

Aleta and LaSIGMA

Year Two

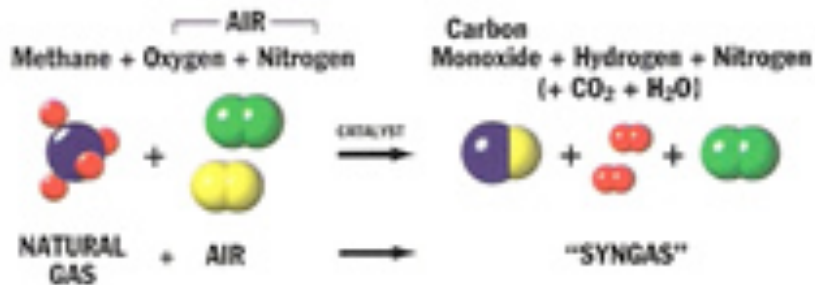
The Journey Continues

Dr. Mainardi Fernando & Suraj

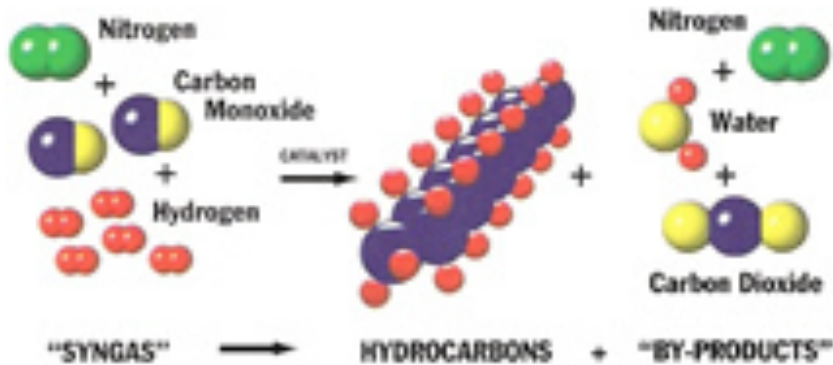


Fischer Tropsch Reaction

Natural Gas to Synthesis Gas



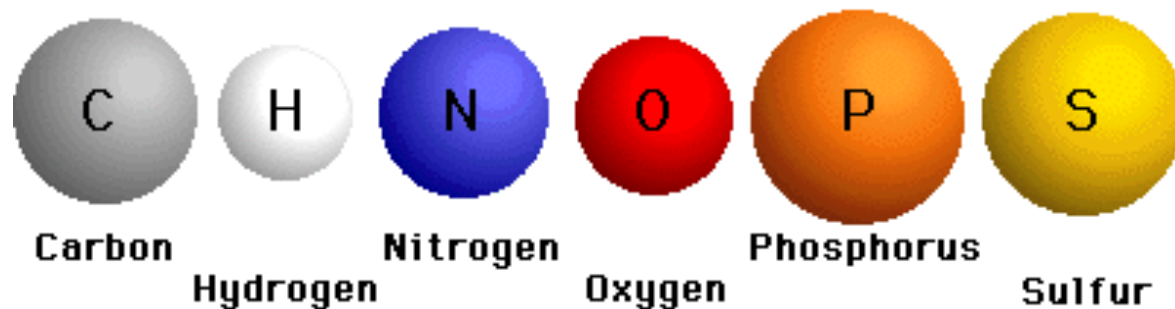
Synthesis Gas to Synthetic Crude



- Reactants – “syngas”
H₂, CO
- Products –
Hydrocarbons
- Catalysts –
CoNi, NiCo, *FeCo and
*CoFe spheres
- [Fischer Tropsch](#)
[Molecular Modeling](#)

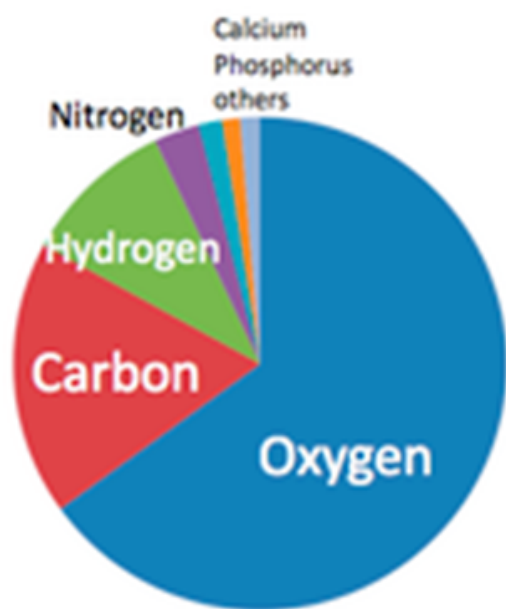
Lesson's Key Concepts

- Most abundant elements
- Diatoms
- Physical Properties/
Physical Change
- Chemical Properties/
Chemical Change
- Types of Chemical
Equations
- Balanced Equations
- Law of Conservation of
...

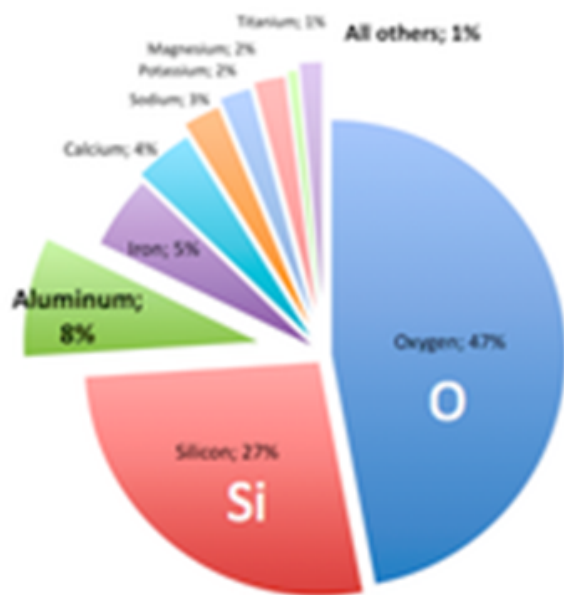


Abundance of the Elements:

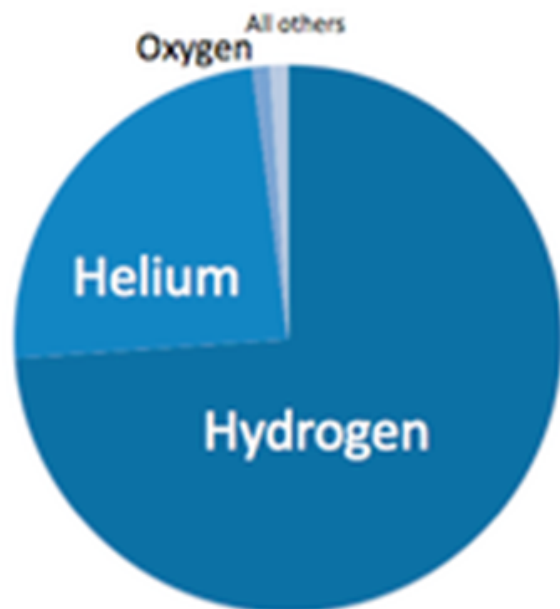
In Life



On Earth
(Earth's crust)

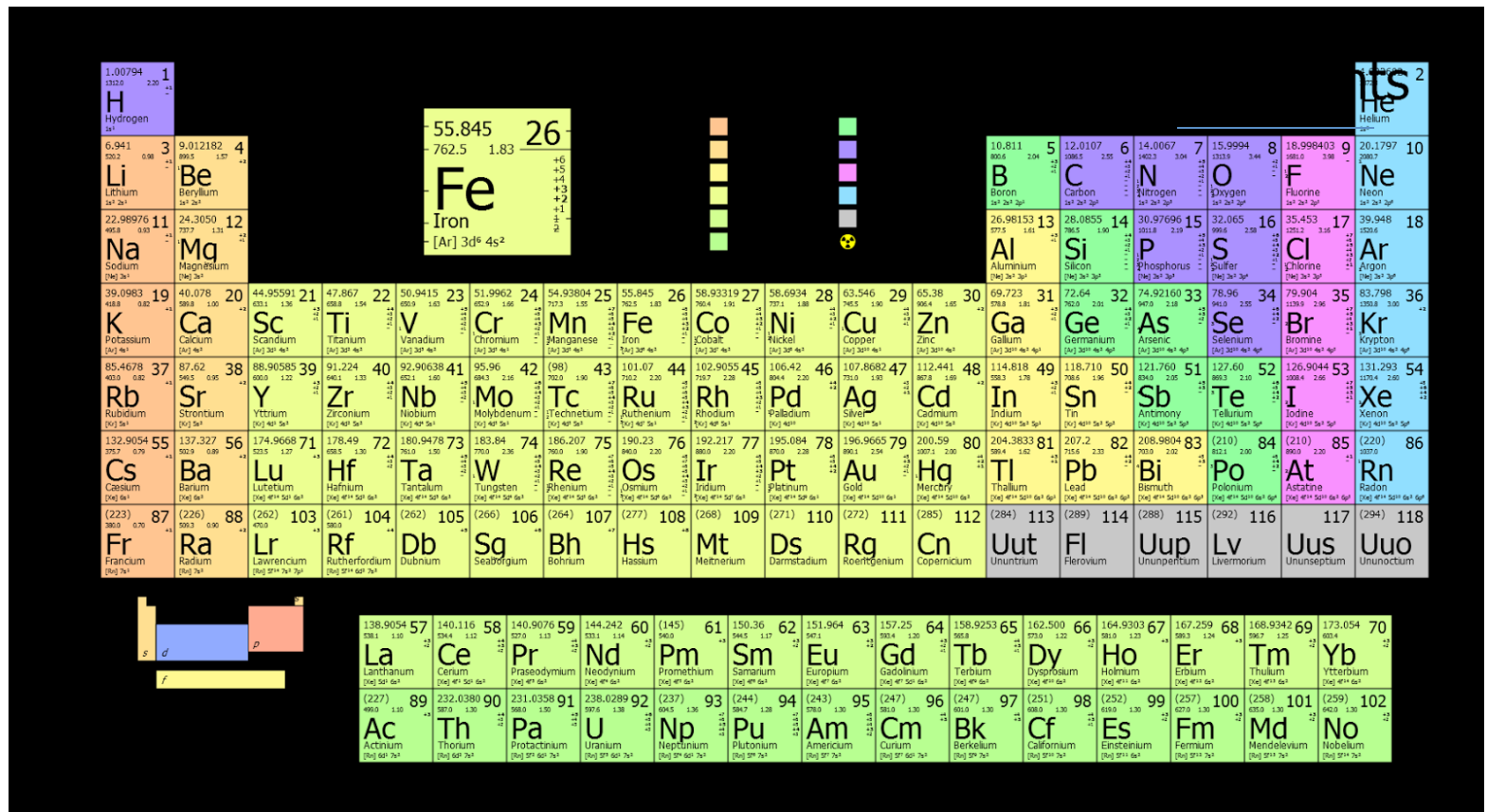


In the Universe



Diatoms

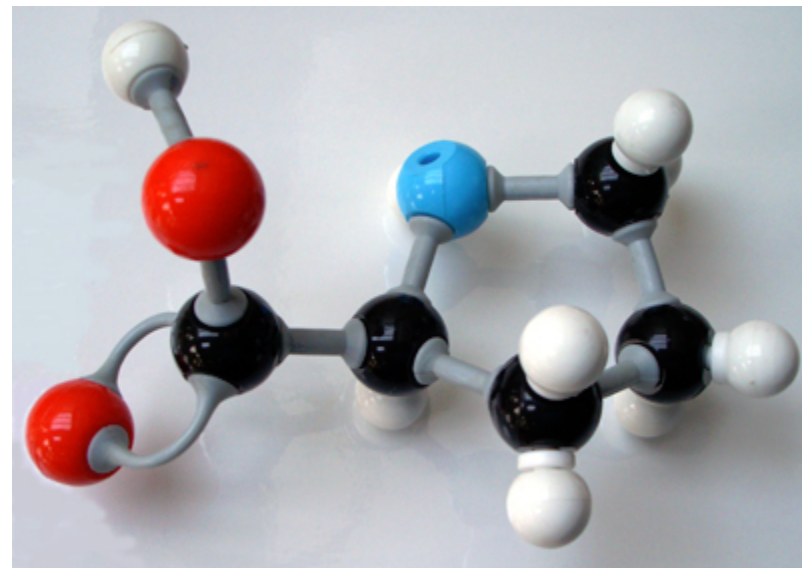
Where do we find the diatoms on the periodic table?



Lesson Time

Molecular Modeling on the Cheap

- Why use models?
- Modeling Used for LaSIGMA

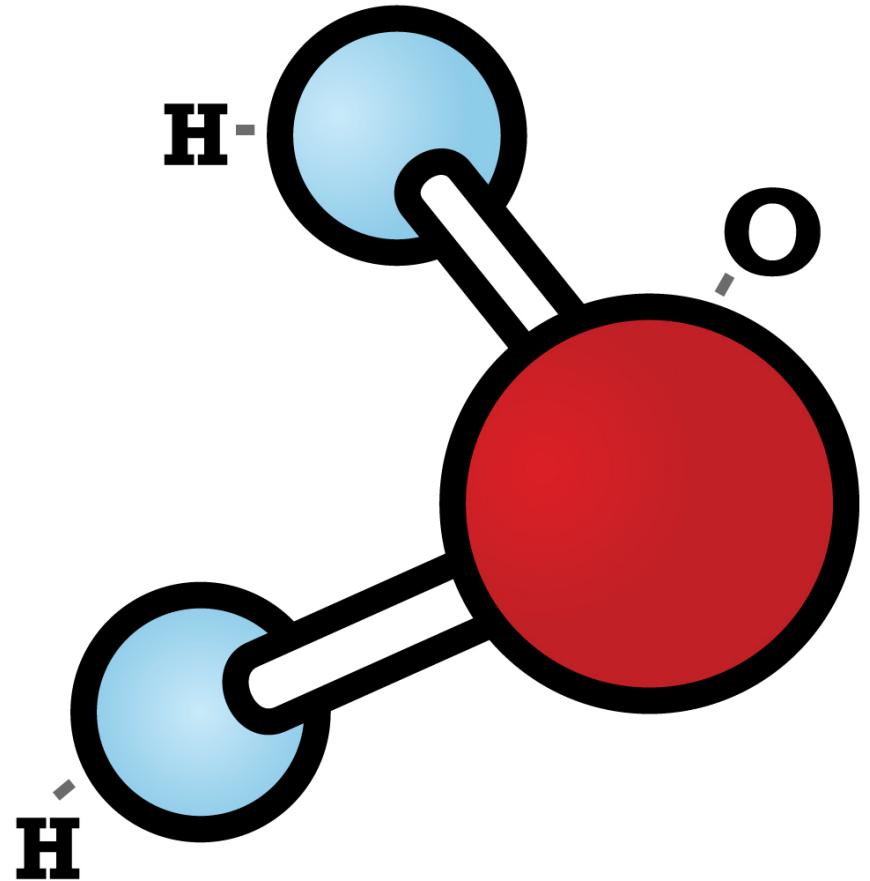


Molecular Modeling on the Cheap

- Let's Get Our Box of Paper Clips
 - Sort out by colors
 - Identify diatomic molecules
 - Jot down what colors will represent which types of atoms
- Hydrogen
 - Oxygen
 - Nitrogen
 - Carbon

Let's Decompose Water

- This is the reaction that occurred with our fuel cells on Tuesday afternoon.
- We started with water and ended up with hydrogen gas and oxygen gas
- Let's make a model of water out of paper clips



Let's Decompose Water

- What Would This Look Like Written As An Equation?

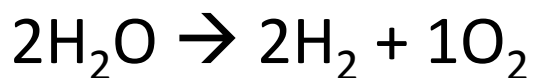


Do you have the same number and types of atoms on both sides of the arrow?

- Then tell me how many of each of the reactant (water) did you need; how many product of hydrogen, and how many product of oxygen.
- We need to obey a law...which law is it?
- The Law of Conservation of Matter

Let's Decompose Water

- So, the BALANCED EQUATION for the DECOMPOSITION of Water is:



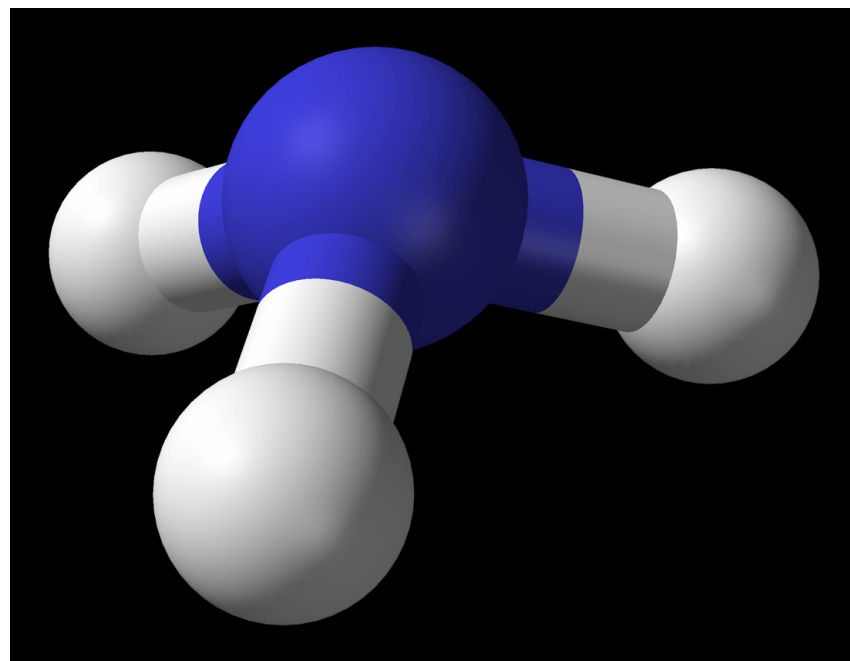
Or, a 2:2:1 ratio

Let's Go Over Our Concepts for the Day Again:

- Most abundant elements
- Diatoms
- Physical Properties/
Physical Change
- Chemical Properties/
Chemical Change
- Types of Chemical Equations
- Balanced Equations
- Law of Conservation of ...

Let's Practice Another

- This time we want to BUILD UP a larger product from two smaller reactants
- Formation of ammonia
 - NH_3
- What are the reactants if NH_3 is the product?
- Are any of these diatoms?
- Now, work your equation



Synthesis of Ammonia

- $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$
- Does this equation obey the law of conservation of matter?
- How many of each reactant and product is needed?
- $1\text{N}_2 + 3\text{H}_2 \rightarrow 2\text{NH}_3$
- Or, a 1:3:2 ratio



Extensions

- Combustion of methane
- Combustion of butane

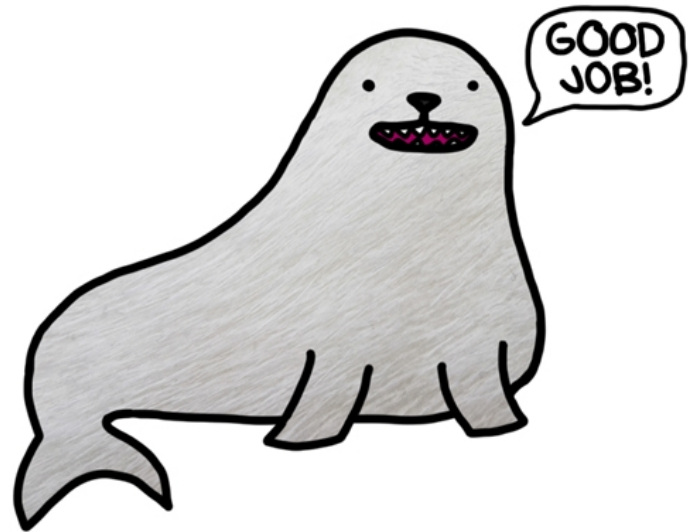
- Calculate masses of reactants and products
- Law of Conservation of...



Let's Check Again...

- Most abundant elements
- Diatoms
- Physical Properties/
Physical Change
- Chemical Properties/
Chemical Change
- Types of Chemical
Equations
- Balanced Equations
- Law of Conservation of ...

SEAL OF APPROVAL



Natalie Dee.com

What Can YOU Do?

- Help others

