

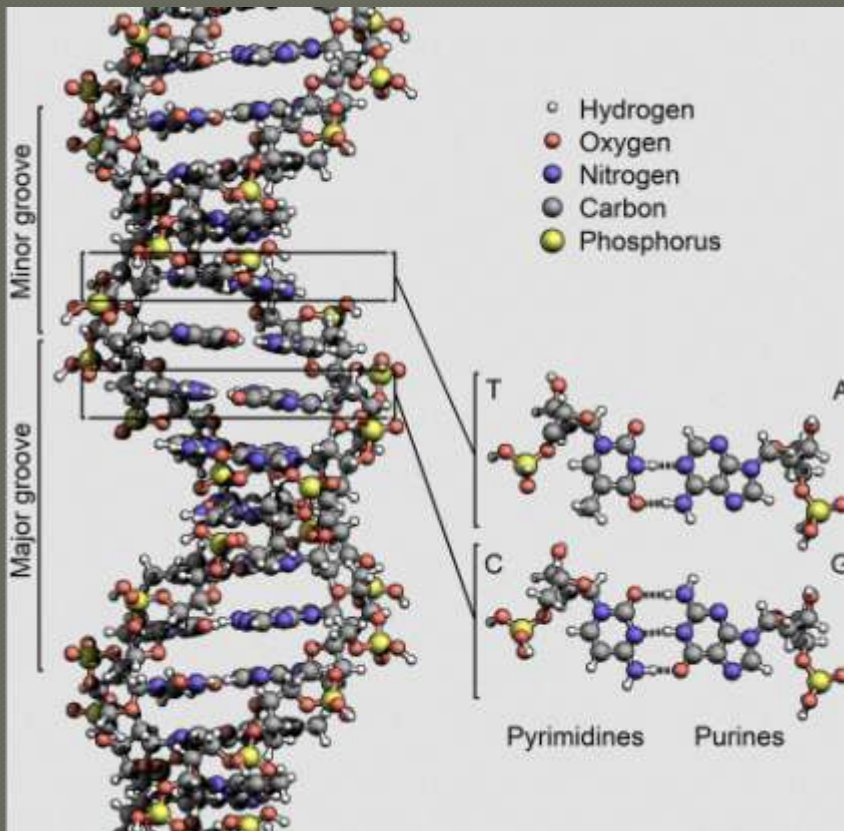
Nitrogen-fixing Plant Families in El Dorado County

Nitrogen

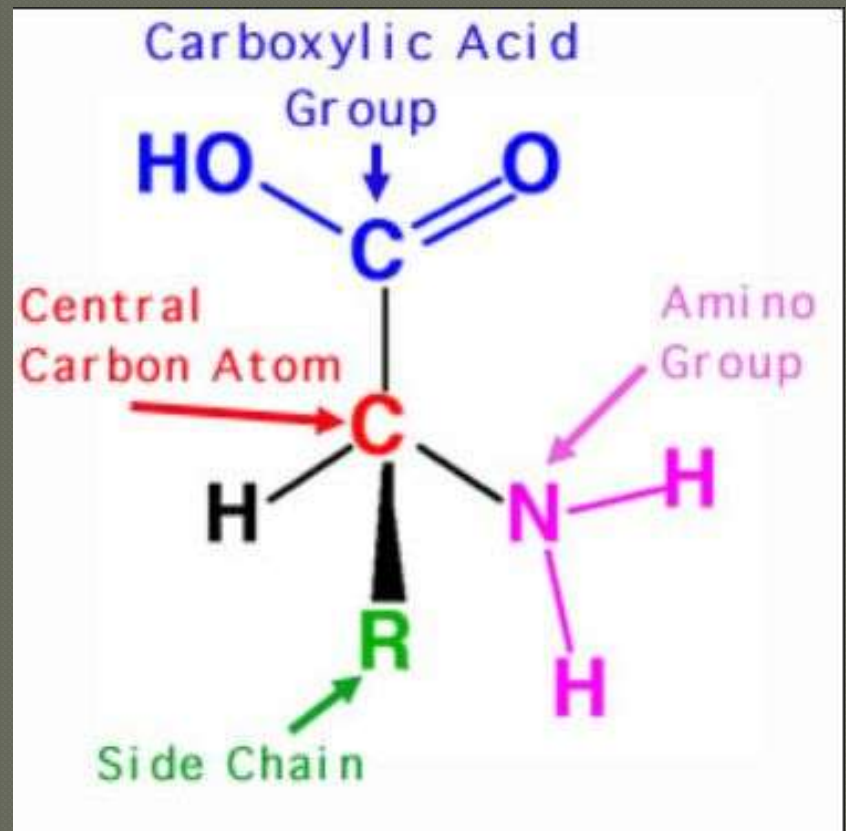
- By volume, dry air contains 78.09% **nitrogen gas (N₂)**
- **Nitrogen** compounds are essential to life on Earth
- Atmospheric **nitrogen** is **unavailable** to most life on Earth

Nitrogen is vital to life on Earth

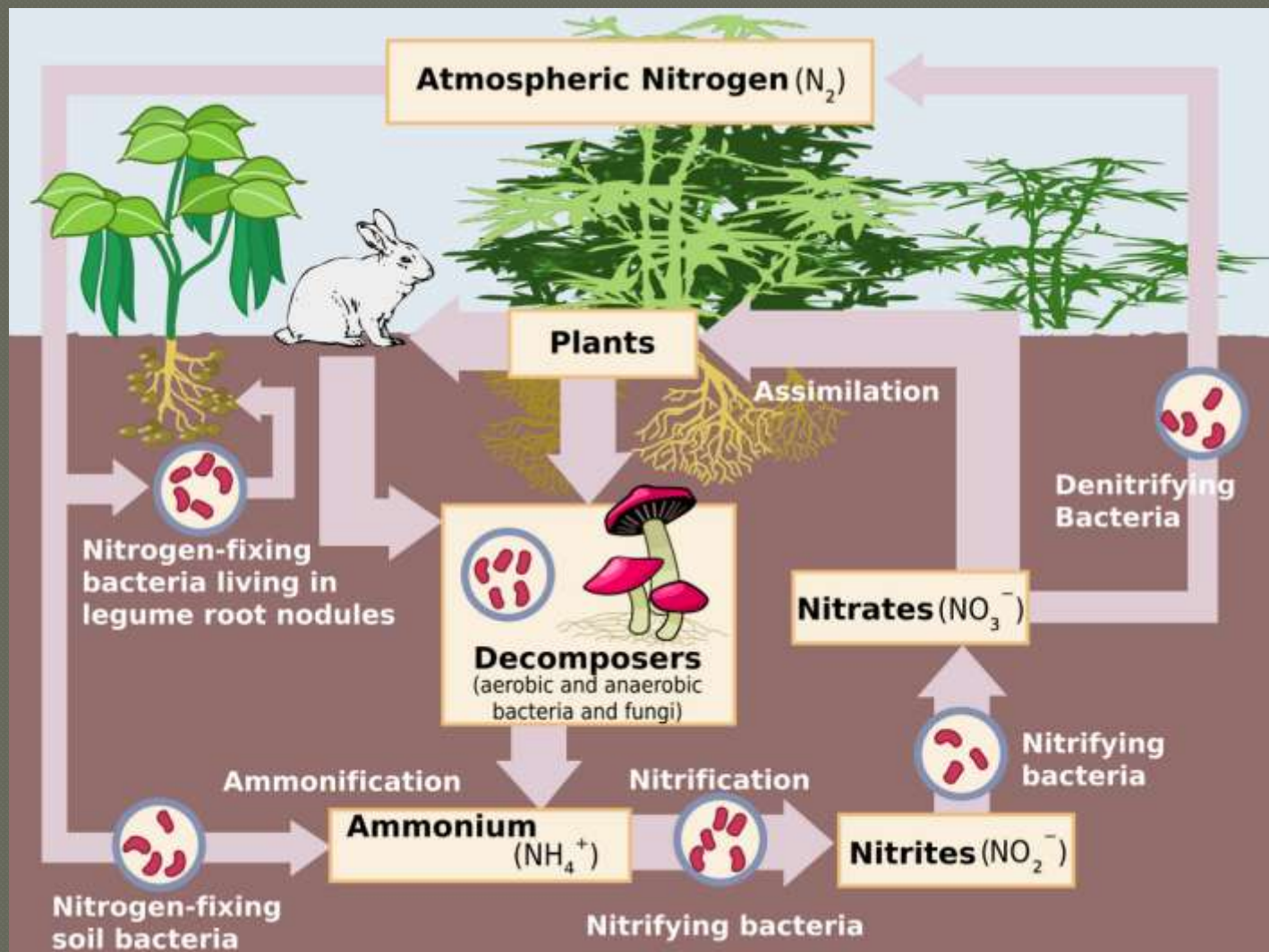
DNA AND RNA



PROTEINS AND ENZYMES



Only bacteria can “fix” nitrogen



N₂ fixing bacteria

○ Legume symbioses

- Legumes (Fabaceae) make root nodules to house *Rhizobium* bacteria.





Fabaceae

**FABOIDEAE or Papilionoideae
(Bean or Pea Subfamily)**

♂
♀ $\text{Ca}^5 \text{CoZ}^{(2)+3} \text{A}^{(9)+1} \text{or } 10 \text{G}^1$

Frankia Symbiots

- *Frankia* form nitrogen-fixing root nodules (sometimes called actinorrhizae) with several woody plants of different families, such as some members of the **Rose Family**, alder (***Alnus species***), and **Ceanothus**

3 genera in Rosaceae

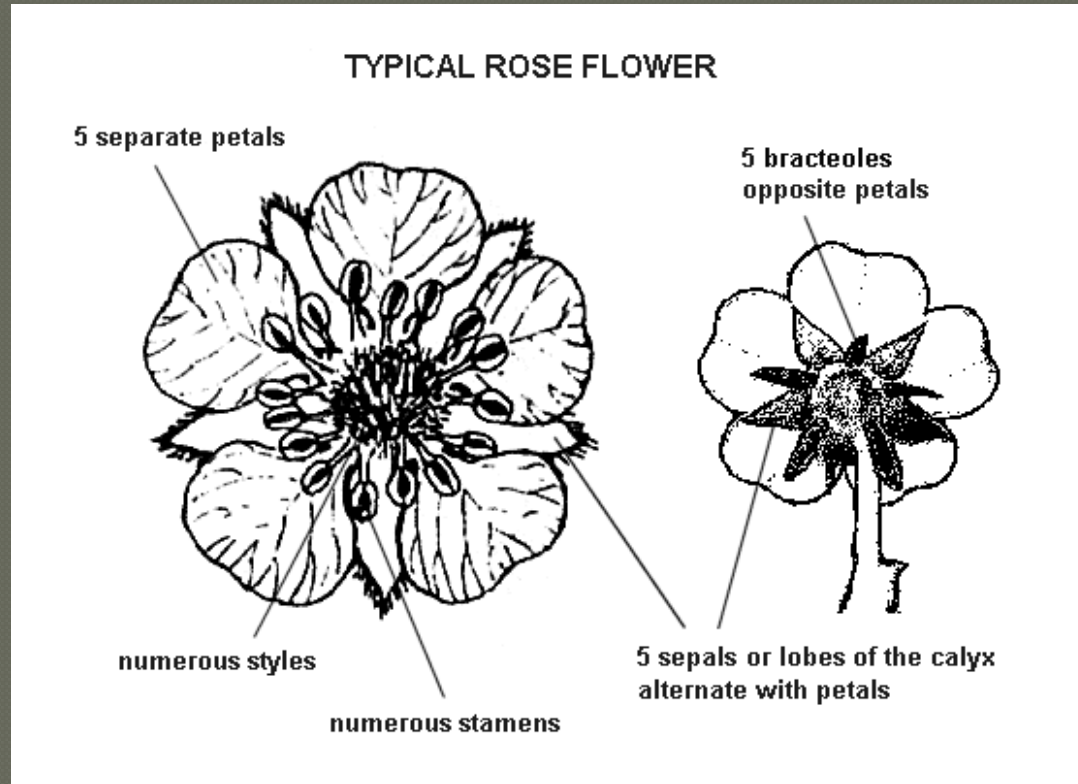
◉ ***Cercocarpus sp.*** Mountain Mahogany

◉ ***Chamaebatia*** Mountain Misery

◉ ***Purshia tridentata*** Bitterbrush



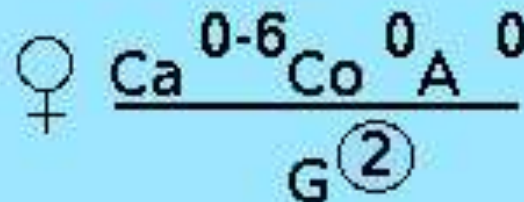
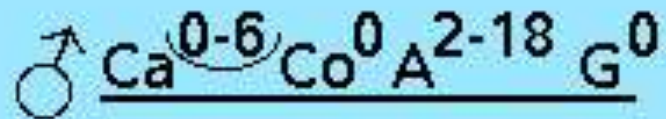
Characteristics of the Rose Family



*K5 C5 A5to++ G (5) or ++, inferior or superior

Alders (*Alnus* sp.) are in the Birch Family, Betulaceae

- Alder, birch (*Betula*) and hazelnut (*Corylus*) are native small trees in El Dorado County
- Flowers are either male or female and occur on the same plant
- No petals
- Male catkins
- Female catkins
- Fruit nut or samara
 - Winged fruit



Alders (*Alnus* sp.) are in the Birch Family, Betulaceae



Buckthorn Family, Rhamnaceae, in El Dorado County

- 24 species of *Ceanothus* - deerbrush, buckbrush, blueblossom, California lilac.
Nitrogen-fixer
- 7 species of *Frangula* - coffeeberry
- 3 species in *Rhamnus* – buckthorn

Buckthorn Family, Rhamnaceae, in El Dorado County

- Evergreen shrubs
- Many small flowers in clusters
- Fruit a drupe or capsule

⊕ ♀ $K_{4-5} C_{4-5} A_{4-5} \underline{G_{(2-4)}}$



Coffeeberry *Frangula* sp.
(formerly *Rhamnus californica*)

Mid-large shrub with grey leaves



Hollyleaf Redberry (*Rhamnus ilicifolius*)

Small shrub with green leaves



Ceanothus sp.



Ceanothus roderickii

