

PLANT/LEAF BIOLOGY FUNDAMENTALS

B3 Summer Science Camp
at Olympic High School

PLANT BIOLOGY

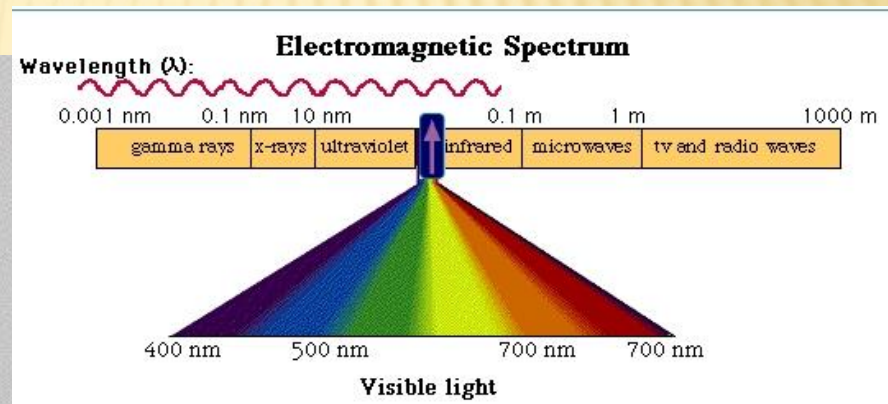
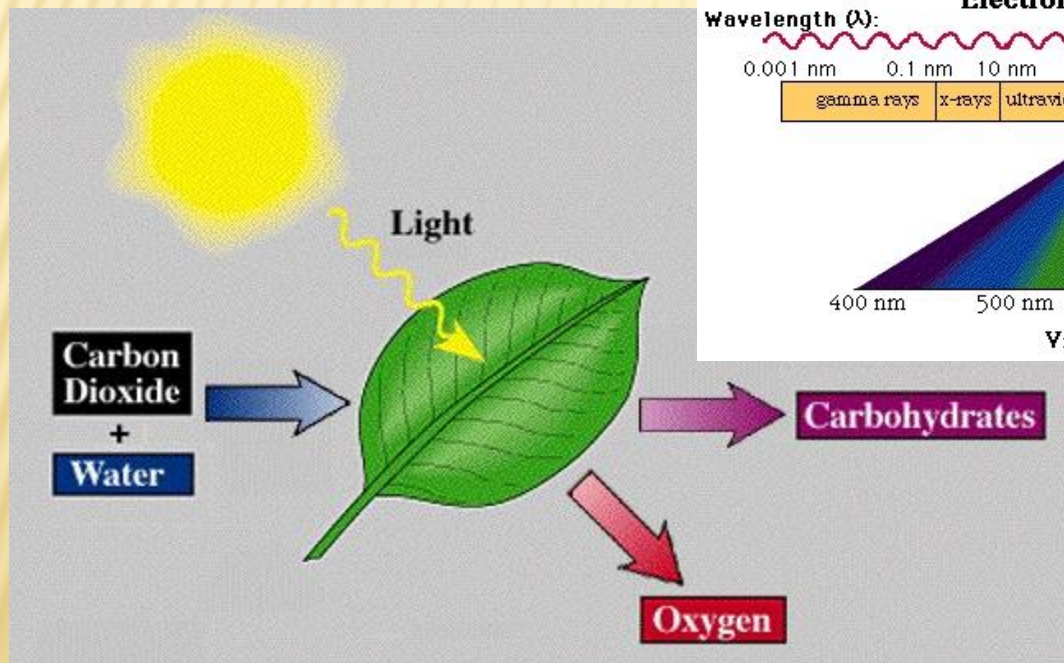
- What makes an organism a plant?
- Have their own kingdom (Plantae)
 - Flowering plants
 - Conifers
 - Ferns
 - Mosses
 - Some algae
- Kingdoms are separated because the *forms* of the organisms are different (shape, or morphology).
 - Chemistry: cellulose in the cell walls, photosynthesize with chlorophyll.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



PHOTOSYNTHESIS

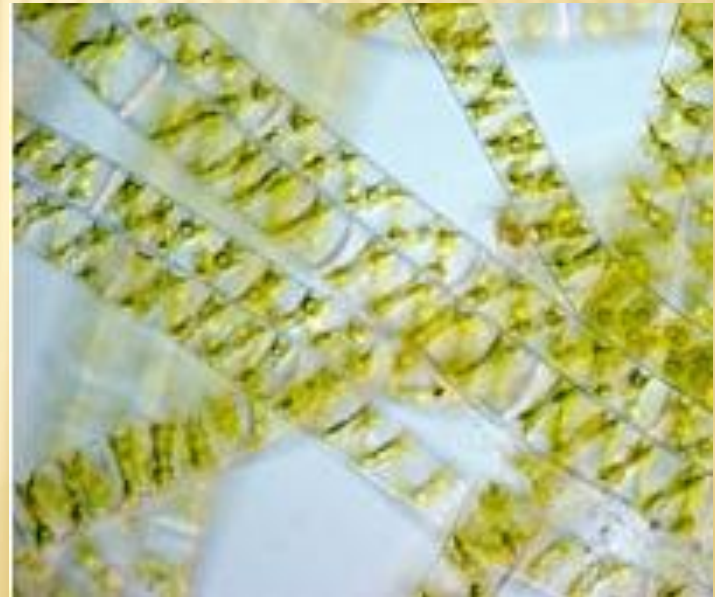
- ✘ The most important problem facing an organism: where does my energy come from?
- + Plants use a chemical process called photosynthesis.

$$E = mc^2$$



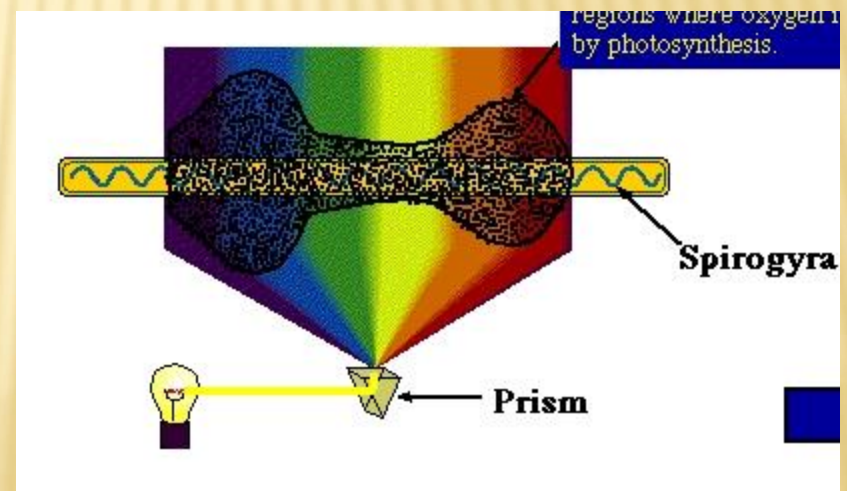
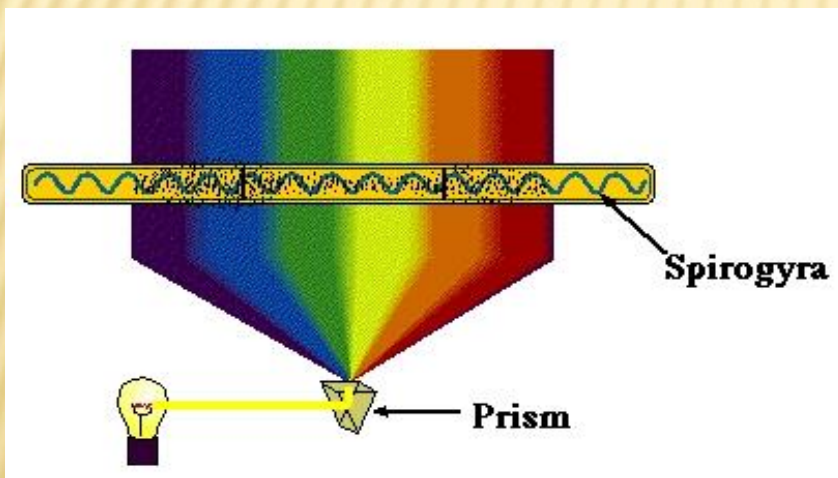
CAPTURING PHOTONS

- ✘ 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?



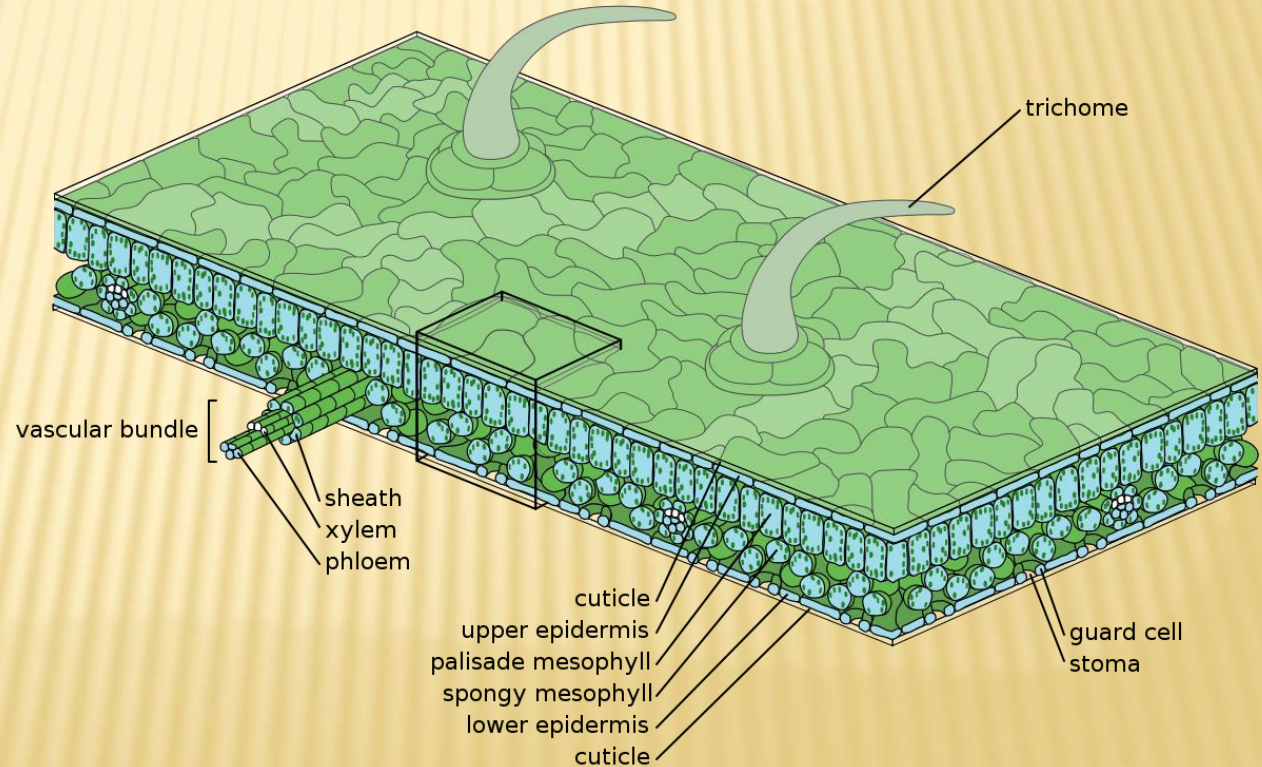
WAVELENGTH: THE SPIROGYRA EXPERIMENT

- ✗ 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.



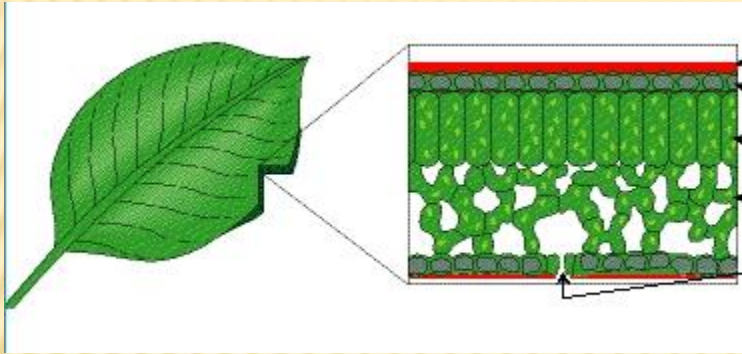
LEAF STRUCTURE

- ✘ 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)?

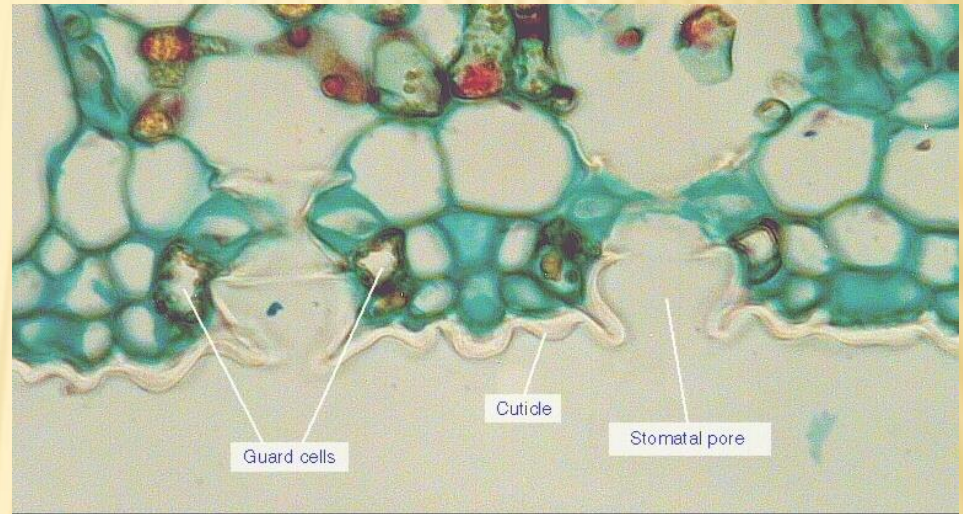


LEAF CELLS

✘ More on specialized cells.

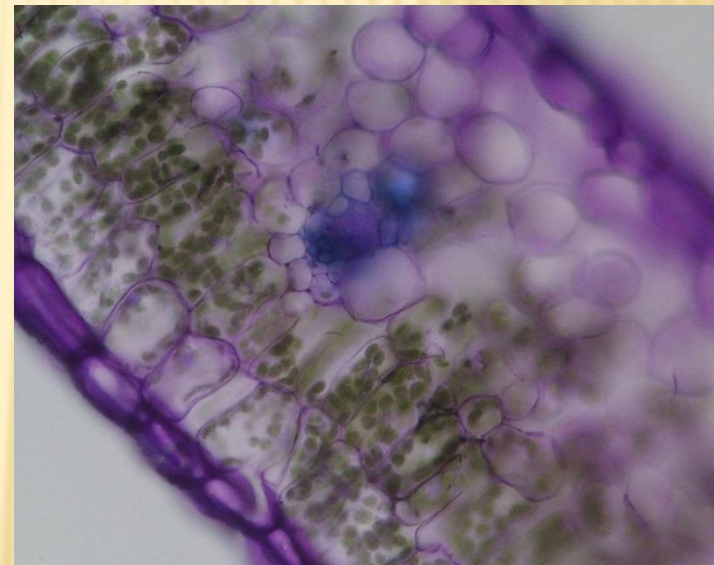
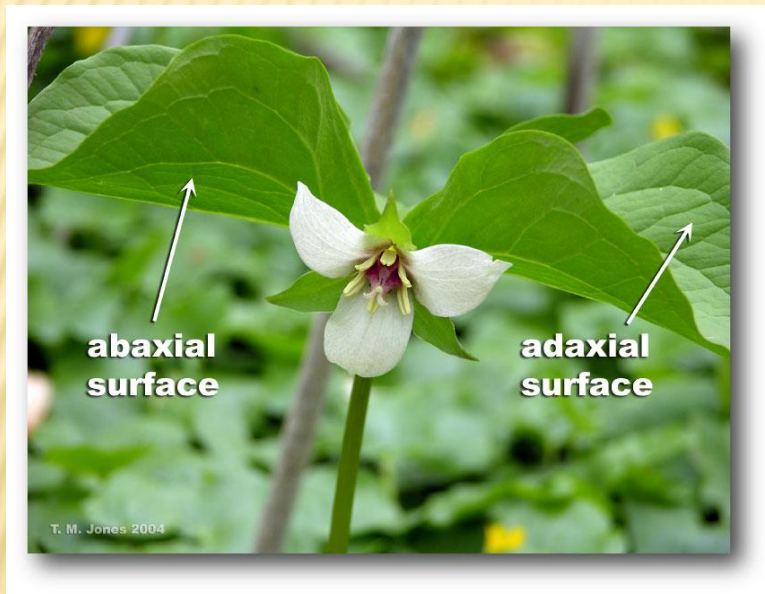


Cuticle (red)
Upper epidermis (grey)
Spongy mesophyll
Palisade Mesophyll
Stoma (opening)



LEAF CELLS – WHICH SIDE?

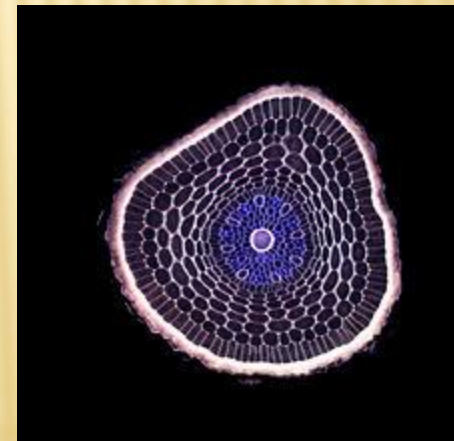
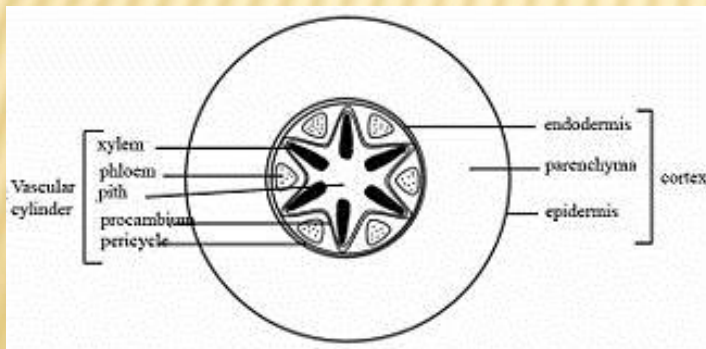
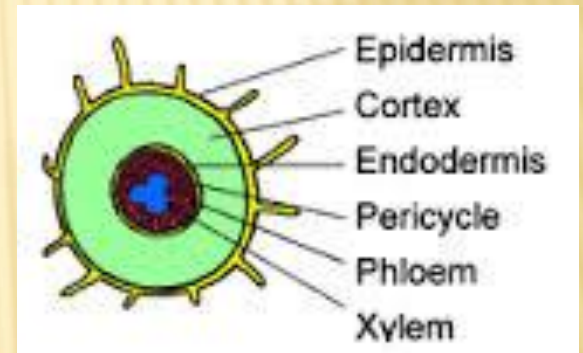
- ✘ The top of the leaf is the adaxial side and the bottom is the abaxial side.



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ROOT STRUCTURE

- ✘ Vascular plants have roots (organs)- usually underground, but not for climbers like ivy.



Barley root - Wikipedia

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?

