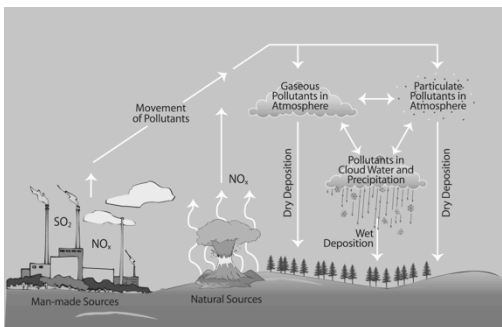
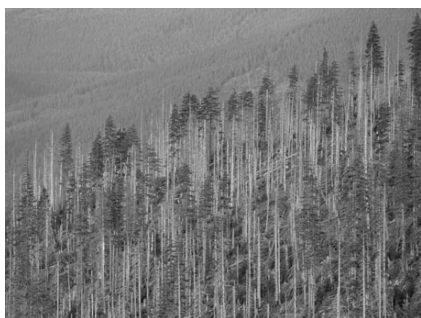


What is this?



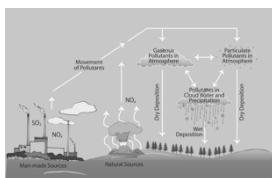
<http://fraggerwaterreport.files.wordpress.com/2010/04/epa-acid-rain-chart.jpg>

Effects of Acid Rain



<http://www.chemistryinquiryboard.org/images/forest/figure2.jpg>

Write it down.

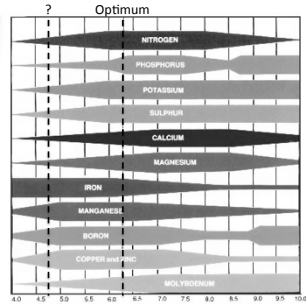


- How does acid rain negatively affect the growth of plants?
- Based on Friday's lecture about ion exchange in plant root hairs, you should be able to tell me.
- You have one elevator ride (3 minutes).

Minerals only available at certain pH

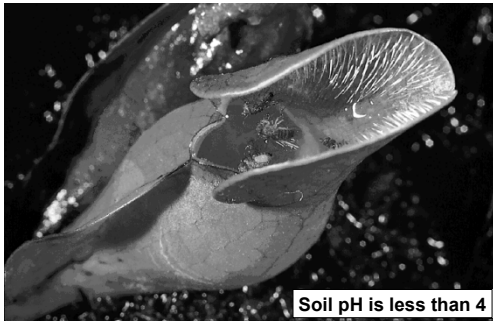
So what can a plant do to get essential nutrients at these pHs?

Low pH:
High productivity
High rainfall



<http://organicgarden.org.uk/gardening/soil/soil-chemistry>

Saracenia (pitcher plant) leaves hold water to drown insects and mine their bodies for minerals



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Carnivorous plants



Soil pH is less than 4




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These plants don't need to eat bugs as a carbon source. Plants are interested in the minerals and trace elements locked inside the cells and tissues.


Questions

- hairs is established by what enzyme?
– ATPase
- What kind of charged particle is freely dissolved in the water surrounding a root hair?
– Anion, ready to enter the cell with the help of a cotransporter



Mineral Nutrition

Plants

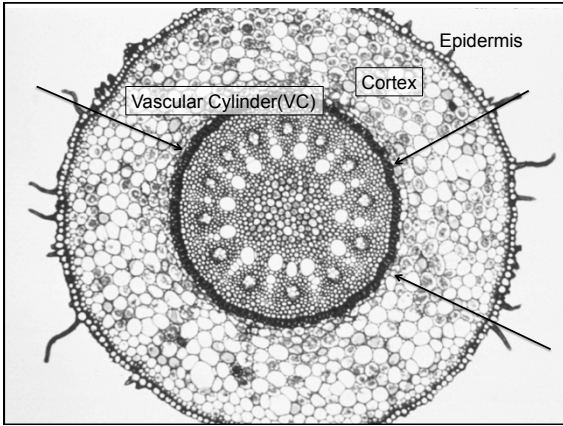


-
-
- How do they get minerals to the leaves?
-

<http://upload.wikimedia.org/wikipedia/commons/thumb/3/31/Fern02.jpg/220px-Fern02.jpg>

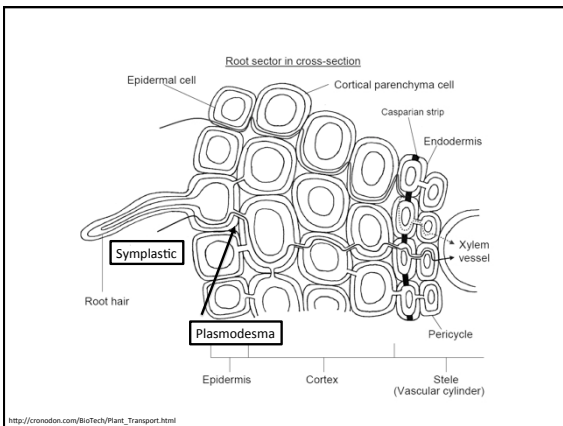
Movement of Ions in plants

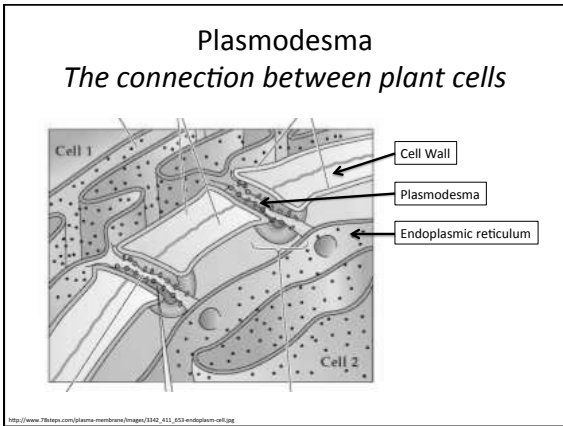
- We know how plants use proton gradients to acquire nutrients in the soil.
- How does that plant get those nutrients from the root hair to the vascular system?



Movement into the plant

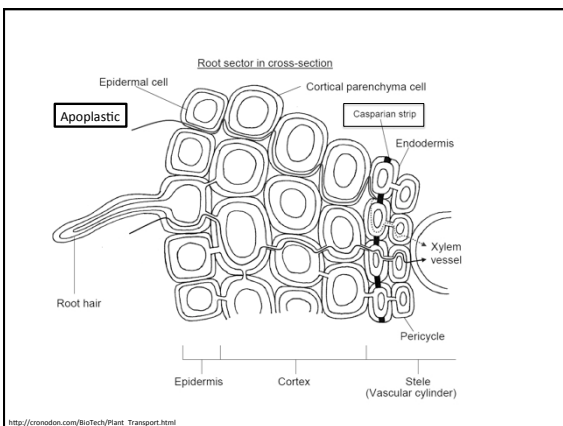
- Symplastic movement • Apoplastic movement
- Water and solutes enter the root hairs and travel to the VC intracellularly
- Travel between cells via plasmodesmata



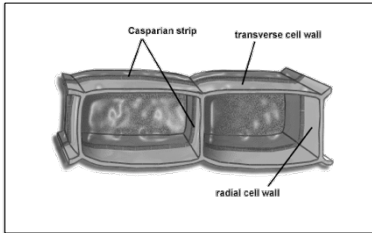


Movement into the plant

- Symplastic movement
- Apoplastic movement
- Water and solutes enter the root hairs and travel to the xylem intracellularly
- Water and solutes enter epidermis and cortex via cell walls and inter cellular spaces (porous)
- Travel between cells via plasmodesmata



Casparian Strip



<http://www.bcb.uwc.ac.za/ecotree/root/images/Endodermis.GIF>

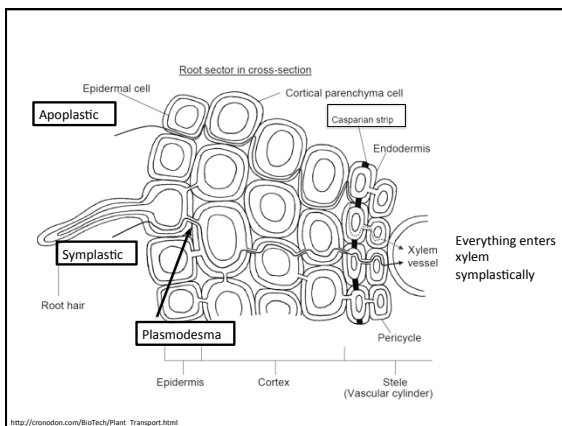
Movement into the plant

Symplastic movement

-
-
- proteins

Apoplastic movement


-
-
-
- endoderm
- Casparian Strip
-



http://cronodon.com/BioTech/Plant_Transport.html

Questions

- The movement of water through the cortex via the plasmodesmata is called what?
 - Symplastic movement
- Which one of the two types of water movement through the cortex shows the most regulation at the level of the root hair?
 - Symplastic movement




Mineral Nutrition

Plants

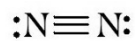
-
-
-
- How do they “fix” nitrogen?

<http://upload.wikimedia.org/wikipedia/commons/thumb/3/31/Fern02.jpg/220px-Fern02.jpg>



Nitrogen

- - NH₃ (ammonia)
 - NO₃ (nitrate)
- - N₂
 - 80% of the atmospheric gas
 - Inert, unreactive, unusable



http://chemwiki.ucdavis.edu/inorganic_Chemistry/Descriptive_Chemistry/Main_Group_Elements/Group_15%3A_The_Nitrogen_Family
