

Water Quality and its Effects on Living Things

Lesson 34

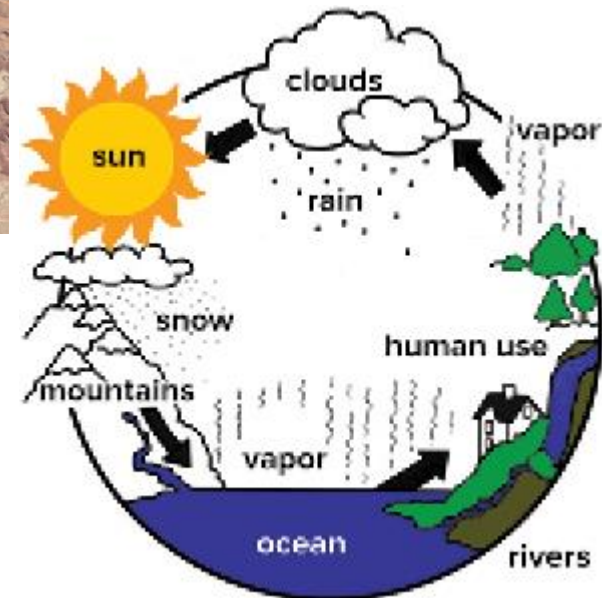
Water quality and its effects on living things

- Water is essential to the survival of every organism on Earth
- Yet, for centuries, humans have used rivers and oceans as dumping grounds for
 - Garbage
 - Sewage
 - Other waste
- We are only learning now that even though organisms living in the water can break down a great deal of the waste materials, we are putting TOO much material in the system



Water quality and its effects on living things

- Water is considered a renewable resource because it is recycled in the water cycle
- People get their water from lakes, rivers, ground water
 - But, in many places in world, water is used faster than it can be recycled
 - Large rivers, like the Colorado River in the US, are being reduced to small streams b/c so much water has been removed



Sources of Water Pollution

- Pollution is a term that refers to any of numerous types of **harmful materials** that are **released into the environment** through **natural** or **human activities**
 - Can be caused directly (point source) or indirectly (non-point source)



Point Sources of Pollution



- Those that come from a small, specific area
- Easy to identify because the material can be traced to the source (you can POINT at it)
- Other point sources of pollution
 - Landfill leak
 - Factory or mill pumping waste water into a river
 - Oil spills
 - Underground storage containers for gas stations
 - Sewage systems
 - Waste water treatment plants
- Because these sources are single locations that can be detected, they are usually simple to recognize and control



Point Sources of Pollution

Point Source	Description of Pollution
Resource industry	Leaks from oil and gas drilling
Recreational	Oil spills from boats and cars
Marine transportation	Garbage from freighters, cruise ships, and tankers
Industrial	Waste water from factories, mills, and power plants

Non-point Sources of Pollution

- Have you ever noticed the dark, shiny area that runs down the middle of the road?
 - The result of rubber residue and oil that has leaked from cars and trucks
 - Eventually, rain washes this material into storm drains and sewers, and the contaminated water is carried to a river and then to the ocean



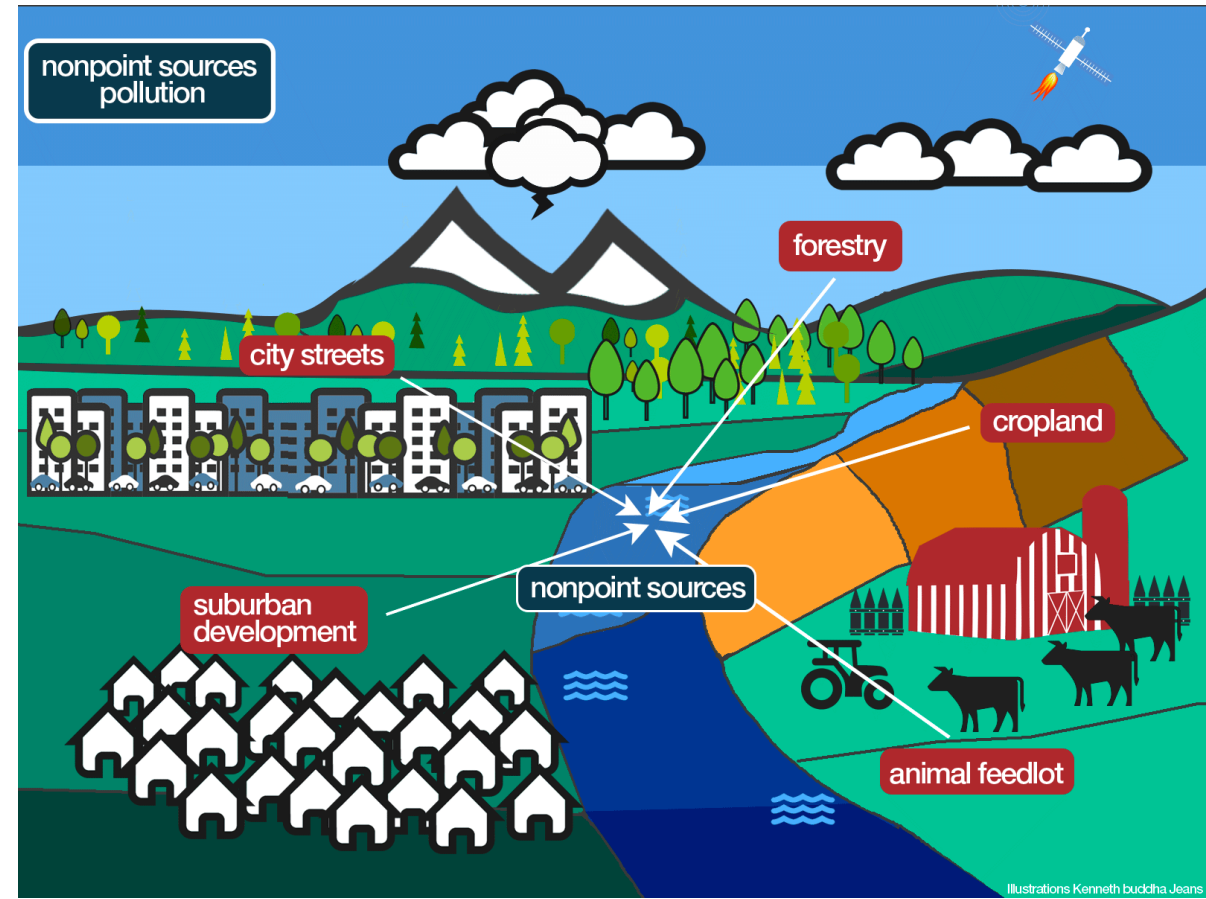
Non-point Sources of Pollution

- Just 1 L of oil can pollute 1 million litres of water
 - However, it is not just oil that gets washed into storm drains
- Pesticides and fertilizers from lawns, animal wastes from parks and farms, and run-off from city streets and driveways are also a problem



Non-point Sources of Pollution

- Non-point sources of pollution are those that come from many different sources, not just one
 - There are many ways for such pollution to get into the water system
 - Makes it difficult to control
 - Many small sources can combine to cause major environmental damage
- Public education and awareness is the most effective way of dealing with this type of problem



Non-point Sources of Pollution

Non-point Source	Description of Pollution
Land development	Industrial spills, increased run-off, increased sediments in water
Agriculture	Pesticides, fertilizers, animal waste
Storm water run-off	Oil, chemicals, and other contaminants from industrial, commercial, and residential sources
Sewage treatment	Sewage leakage, causing bacterial contamination
Forestry	Increased run-off, increased sediments in water, increased erosion
Air pollution from automobiles and industry	Air filled with particles and toxins that become deposited in water supplies
Water activities	Gas and oil spills from boats

Non-point Sources of Pollution

- Ground water is one of the most important sources of water affected by non-point sources of pollution
 - Polluting chemicals spilled on to the ground can find their way into ground water and then aquifers
 - Water flowing through aquifers takes a long time to move through pore spaces in rock
 - Therefore, pollutants may contaminate (spoil or even poison) water supplies from hundreds of years



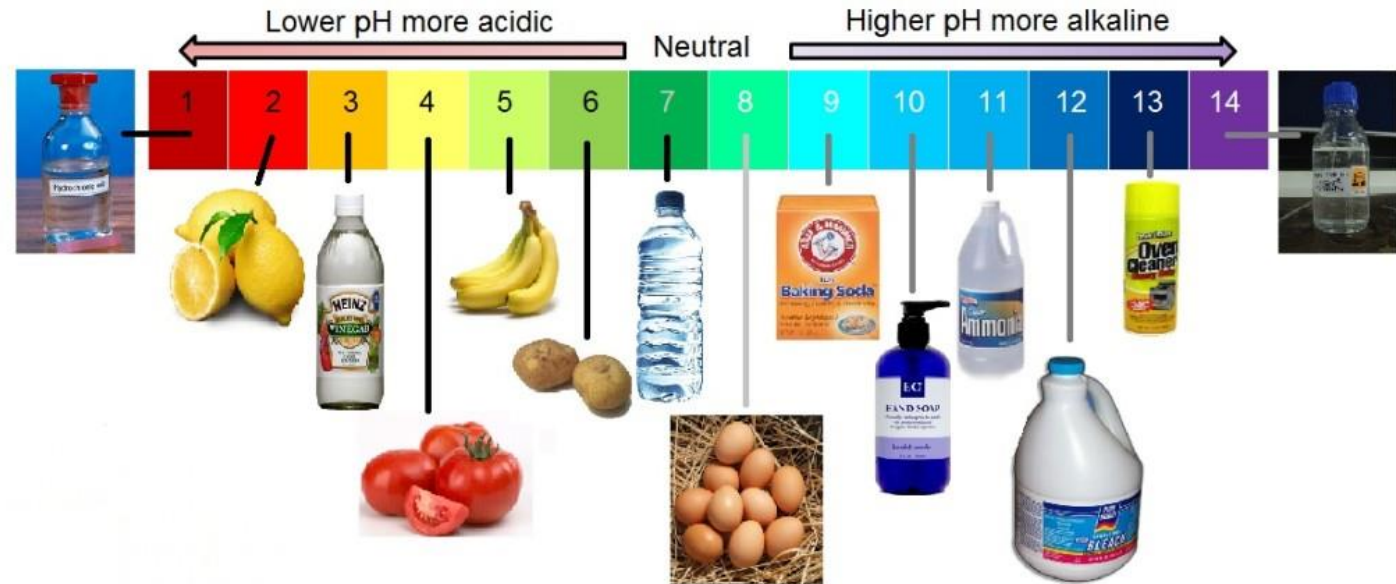
The Effects of Water Pollution

- Harmful chemicals in water can hurt or kill things that live in water
 - Can also harm or kill people and other living things that drink polluted water
- Animals (including people) may eat other living things that are sick or poisoned from pollution, thus becoming sick as well
- Other pollutants (old fishing nets, plastic) can hurt living things if they get tangled in them
- Oil spills hurt and kill living things because the oil sticks to them
 - May suffocate
 - Birds cannot fly with oil on their wings



How pollution in the air affects water quality

- Some pollutants are gases and particles that are given off by cars, trucks, smokestacks
 - The wind carries these pollutants high into the air
 - They mix and dissolve with water vapour and form strong acids
- **Acidic precipitation** (acid rain and acid snow) carries this acidic water back to Earth and makes water in ponds and lakes more acidic
- Precipitation is called acidic if it has a pH of less than 5.0



Summary



Water is essential to the survival of every organism on Earth. Yet many factors, natural and human-related, can interfere with the water cycle and the quality of the water at various stages of the cycle. When this happens, the life that exists in aquatic environments can change, often not for the better. Human activities are a particular concern because they can lead to rapid and sometimes devastating changes in the water resources on which we all rely, especially clean drinking water.

