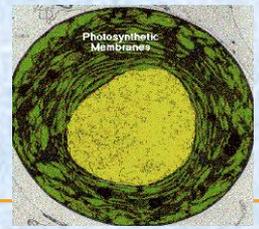


# PLANT/LEAF BIOLOGY FUNDAMENTALS

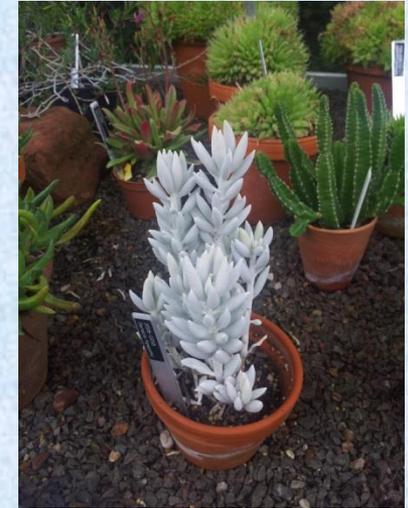


B3 Summer Science Camp  
at Olympic High School 2016



# PLANT BIOLOGY

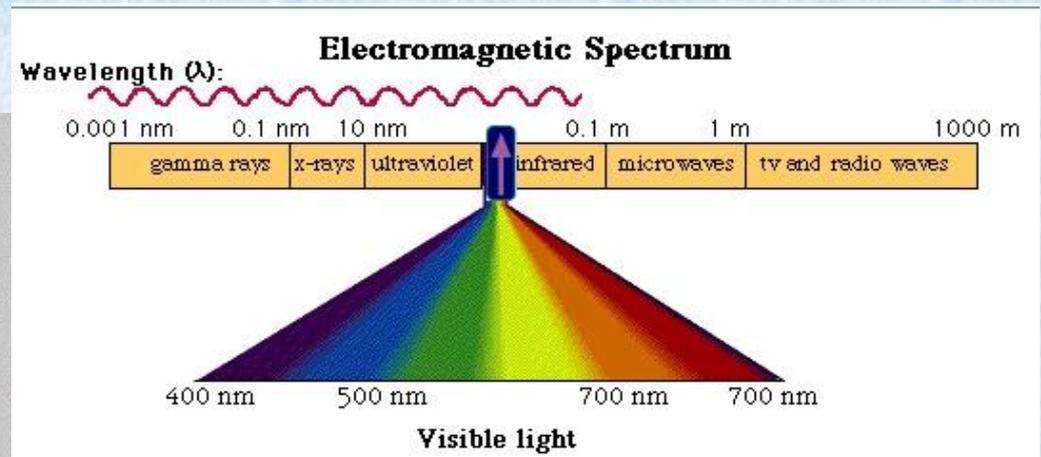
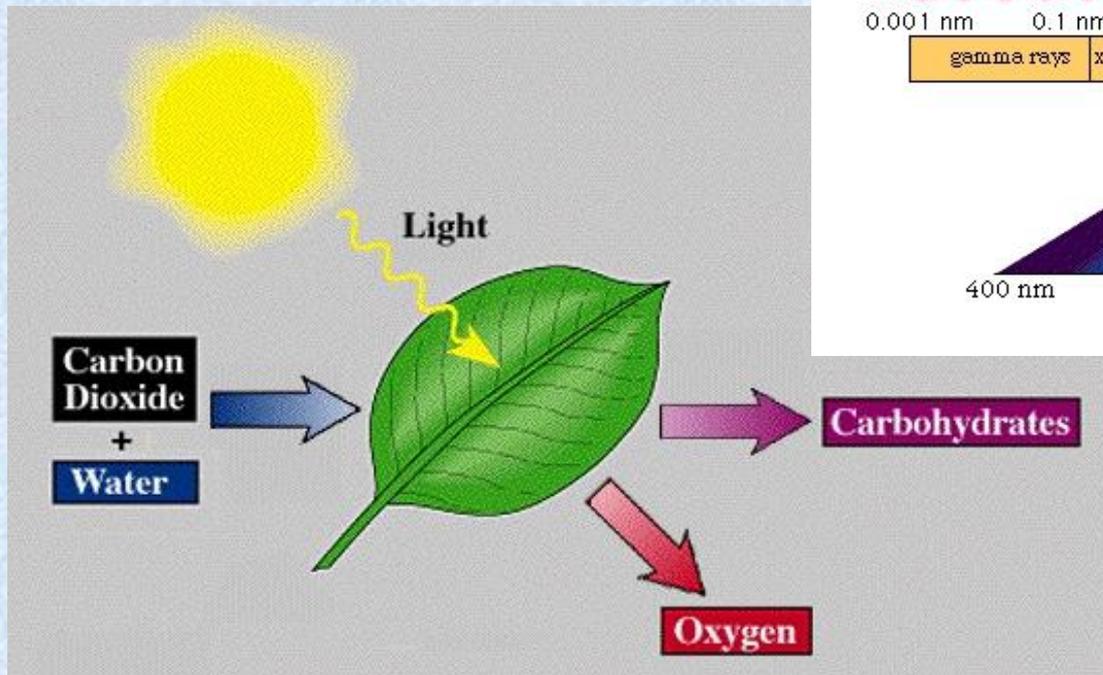
- What makes an organism a plant?
- Have their own kingdom (Plantae)
  - Flowering plants
  - Conifers
  - Ferns
  - Mosses
  - Some algae
- Kingdoms are separated because the *forms* of the organisms are different (shape, or morphology).
  - Chemistry: cellulose in the cell walls, photosynthesize with chlorophyll.
  - Biology: multi-cellular and differentiated, developmental changes, sexual reproduction, modular/indeterminate growth, alteration of generations.
  - Lifestyle: stationary, no immune system, phototrophs



# PHOTOSYNTHESIS

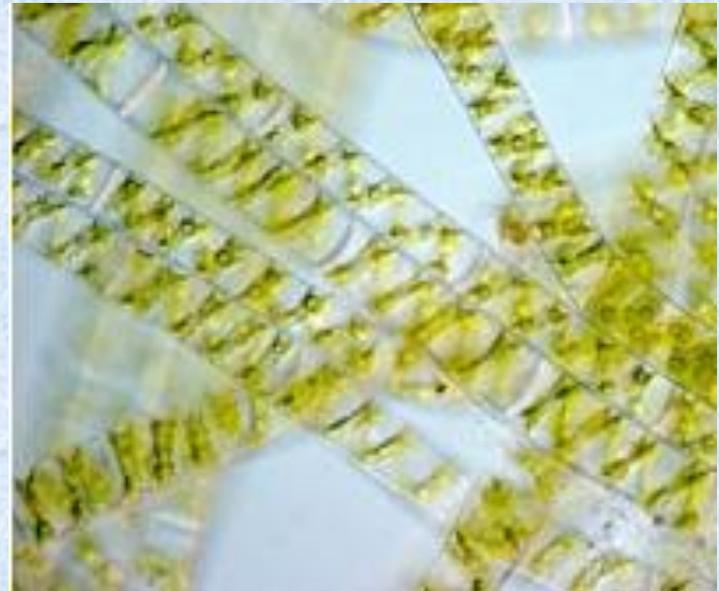
- ✘ The most important problem facing an organism: where does my energy come from?
- + Plants use a chemical process called photosynthesis.

$$E = mc^2$$



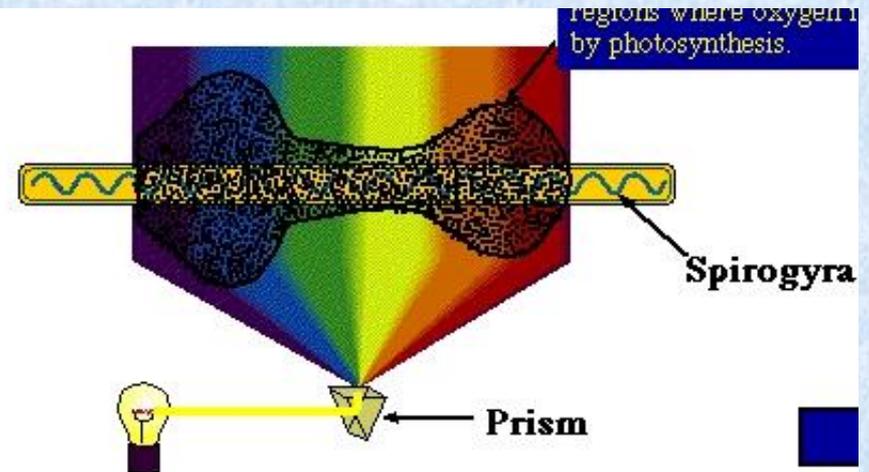
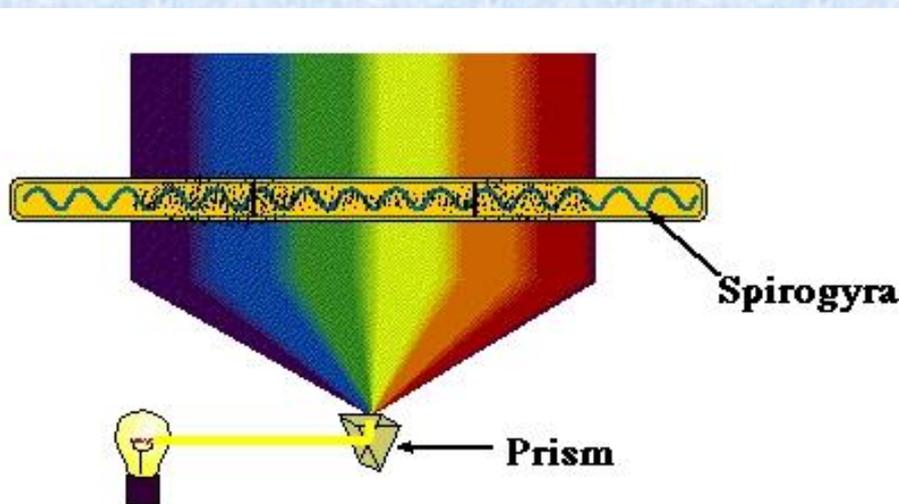
# CAPTURING PHOTONS

- ✘ Different plants select different sets of photons as the energy source (wavelength)
  - + Why is this an advantage (think competition)
  - + How do you figure out what photons are used by the plant?
    - ✘ What experimental design can you think of to test this?



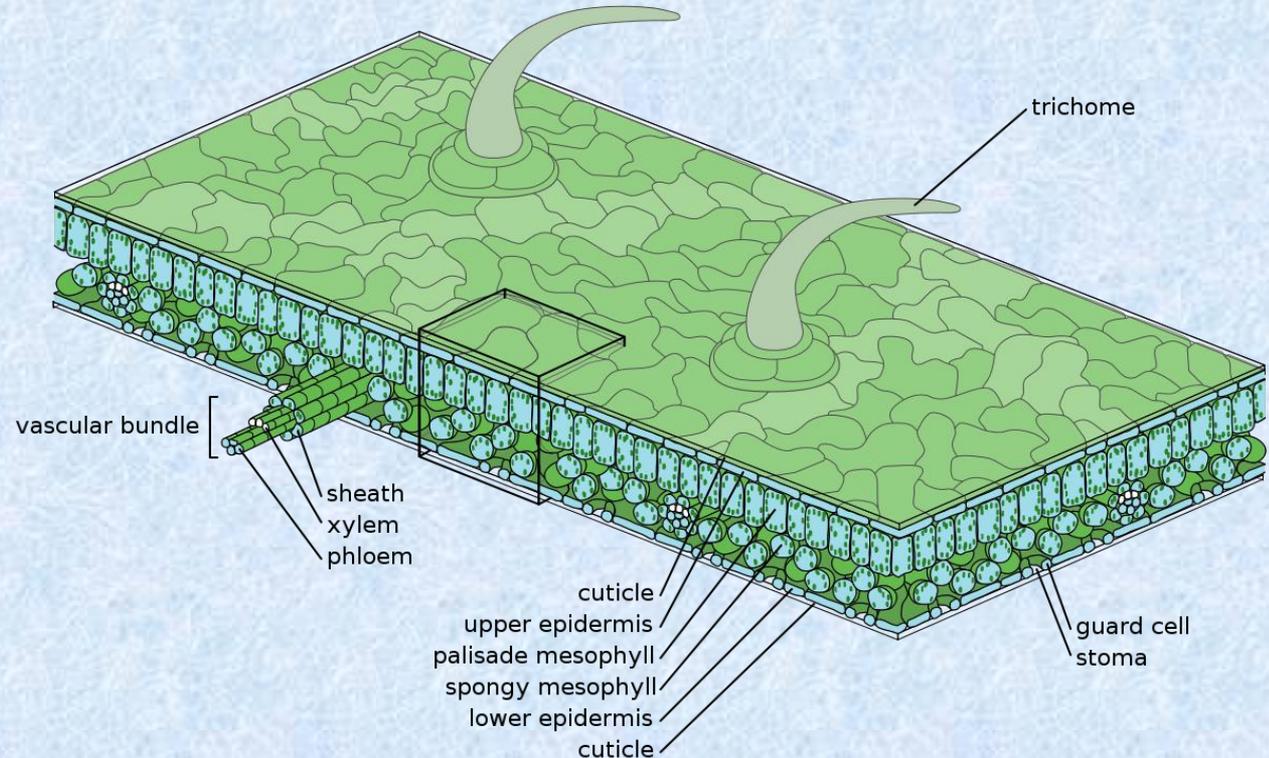
# WAVELENGTH: THE SPIROGYRA EXPERIMENT

- ✘ In water the oxygen collects as bubbles on the leaf surface –there is a high local concentration of oxygen
- ✘ There are bacteria that need the oxygen to survive
- ✘ A prism can be used to select the wavelength of light that illuminates the aquarium.



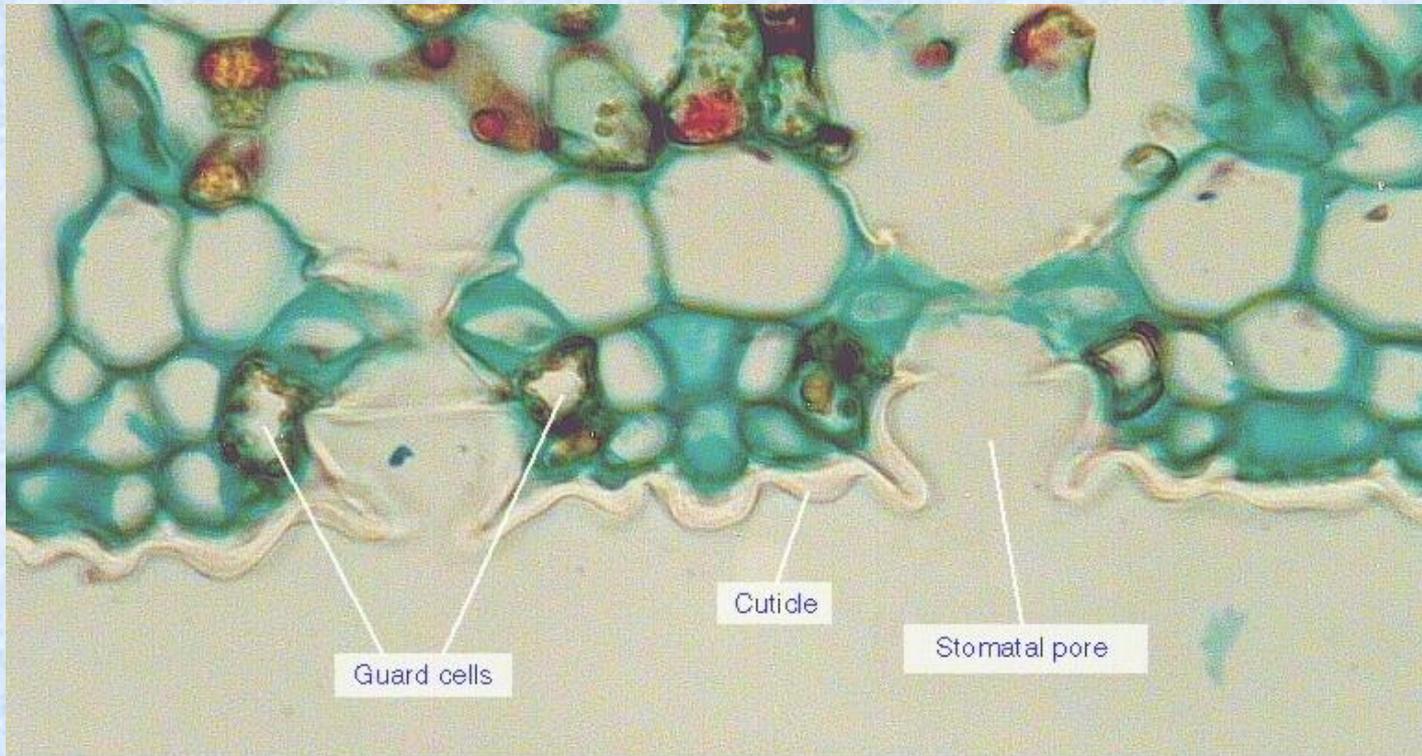
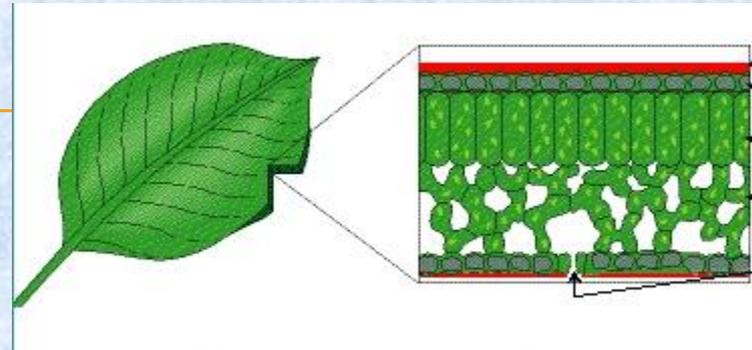
# LEAF STRUCTURE

- ✘ If you think of organisms as machines – they have parts with particular functions - these parts are *organs*.
- + What is the function of each part of the leaf (the part we harvested)?

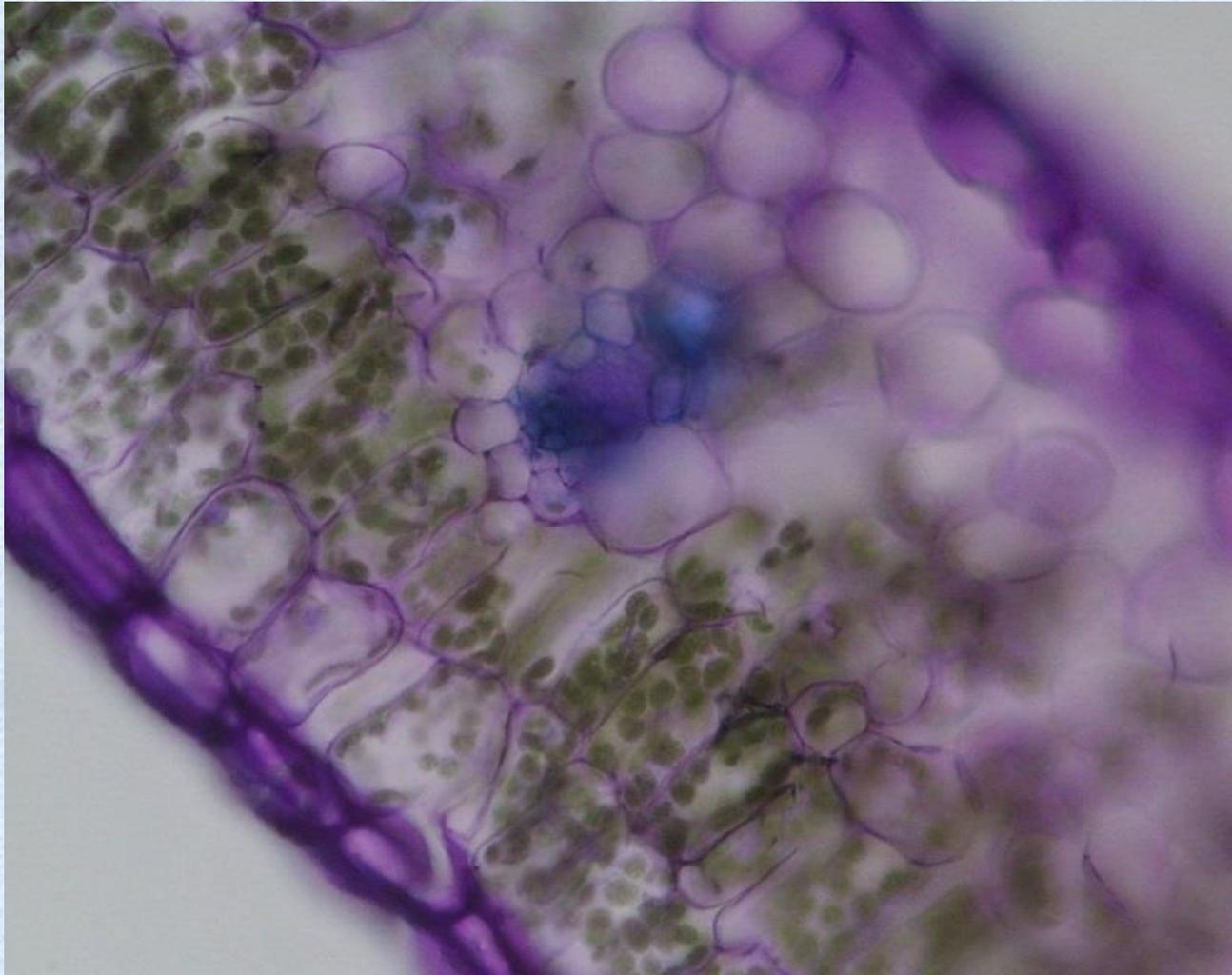


# LEAF CELLS

- Cuticle (red)
- Upper epidermis (grey)
- Spongy mesophyll
- Palisade Mesophyll
- Stoma (opening)



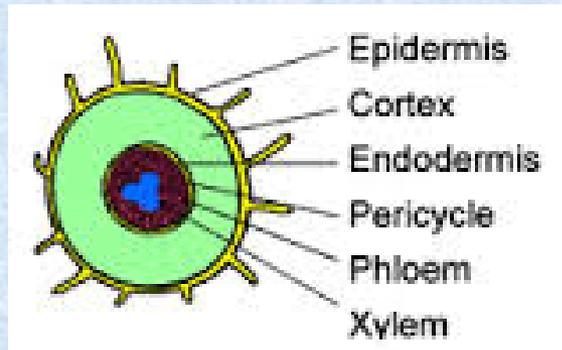
# LEAF CELLS – STRUCTURES



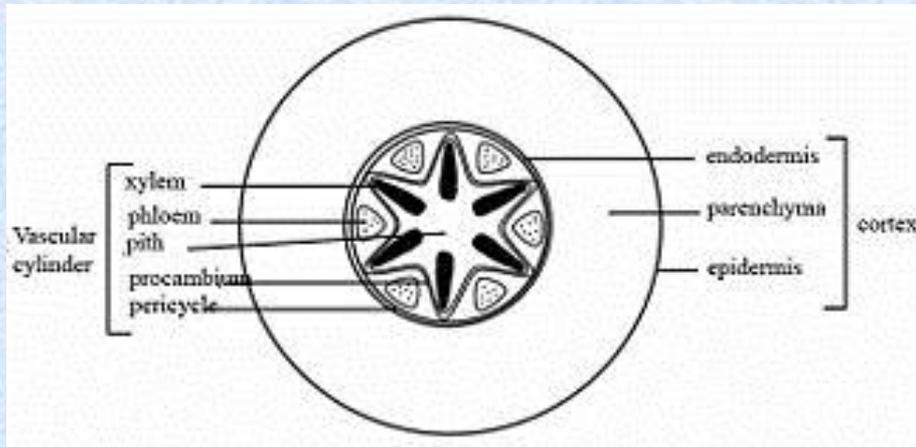
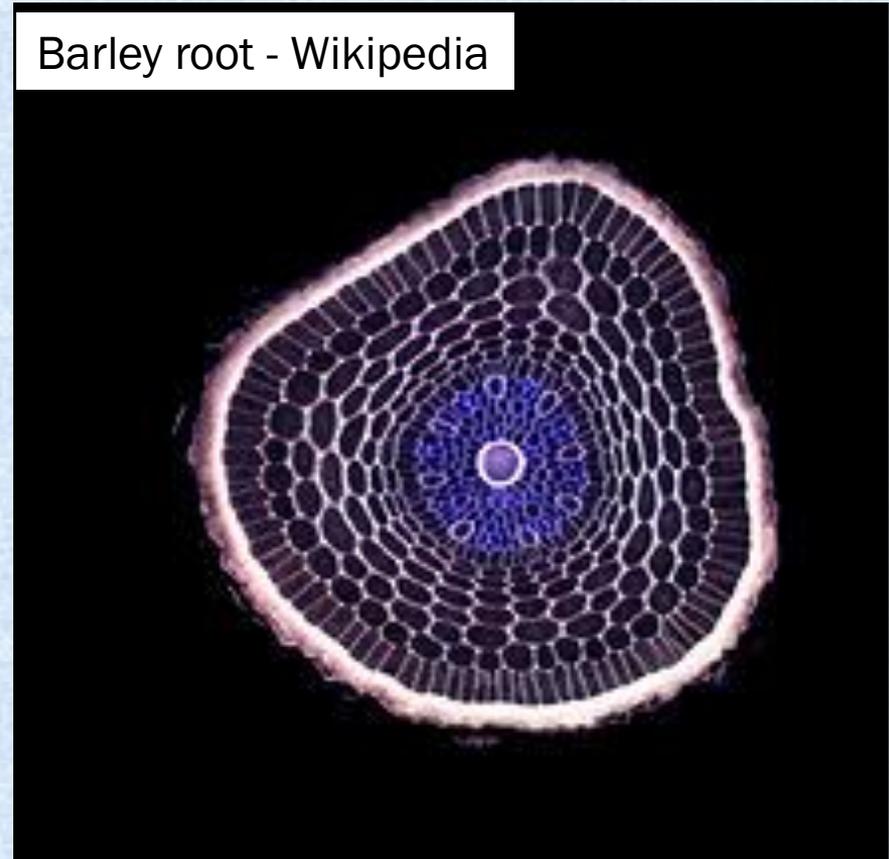
[faculty@unlv.edu](mailto:faculty@unlv.edu) – identify the layers

# ROOT STRUCTURE

- ✘ Vascular plants have roots (organs)- usually underground, but not always for climbers like ivy. Shape is tube-like rather than flat.



Barley root - Wikipedia



More about photosynthesis in plants and plant diversity:

[https://www2.estrellamountain.edu/faculty/farabee/biobk/BioBookDiversity\\_2.html](https://www2.estrellamountain.edu/faculty/farabee/biobk/BioBookDiversity_2.html)

# PLANT TYPES

- ✘ Why are plants central to land ecology?
- ✘ What toxic compound do plants produce the most of?
- ✘ How many species of *vascular* plants are there?
- ✘ How many species are living at this time?

