


Slide 1


Chemistry of Water & Waste Water

Welcome to RIT Chemistry 272



Slide 2

**Chemistry, Chemistry, why for us
thou, Chemistry?**




Chemistry is the MOST practical of the sciences.

Chemistry is rooted in materials (things) and their properties.

Any science that cares about things, cares about Chemistry.

Slide 3

Types of Chemistry




Chemistry has several different branches of study, each of which supports environmental science in a slightly different way:

- Organic Chemistry
- Inorganic Chemistry
- Physical Chemistry
- Analytical Chemistry
- Biochemistry

Note: There are other ways to subdivide chemistry

Slide 4

Organic Chemistry



Organic Chemistry is all about compounds containing carbon and a handful of other types of non-metal atoms (O, H, N, S, P, Cl, Br, F).


Because of the way carbon bonds to form molecules, there are actually more organic molecules than any other kind.

Since life forms are built of organic molecules, organic contaminants can impact those life forms.

In natural systems, death and decay release organic materials into the ecosystem.

Slide 5


Inorganic Chemistry



Inorganic chemistry studies all of the molecules that aren't organic. Most metals and metal compounds fall into this group.

Slide 6

Physical Chemistry




Physical chemistry studies the physical properties of all molecules. Physical properties include things like boiling point, vapor pressure, solubility, interaction with other molecules.

Knowledge of physical properties helps us to understand the interaction with water and water systems, the interaction with other materials in the water shed. It also gives us clues as to ways to remove the contaminants and to test for the contaminants.

Slide 7

Analytical Chemistry




Analytical chemistry is about the separation, identification, and quantification of molecules. This is one of the most essential areas in environmental science because it provides the basis for determining the degree and type of contamination in a water system.

This is CSI

Slide 8


Biochemistry



Biochemistry really incorporates much of the other four sub-disciplines of chemistry but focuses specifically on the molecules associated with living organisms. In doing so, it uses information from organic, inorganic, physical, and analytical chemistry.

Slide 9


Environmental Chemistry



Environmental chemistry is really a broad subject that, like biochemistry, straddles all aspects of chemistry. Rather than focusing on different types of molecules, it focuses on all molecules and interactions within a particular system: the environment.

Slide 10

The Challenge of the Chemistry of Water




This course encompasses many different aspects of chemistry. Organic chemistry is a full year course sequence, inorganic chemistry is another year, physical chemistry is another year, analytical chemistry is another year, biochemistry is another year.

THAT'S 5 YEARS WORTH OF CHEMISTRY IN ONE COURSE!!!!!!

Slide 11

The Simplicity of the Chemistry of Water




Fortunately, we don't need a thorough knowledge of all the different areas of chemistry. We have a very narrow focus: water and its common contaminants.

Hopefully, we can gather enough basic chemical information to make sense of this one aspect of environmental chemistry.

Slide 12

The Goals




We want to remain at all times practical:

Dirty Little Secret: None of you are chemists, none of you care about chemistry, none of you will likely do any chemistry in your future career (although you never know for sure...)

So....

The Goals



1. Recognize the "system".
2. Recognize what may impact the system: what is worth testing for?
3. Know how the test is done. This knowledge helps you understand the significance and limitation of the result you are given.
4. Know how to identify the contaminants in a system.
5. Know how to quantify the contaminants in a system.
6. Understand what that result means.
