Chem 108: Lab

Week 9

Sign in
Pick up handouts plus a scantron
Sit at your lab station

i.e. **where your lab drawer is located**

Today's Experiments: Chemical Reactions I & II
Select a partner; Procedures pg. 62 & pp.44-45
Chemical Reactions I: Fermentation, Synthesis of Ethanol
Chemical Reactions II: General Reactions

Both sets of procedures are to be completed today.

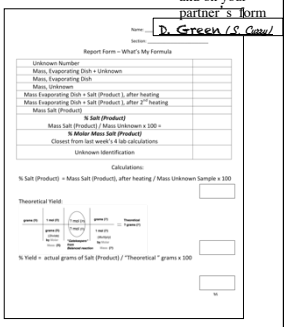
What's My Formula?

DUE Today:

ONE Complete Group Report
(Pages Stapled Together)

Confer with Group members after completing today's Lab procedures with your partner and getting the data pages signed by Dr. R.

S. Cuzzy (D. Green)
and on your partner's form
D. Green (S. Cuzzy)



What's My Formula?

DUE Today:

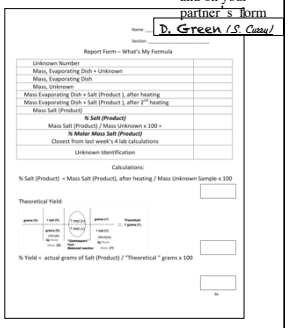
ONE Complete Group Report
(Pages Stapled Together)

Confer with Group members after completing today's Lab procedures with your partner.

Each group member is to contribute one completed replacement pg. 36 handout with their own name first followed by partners' names of all members in entire group. The unknown number(s) should be the one(s) worked on, in the order worked on.

There must be one form for each unknown including bonus samples.

S. Cuzzy (D. Green)
and on your partner's form
D. Green (S. Cuzzy)



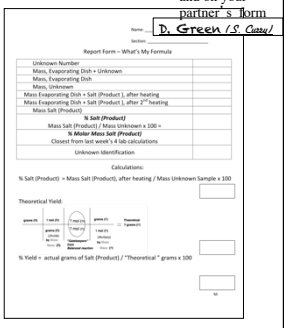
What's My Formula?

DUE Today:

ONE Complete Group Report
(Pages Stapled Together)

Each page 36 must have a complete set of clear calculations for the unknown 's number to include % Yield & Theoretical Yield Calculations for the respective unknown.

S. Cuzzy (D. Green)
and on your partner's form
D. Green (S. Cuzzy)



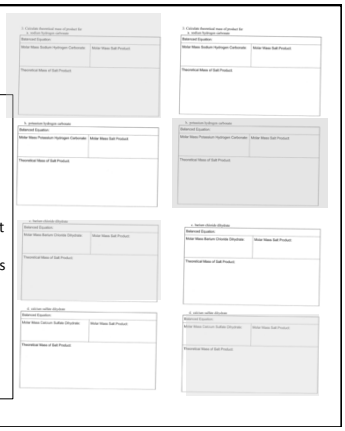
What's My Formula?

DUE Today:

ONE Complete Group Report
(Staple Pages Together)

Completed pages 37 & 38 must have a complete set of clear Theoretical % Mass calculations and reactions for each of the respective unknowns.

Separate pages for each unknown are acceptable.



What's My Formula?

Post Lab:
Must submit Individually
From calendar link

DUE Friday

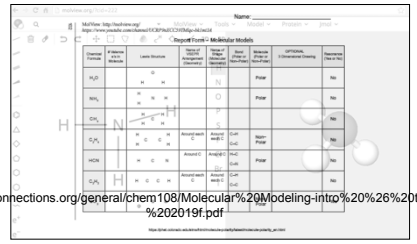
Molar Comparisons of Analgesics
Calculate Moles : Doses (mmol/dose)

Molecular Modeling

(Collaborative Effort / Individual Report Forms)

Report Form (*Replaces Molecular Model ~~Lab pp. 102-104~~*)

http://chemconnections.org/general/chem108/Chemistry%20108%20Molecular%20Modeling%20Form%20Fall%202019.pdf

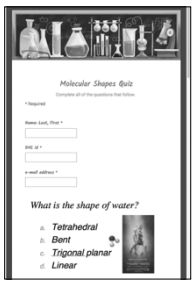


http://chemconnections.org/general/chem108/Molecular%20Modeling-intro%20%26%20table%202019f.pdf

Turn-in individually
Due 23-Oct

QUIZZES

Moles / Molar Mass
&
Molecular Formulas
and
Molecular Shapes
Both Quizzes
DUE:
25-Oct



Submit individually on-line
Refer to Calendar & Resources pages for links

Chemical Reactions I & II

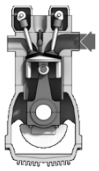
With your selected partner; Lab Manual pp.44-45. & pg. 62

Do Today

pp. 44-45

- ✿Combination (Synthesis)
- ✿Decomposition
- ✿Single Displacement
- ✿Double Displacement

1

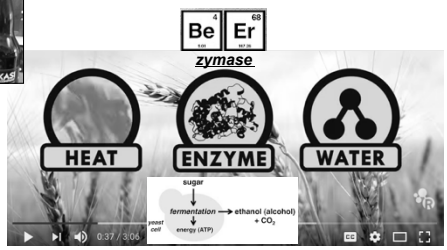


- ✿Biological Reactions: Enzyme Catalysts
- ✿**Fermentation pg. 62**
- ✿Combustion: Oxidation-Reduction

http://www.piney.com/BabNinkasi.html)

Chemical Reactions I (Biological Reaction)

Bakers' yeast fermentation



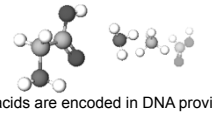
https://www.youtube.com/watch?v=vW99JEaDApY

http://www.piney.com/BabNinkasi.html

Amino Acids & Enzymes

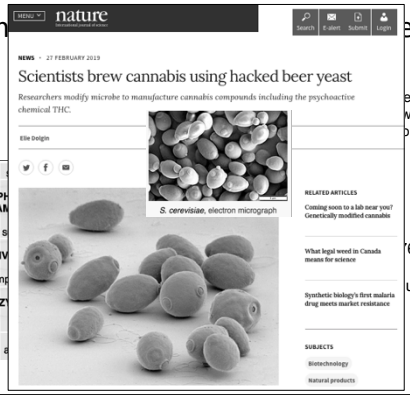
Pre-set Legos of Chemical Biology & Bio-catalysis

Amino acids contain **carbon, hydrogen, oxygen, and nitrogen**, which resemble the following shapes & structural components



- •20 different amino acids are encoded in DNA providing a genetic code, an archive representing specific sequences of amino acids, which are linked together forming a specific protein.
- •Hundreds of amino acids are linked together through amide (peptide) bonds to form these proteins, some of which, enzymes, provide the catalytic basis for the chemistry of life.
- •There are less than 20,000 total proteins produced from humans' entire DNA genome, each coded for by a specific gene in DNA's ~3 billion genetic bases.

Amino Acids → Proteins



Chemical Reactions: Fermentation

Start Today: in pairs **pg. 62**

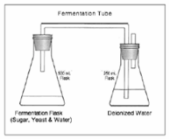
http://www.piney.com/BabNinkasi.html

A 3900-year-old clay tablet, which was found in Iraq between the Tigris and Euphrates rivers, had a Sumerian poem (*http://www.piney.com/BabNinkasi.html*) honoring Ninkasi, the patron goddess of brewing. It contains the oldest surviving beer recipe, describing the fermentation of the carbohydrates found in bread, *bappir*, made from barley, honey, dates and sweet aromatic herbs. The global availability of carbohydrates and native microbes (yeasts) has led to the production of many different types of beers, ales, wines, and fruit based alcoholic beverages in many countries throughout the world. [*The bottle on the left was found in Eugene, Oregon, ….. But, it dates only to 2016.*]

In this experiment you will ferment a carbohydrate, sucrose (table sugar), using bakers yeast. The reaction is:

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{\text{zymase}} 4\ C_2H_5OH + 4\ CO_2$$

sucrose ethanol



Chemical Reactions I

✿Biological Reactions: Enzyme Catalysts

Fermentation **pg. 62**

Report Form – Fermentation–Distillation

Preparation of the solution **pg. 66**

Mass, sucrose + container	
Mass, container	
Mass, sucrose*	

To Do Today

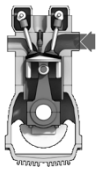
Have Dr. R. initial completed data pg. 66

Chemical Reactions I & II

With your partner; Complete Lab Manual pp.44-45. & pg. 62

Do Today

1



pp. 44-45

✿Combination (Synthesis)

✿Decomposition

✿Single Displacement

✿Double Displacement

✿**Combustion: Oxidation-Reduction**

✿Biological Reactions: Enzyme Catalysts

Fermentation pg. 62

http://www.piney.com/BabNinkasi.html)

Combustion Products

Energy & CO_2

#3

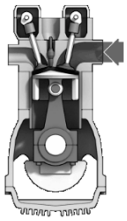
https://www.youtube.com/watch?v=Q9u8vM8YjeU&index=3&list=PLE7B4FAD08F1EBCE2

✿**Combustion: Oxidation-Reduction Reaction**

Octane (Gas) Combustion Engine

$$2\ C_8H_{18(l)} + 25\ O_{2(g)} \longrightarrow 16\ CO_{2(g)} + 18\ H_2O_{(l)} + \textbf{\textit{energy}}$$

1



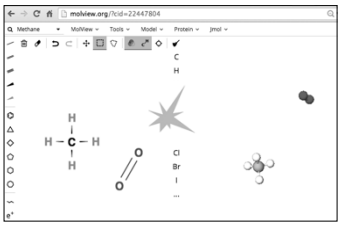
http://chemconnections.org/general/movies/4StrokeEngine_Ortho_3D_Small.gif

http://molview.org

Molecular Shapes ⟺ Lewis Structures

MolView: Visual On-line Molecular Modeling

https://www.youtube.com/watch?v=cOJ3MUpDrfI&list=PLE7B4FAD08F1EBCE2&index=2



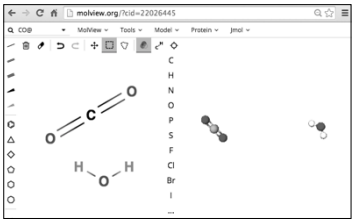
Bonding, Lewis Structures

Computational Experiments, Molecular Modeling

http://molview.org

Molecular Shapes ⟺ Lewis Structures

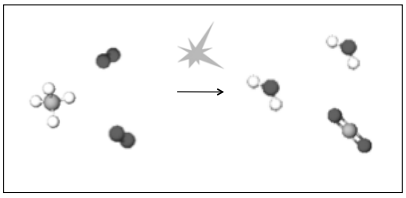
MolView: Visual On-line Molecular Modeling



Bonding, Lewis Structures
Computational Experiments, Molecular Modeling

Combustion

$$1\ CH_{4(g)} + 2\ O_{2(g)} \longrightarrow 1\ CO_{2(g)} + 2\ H_2O_{(g)} + energy$$

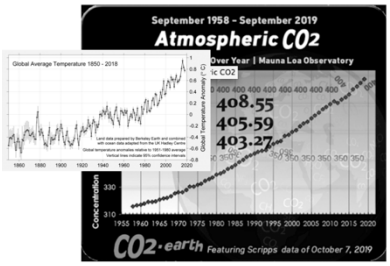


Bonding, Lewis Structures
Computational Experiments, Molecular Modeling

CO_2 Concentration Effects

#4
https://www.youtube.com/watch?v=EvphJO8VKlc&index=4&list=PLE7B4FAD08F1EBCE2

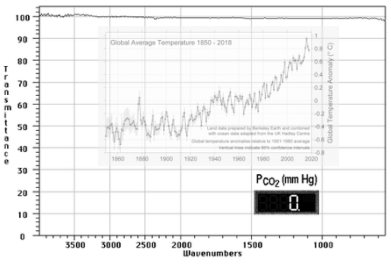
CO_2 Concentration Effects



#4
https://www.youtube.com/watch?v=EvphJO8VKlc&index=4&list=PLE7B4FAD08F1EBCE2

Infrared Spectra: CO_2 Concentration Effects

Nitrogen & Oxygen produce flat lines: 100% Transmission, 0 Absorbance



Turn in Global Warming scantron for quiz credit

Global Warming

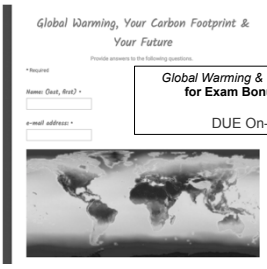
Survey Questions Bonus & Carbon Footprint Bonus

http://chemconnections.org/general/chem108/Global%20warming%20questions.pdf

Global Warming Survey Questions **for Quiz bonus (100%)**

Turn in Completed Scantron

DUE Today



Global Warming & Your Carbon Footprint **for Exam Bonus (up to 30 pts.)**

DUE On-line 11-Dec

http://chemconnections.org/general/chem108/Global%20warming%20%26%20Carbon%20Footprint.2017.pdf

Chemical Reactions II

Each partner is to keep individual records & reports pp. 46-52

To Do today:
- Combination (Synthesis)
- Decomposition
- Single Displacement
- Double Displacement

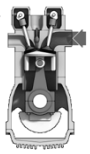
- Combustion: Oxidation-Reduction
- Biological Reactions: Enzyme Catalysts

Have Dr. R. initial completed Lab Manual pp.46-47 plus pg. 66

Chemical Reactions

Individual reports are to be turned in,

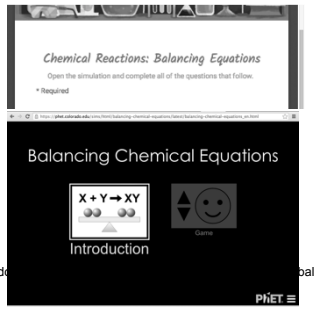
- Laboratory Manual: Report Form pp.46-52 DUE Next Week



Post Lab: On-line Balancing Equations DUE Next Week

DUE Next Week

Post lab : On-line Balancing Equations



https://phet.colorado balancing-chemical-