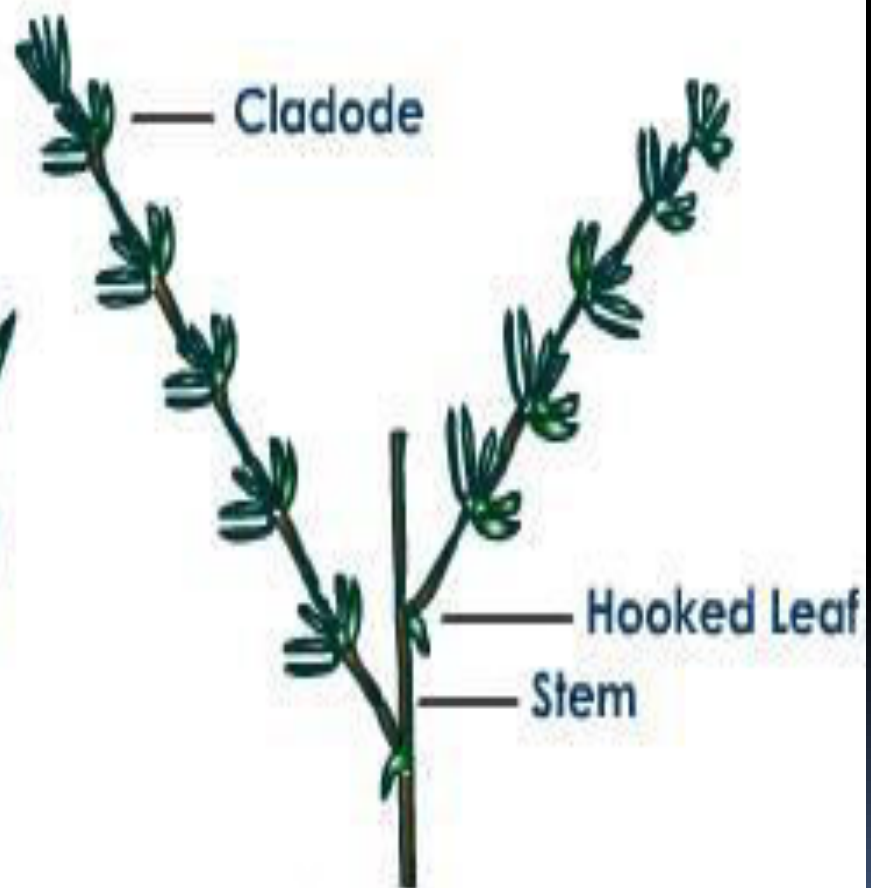


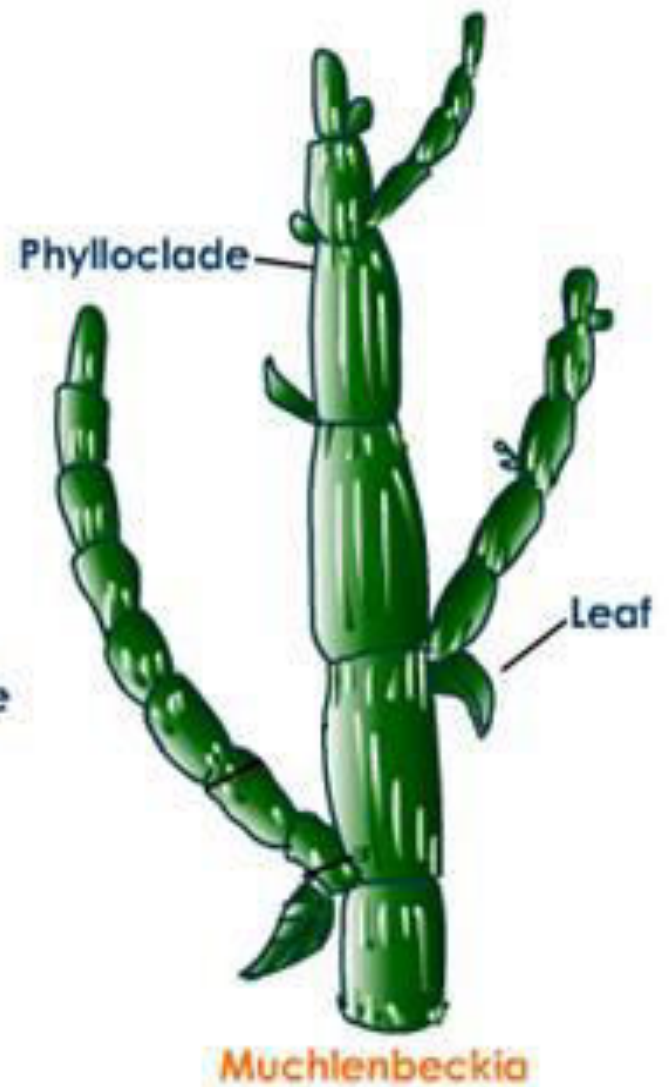
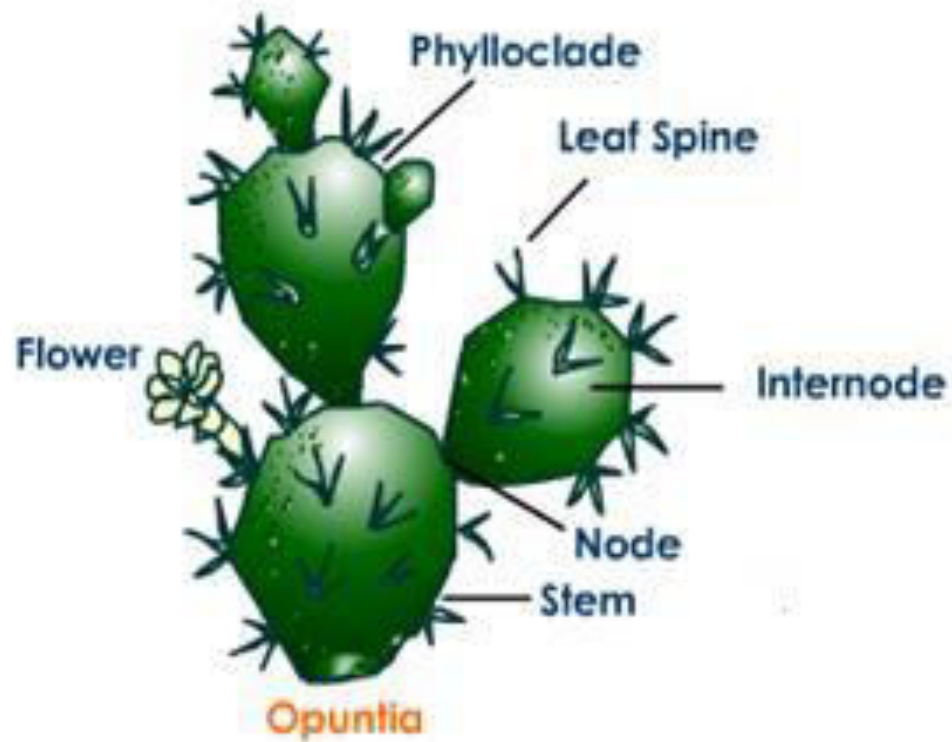
Fig. 8.20. A, B & C—Phylloclade and cladodes. A—Phylloclade of *Cocoloba*. B—Cladodes of *Ruscus*. C—Cladodes of *Asparagus*.



RUSCUS



Asparagus



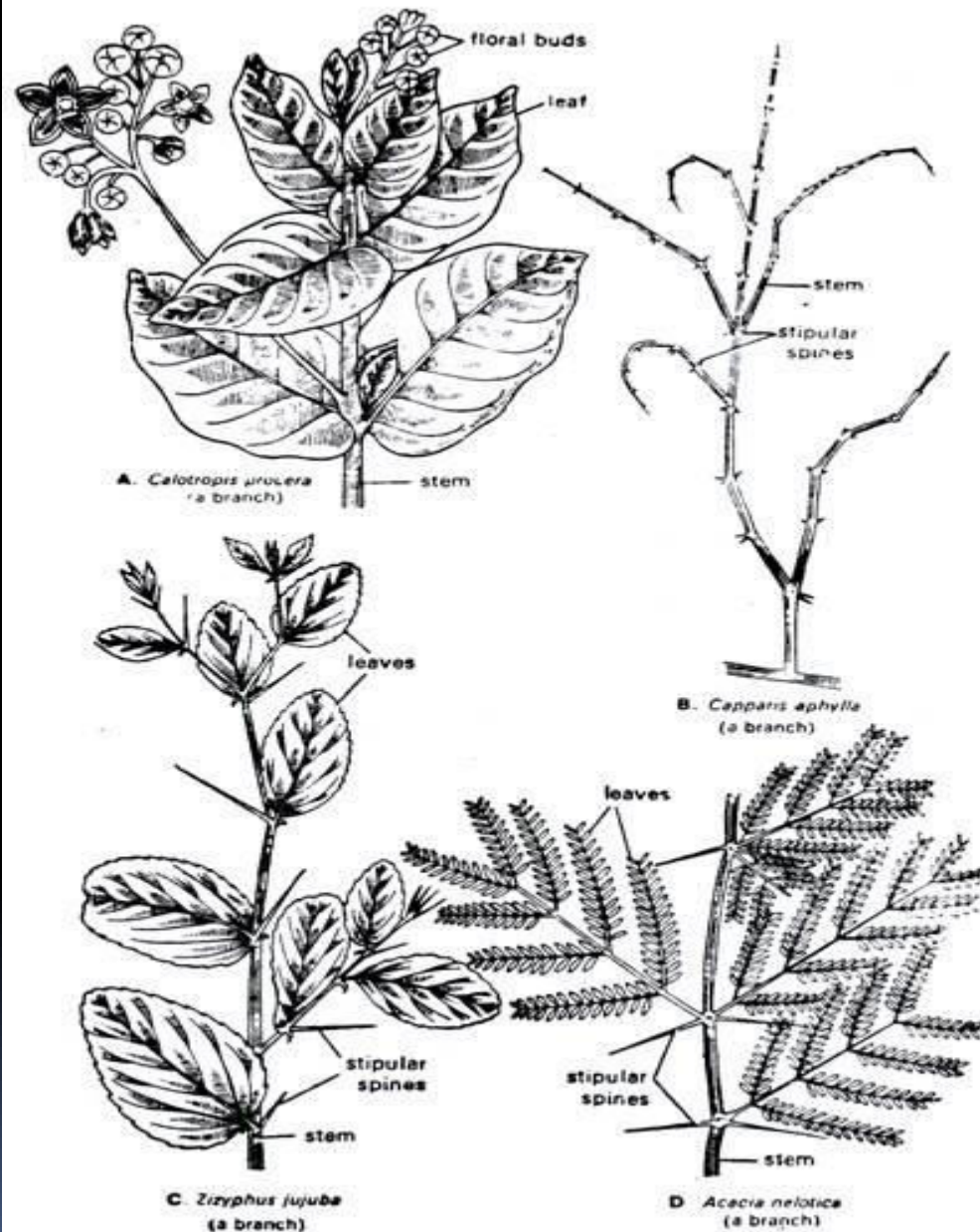
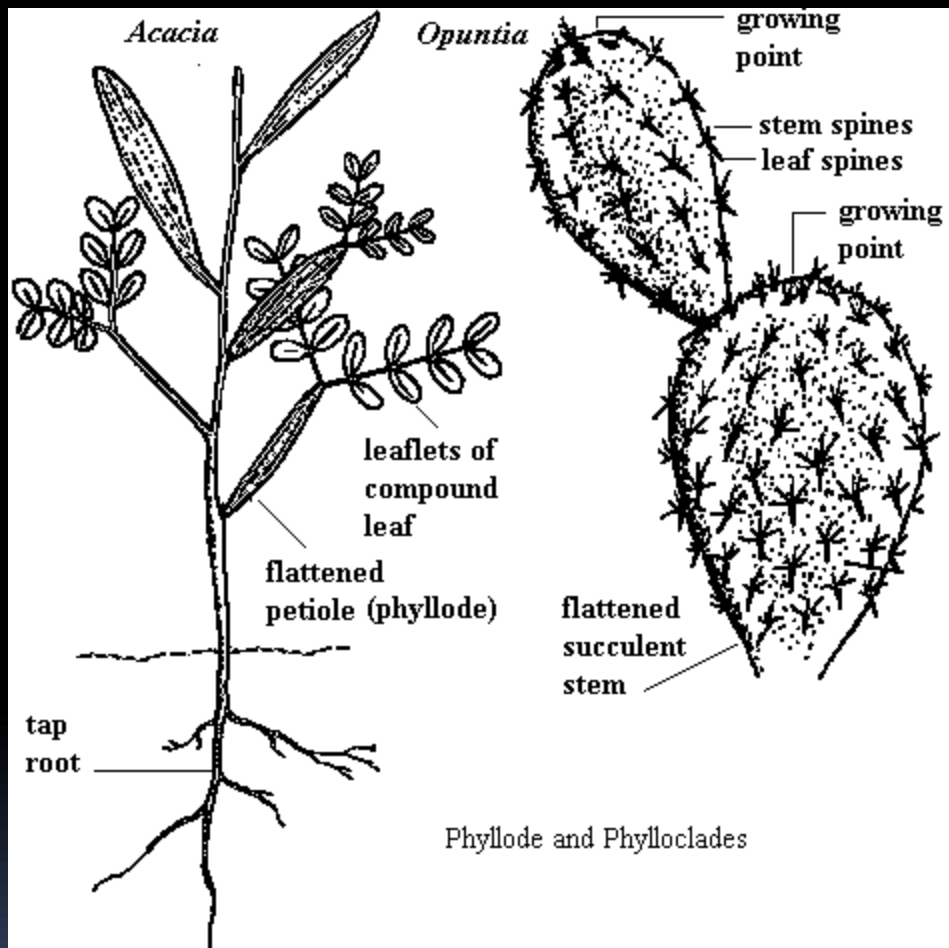


Fig. 10-16. Some common true xerophytes.



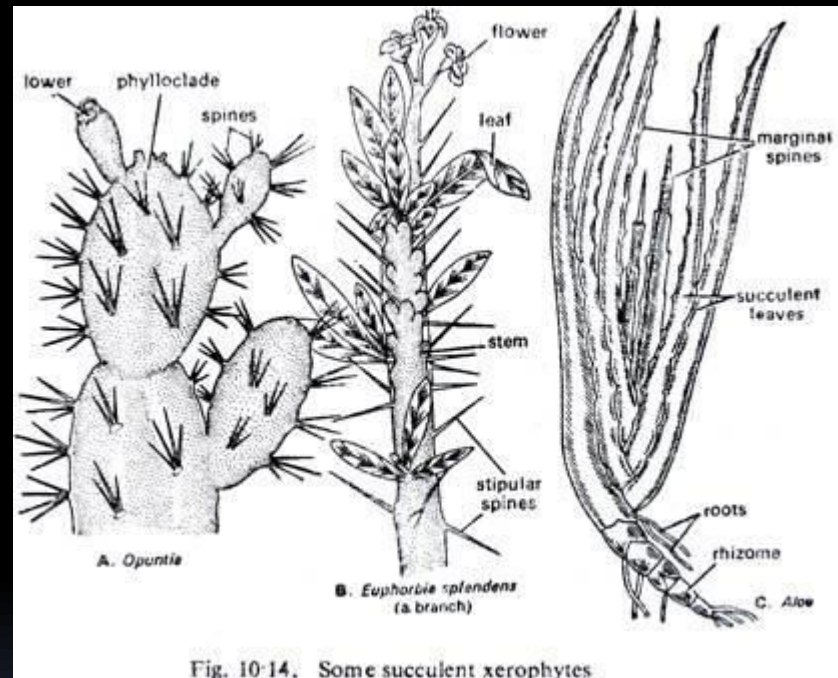


Fig. 10-14. Some succulent xerophytes