TerrAqua Columns

Materials

2x 2-Liter soda bottles	distilled water	hole punch
1 bottle cap	utility knife	scissors
2 paperclips	pebbles	clear and masking tape
1 snail	seeds	pen/sharpie
1 aquatic plant	soil	ruler
wicking material-fabric	ice pick / awl	lab report

- 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

Florida Ecosystems

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

Click here

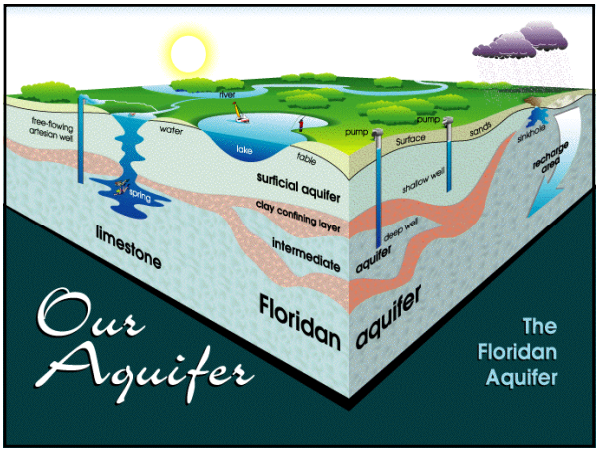
- Terrestrial and aquatic ecosystems are often looked at as two independent entities.
- Land and water are connected in many ways.
- The major link between terrestrial and aquatic ecosystems is water.

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.

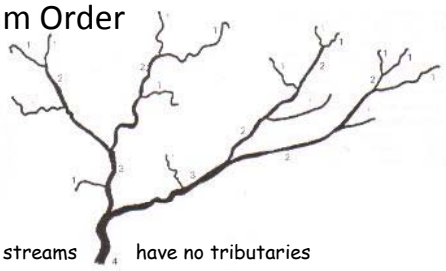
- Recent concerns about interactions between land use and water quality have led to the study of nutrient and chemical flow from terrestrial to aquatic ecosystems.
- Fertilizers and pesticides make their way into aquatic systems, causing water-quality problems
  - algal growth / blooms
  - build-up of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



- 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.

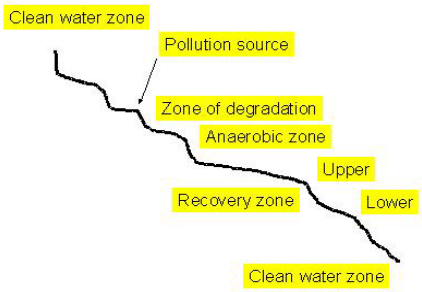
- Populations of algae, aquatic plants, and animals can be monito in aquatic systems.
- Changes in soil microorganism populations and soil structure can also be monitored.

Stream Order



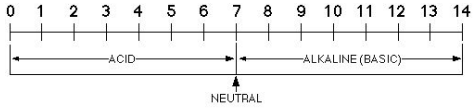
- 1st order streams have no tributaries
- 2nd order streams are where two 1st order streams meet
- 3rd order streams are where two 2nd order streams meet
- 4th order streams are where two 3rd order streams meet

Pollution



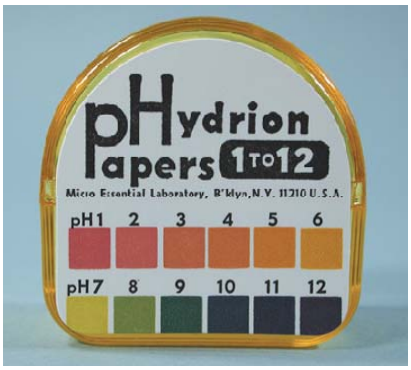
pH

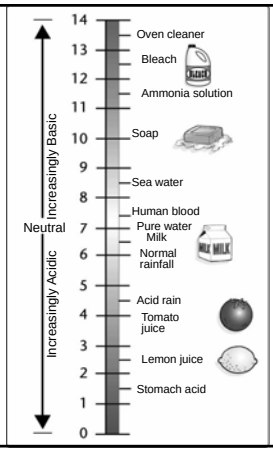
A logarithmic scale for expressing the acidity or alkalinity of a solution.



pH below 7 indicates an acid solution

pH above 7 indicates an alkaline solution





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.

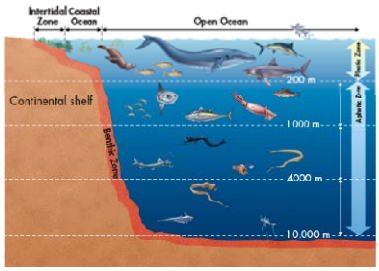
- The oxygen is then available for aquatic organisms to utilize in basic metabolic processes.
- Most plants and animals can grow and do well when the dissolved oxygen level exceeds 5 mg/l. A drop in the level to 3-5 mg/l causes organisms to become stressed. Levels below 3 mg/l causes death in many species.

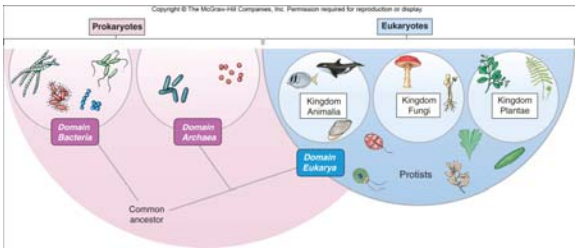
- Oxygen is used up during the decomposition of organic material.
- An overload of nutrients from human activities cause overgrowth of phytoplankton.
- The phytoplankton ultimately die and fall to the bottom where they decompose, using up oxygen.

- The same 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 prolific plant and algal growth can ruin waterways for boating, fishing and swimming. Red Tide
- The uncontrolled growth also harms fish and other aquatic life by changing the amount of dissolved oxygen in the water system.

Marine Ecosystems





Resources

Mackean, D. (2009). IGCSE Biology, 2nd ed. London, UK: Hodder Education.