
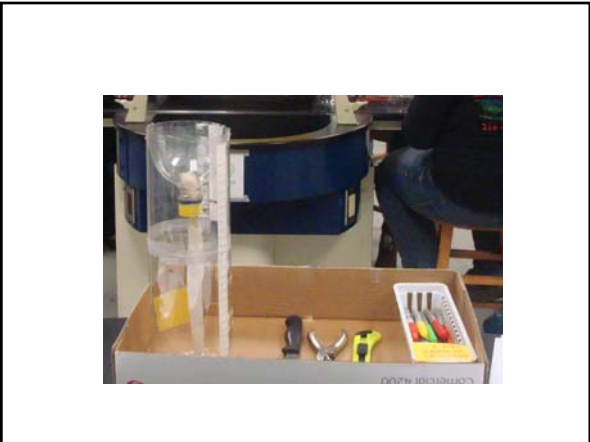


TerrAqua Columns

Niches and Community Interactions

- ## Materials
- | | | |
|----------------------------|----------------|------------------------|
| 2x 2-Liter soda bottles | seeds | hole punch |
| 1 bottle cap | soil | scissors |
| 2 paperclips | ice pick / awl | clear and masking tape |
| distilled water/pond water | utility knife | pen/sharpie |
| pebbles | drill | ruler |
| wicking material-fabric | | |
- Some materials we need to share, be patient
 - Help your partner when needed

- ## The Ecosystem Lab
- 
- Construct TerrAqua columns with 2 2-Liter bottles
 - Once assembled:
 - keep at home and track progress using photos , drawings and graphs
 - Measure and record data for a period of 2 weeks



Masking tape ruler



Why study TerrAqua Columns?

- Terrestrial and aquatic ecosystems are often looked at as two independent entities.
- Land and water are connected in many ways.
- The major link between terrestrial and aquatic ecosystems is water.

- Populations of algae, aquatic plants, and animals can be monitored in aquatic systems.



- Changes in soil microorganism populations and soil structure can also be monitored.



- Various aspects of terrestrial and aquatic systems can be monitored by the growth of plants and algae.

- For plants in the terrestrial system, % germination, height, weight, leaf size, length of life cycle and seed production can serve as measures of plant health.

Water is essential for terrestrial communities and usually finds its way to

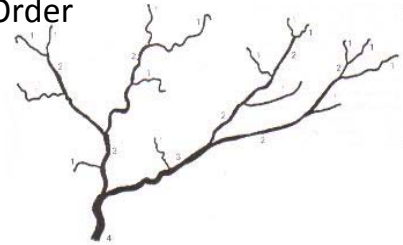
- Wetlands
- Rivers
- Lakes
- Oceans



- As water passes through the soils of fields and forests, it picks up compounds such as nutrients and agricultural chemicals.
- These compounds enter aquatic communities, modifying the biological, physical, and chemical aspects of those communities.

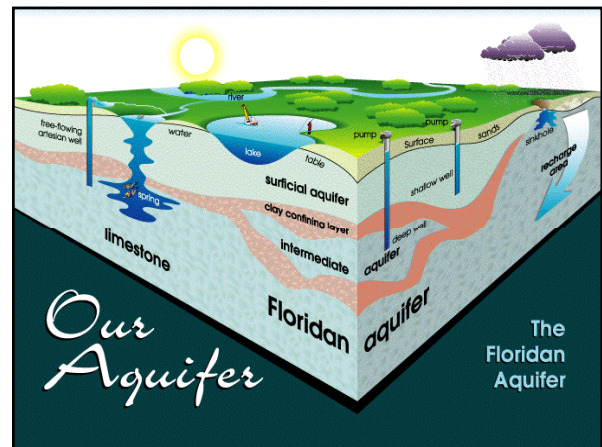
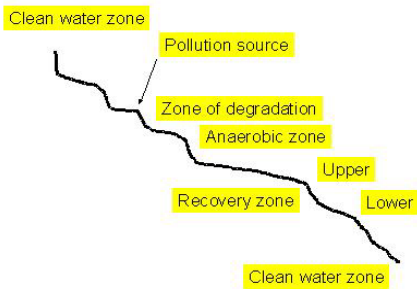
- Recent concerns about interactions between land use and water quality have led to the study of nutrient and chemical flow from terrestrial to aquatic ecosystems.
- Fertilizers and pesticides make their way into aquatic systems, causing water-quality problems
 - algal growth / blooms
 - build-up of toxins in drinking water

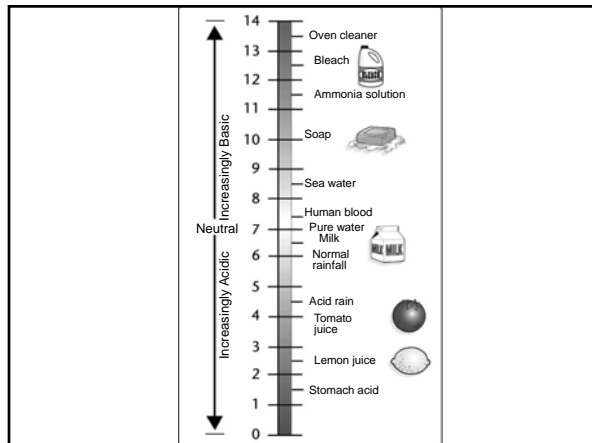
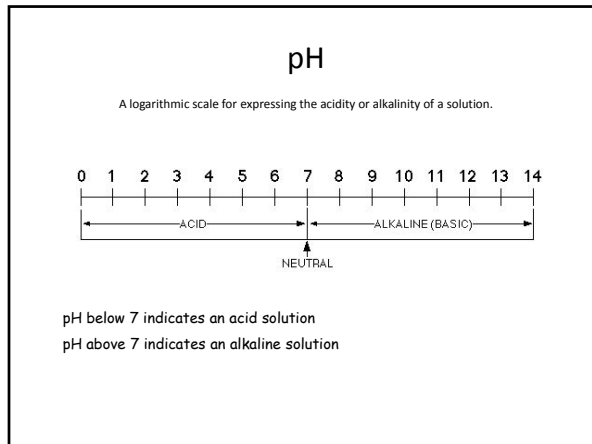
Stream Order



- 1st order streams have no tributaries
- 2nd order streams are where two 1st order streams meet
- 3rd order streams are where two 2nd order streams meet
- 4th order streams are where two 3rd order streams meet

Pollution





Dissolved Oxygen

- Dissolved oxygen is an essential indicator in assessing a water-body's health
- Oxygen enters the water from the atmosphere and through aquatic plant and phytoplankton photosynthesis

- The oxygen is then available for aquatic organisms to utilize in basic metabolic processes
- Most plants and animals can grow and do well when the dissolved oxygen level exceeds 5 mg/L
 - A drop in the level to 3-5 mg/L causes organisms to become stressed
 - Levels below 3 mg/L causes death in many species

- Oxygen is used up during the decomposition of organic material
- An overload of nutrients from human activities (fertilizers and run off) cause overgrowth of phytoplankton
- The phytoplankton ultimately die and fall to the bottom where they decompose, using up oxygen

- The nutrients - phosphorus (P) and nitrogen (N) - that fertilize our lawns, also "fertilize" our river, lakes, ponds and streams
- Many area streams, lakes and ponds are grossly over-fertilized by nutrients, which come from storm water runoff and sewage treatment plant discharges

- These excess nutrients cause aquatic plants and algae to grow over abundantly in the summer
 - a condition called **eutrophication**
- This plant and [algal growth](#) can ruin waterways for boating, fishing and swimming
- The uncontrolled growth also harms fish and other aquatic life by changing the amount of dissolved oxygen in the water system



Resources

- Ancient Lights. (2003). *Biology: the science of life: ecosystems: the role of abiotic factors*. Retrieved September 26, 2011 from <http://www.discoveryeducation.com>
- Mackean, D. (2009). *IGCSE Biology*, 2nd ed. London, UK: Hodder Education.
- Miller, K., Levine, J. (2011). *Biology, Florida ed*. Pearson Education, Inc.

Florida Ecosystems

- hardwood hammocks
- mangroves
- pinelands
- scrubs
- coral reefs
- dunes
- marshes
- swamps

[Click here](#)