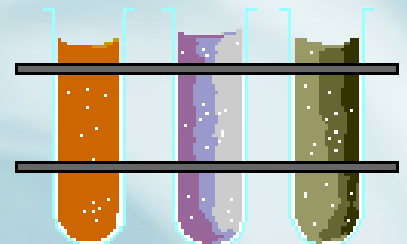




SCH 4C

ROCHELEAU



WHAT IS A SCIENTIST?

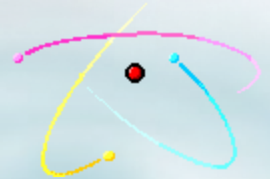
- They **ASK** and **ANSWER** questions... Basically, it's all about their attitude... Scientists themselves are ... **SKEPTICAL** — They must be able to **TEST PHENOMENA!!!**
- *If it can't be tested... It's NOT SCIENCE!*
- Scientists **WONDER, QUESTION**, and strive to find out **WHY**, and experiment, - they have the same attitude as most small children and well.... Ms. Rocheleau
- Scientists are adults who've never lost that wonder of nature and desire to know.



WHAT EXACTLY IS CHEMISTRY?

- It's all about **matter**, which is anything that **occupies a space** and **has a mass**.

- *Chemistry is the study of the composition and properties of matter and the changes it undergoes.*



THE BASIC BRANCHES OF THE CHEMIS TREE

Analytical
Chemistry

Biochemistry

Physical
Chemistry

Organic
Chemistry

Inorganic
Chemistry

Biotechnology



Chemis TREE

Wow your teacher is so funny!!!



ANALYTICAL CHEMISTRY

- This branch is highly involved in the analysis of substances.
- Chemists from this field may be trying to find out what substances are in a mixture a.k.a. *qualitative analysis* or how much of a particular substance is present a.k.a. *quantitative analysis*.



BIOCHEMISTRY

- This branch specializes in living organisms and systems.
- Biochemists study the chemical reactions that occur at the *molecular* level of an organism .
- Biochemists study processes such as digestion, metabolism, reproduction, respiration, and so on and so forth...
- It can be hard to distinguish between a biochemist and a molecular biologist because they both study living systems at a microscopic level but biochemists concentrate more on the reactions that are occurring.



PHYSICAL CHEMISTRY

- This branch figures out how and why a chemical system behaves as it does.
- Physical chemists study the physical properties and behavior of matter and try to develop models and theories that describe this behavior.



ORGANIC CHEMISTRY



- This is the study of CARBON and its compounds.
- It's the most organized of the areas of chemistry — with good reason.
- There are MILLIONS of organic compounds, with thousands more discovered or created each year.
- Industries such as the polymer industry, the petrochemical industry, and the pharmaceutical industry depend on organic chemists.

INORGANIC CHEMISTRY



- This branch is involved in the study of inorganic compounds such as salts. A **salt**, in chemistry, is defined as the product formed from the neutralization reaction of acids and bases. Salts are ionic compounds composed of cations <meow >(positively charged ions) and anions (negative ions) so that the product is electrically neutral (without a net charge).

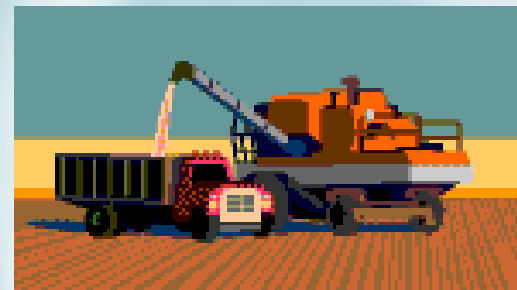
A base and an acid, e.g. $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$

- It includes the study of inorganic properties of these compounds.
- It also includes the study of the individual elements of the inorganic compound. Basically they study everything that doesn't involve carbon. They leave that to the organic chemists!!

BIOTECHNOLOGY



- It's the application of biochemistry and biology when creating or modifying genetic material or organisms for specific purposes.
- It's used in such areas as cloning and the creation of disease resistant crops, and it has the potential of eliminating genetic diseases in the future.



PURE VS APPLIED CHEMISTRY



- Pure chemists are free to carry out whatever research interest them — or whatever they can get funded. The researcher basically wants to know for the sake of knowledge, often called basic research. Chemists use undergraduate or graduate students to help conduct the research. The work becomes part of the professional training of the student. The researcher publishes his or her work in professional journals for other chemists to examine and attempt to refute. Funding is always a problem because equipment and chemicals are expensive...
- Applied chemists work for private corporations. Their research is directed toward a very specific short-term goal set by the company — product improvement or the development of a disease-resistant strain of corn for example. Money is available for equipment and instrumentation with applied chemistry but there's also pressure to meet the company's goals.

PURE CHEM AND APPLIED CHEM IN THE REAL WORLD



- Share the same basic differences as SCIENCE VS TECHNOLOGY.
- In SCIENCE (Pure Chem) the goal is simply the basic acquisition of knowledge. There doesn't need to be any apparent practical application. Science is simply knowledge for knowledge's sake.
- TECHNOLOGY (Applied Chem) is the application of science toward a very specific goal.
- Pure Chemists generate data used by applied chemists. Both types of chemists have their own sets of strengths, problems and pressures.
- Because of dwindling federal dollars, many universities are becoming much more involved in gaining patents, and they're being paid for technology transfers into the private sector...

WHAT DOES A CHEMIST DO ALL DAY???



- Chemists analyze substances.
 - They may try to find the active compound in a substance found in nature, or may analyze water to see how much lead is present.
- Chemists create, or synthesize new substances.
 - They may try to make a synthetic version of a substance found in nature or create an entirely new compound. Find a way to make insulin, create a new plastic, pill or paint. Find a new, more efficient process to use for the production of an established product.
- Chemists create models and test the predictive properties of substances.
 - They may measure the strength of a new polymer strand or determine the octane rating of a new gasoline.



WHERE DO CHEMISTS ACTUALLY WORK???



- You may be thinking that chemist can be found deep in a musty lab working for some large chemical company, but chemists hold a variety of jobs in a variety of places!!

QUALITY CONTROL CHEMISTS

- These chemists analyze raw materials,
- intermediate products, and final products for purity to make sure that they fall within specifications. They may also offer technical support for the customer to analyze returned products. Many of these chemists often solve problems when they occur within the manufacturing process.



INDUSTRIAL RESEARCH CHEMISTS

- Chemists in this profession perform a large number of physical and chemical tests on materials. They develop new products and they work on improving existing products. They work with particular customers to formulate products that meet specific needs. They also supply technical support to their customers.



SALES REPRESENTATIVES



- Chemists work as sales representatives for companies that sell chemicals or pharmaceuticals. They may call on their customers and let them know of new products being developed. They also help their customers solve problems.

FORENSIC CHEMIST



- Forensic chemists analyze sample taken from crime scenes or analyse samples for the presence of drugs or traces or elements and compounds. They are used to determine common uses and places where these elements and compounds are located. They are also called to testify in court as expert witnesses.

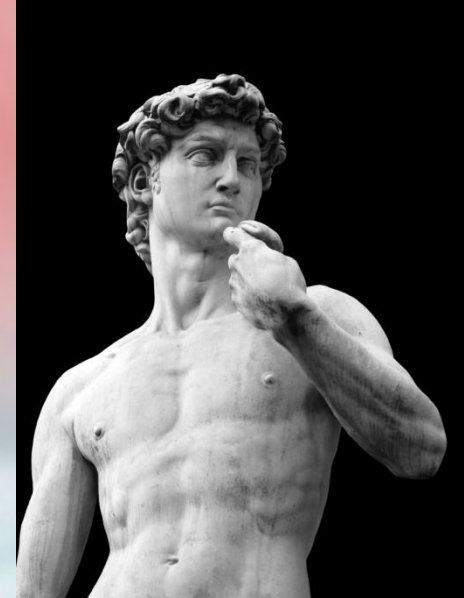
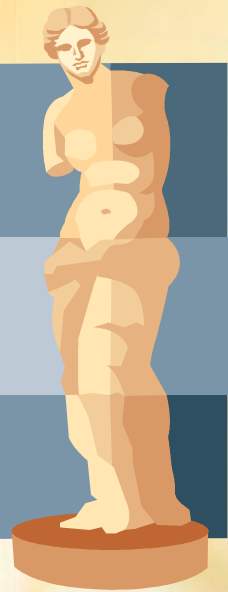
ENVIRONMENTAL CHEMIST



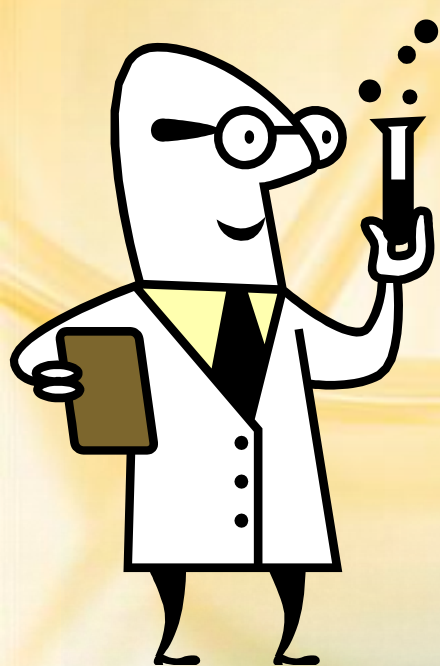
- These chemists work for water purification plants, the Environmental Protection Agency, the Department of Energy, or similar agencies. This type of work appeals to people who like chemistry but also like to get out in nature. They often go to sites to collect their own sample.

PRESERVATIONIST OF ART AND HISTORICAL WORKS

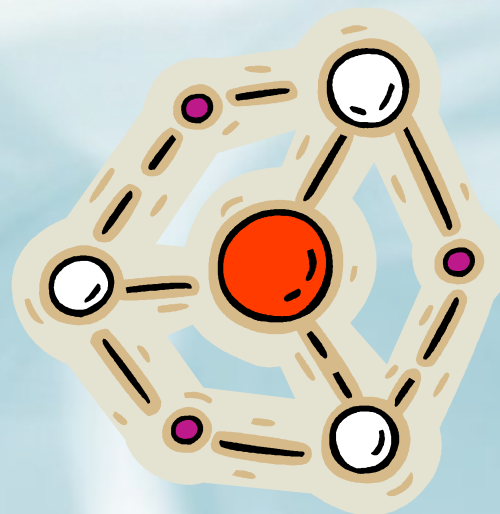
- Chemists work to restore paintings and statues such as the Sistine Chapel ceiling and Mummies! They also preserve the precious artefacts and documents by ensuring the best environment by balancing the lighting, gases and temperatures within protective cases. They protect and preserve our heritage. They also detect forgeries.



CHEMICAL EDUCATOR



Chemists working as educators teach in public schools and colleges and universities. University professors conduct research and work with undergraduate and graduate students.



THERE ARE MANY MANY MANY MORE!!!!

- These were just a few that I thought may interest you!!! I didn't even touch on
 - LAW
 - MEDICINE
 - TECHNICAL WRITING
 - GOVERNMENTAL RELATIONS
 - CONSULTING
- We only have so much time to discuss this!!!



IF YOU AREN'T INTERESTED IN BECOMING A CHEMIST, WHY SHOULD YOU BE INTERESTED IN CHEMISTRY??



- (Quick Answer) To pass this course....
- Everything you touch, eat etc. has gone through the hands of a chemist!!! Think about it!! Pretty crazy when you think about it!
- Chemist are involved in *almost* every aspect of society.
- Since Chemistry is part of our everyday world, knowing something about chemistry will help you interact more effectively with our chemical environment.

YOU WILL NEED YOUR PERIODIC TABLE FOR THIS ONE!!

- [Periodic Table Song](http://www.youtube.com/watch?v=GF1vXVMb110) <http://www.youtube.com/watch?v=GF1vXVMb110>

<http://www.privatehand.com/flash/elements.html>

<http://www.edu-cyberpg.com/IEC/elementsong.html>

QUICK THINKING!!!

- If H_2O is water, what is H_2O_4 ?
- It's for drinking, bathing etc....

QUICK THINKING!!!

**What weapon can you make from
the Chemicals:**

Potassium, Nickel and Iron?

KniFe

QUICK THINKING!!!

**Tell the rodeo cowboy what to do
with the calf.**

Europium

QUICK THINKING!!!

What did the gambler do with his cards?

Palladium

QUICK THINKING!!!

**What does a chemist aim to do
when he becomes flabby?**

Fermium

QUICK THINKING!!!

If the molecule H_3NCONH_3 is Urea,
what would you call the following
molecule? $\text{H}_3\text{NCONH}_3 - \text{H}_3\text{NCONH}_3$

Diurea

QUICK THINKING!!!

Why do chemists like nitrates so much?

They're cheaper than day rates.

QUICK THINKING!!!

**What do you call a swim team
made up of girls named Jennifer?**

Hydrogens

QUICK THINKING!!!

**What did one man say to another
man while sitting on a porch in
Kinmount?**

That carbon there for days!

QUICK THINKING!!!

What are the doctor's favourite elements?

Helium and Curium

QUICK THINKING!!!

What is a robber's least favourite element?

Copper

QUICK THINKING!!!

What is a soccer mom's favourite element?

Vanadium

QUICK THINKING!!!

What is Mickey Mouse's favourite element?

Plutonium

QUICK THINKING!!!

What is Dr. Watson's favourite element?

Holmium

QUICK THINKING!!!

What is a tailor's favourite element?

Sodium

QUICK THINKING!!!

What is an orthopaedic surgeon's favourite element?

Neon

QUICK THINKING!!!

**What is a used car dealers
favourite element?**

Selenium

QUICK THINKING!!!

**Which element is least likely to be
at a party?**

Boron