Welcome to Chemistry 101

Laboratory Sessions

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Available: Before, during, or after class or by appointment
Office Hours: See Syllabus for Zoom Access Times

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Class ALWAYS starts on time

Each lab has a briefing

Miss briefing ➔ Can't do lab (WCC Risk Management Policy)

Each lab is different … instructor reserves the right to deny seating based on missed content

Tardiness is a safety hazard to all in the lab!

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Summary of Course Materials and Their Location

On Blackboard: (Red font indicates material found only on Blackboard)

Announcements	Practice Quizzes	Lab Hand-Outs
Course Syllabus	Exams	Lab Hand-Ins
Test Schedule	Optional Practice Quizzes	Lab Calculation Summaries
Class Stats		Lab Syllabus
		Lab Schedules
Outcomes		Lab Safety Links
		DVD Transcripts

On Instructor Owned Media: (Blue font indicates material found only on instructor-owned media)

Course Information Documents		Lab Syllabus
Outcomes	Optional Practice Quizzes	Lab Hand-Outs
Lecture Slides		Lab Hand-Ins
Lecture Notes		Lab Calculation Summaries
Annotated Outcomes		Lab Briefing Slides
Flashcards		Lab Procedure Summaries
Reading List		Lab Safety Links
Music Videos & Demos		Extra Background Information
		DVD Transcripts

(Black font indicates material found on both)

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No Electronics (except calculators) On Lab Bench

Protect your investment:
Keep away from flames and potential spills

Electronics on table is asking for disaster
Store electronics in personal storage area

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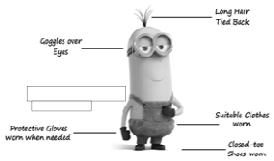
Dress Code (For Hands On Lab)

Skin you don't want burned or spilled upon should be covered

Statistically, most injuries during intro labs: Below the knees

Recommendations:

- **No shorts**
- **No sandals**
- **No exposed skin below the waist**
- **Leather (not cloth) shoes**



Consider:

- **Tying back long hair**
- **Wearing Sturdy NATURAL FIBER old clothes**
  - **Synthetics stick to skin when burned**
  - **Cotton and "non-fuzzy" wool preferred**

Best to wear glasses, not contacts

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Required Materials

Cem Department lab handout (Must Print)
Carbonless copy lab notebook (does not have to be WCC)
Safety goggles (Department or personal)
Hand-held "scientific" calculator
(Phone apps not acceptable)

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Blackboard

Lab Handouts
- Furnished by Chemistry Department
- Must Print (and read!) Before Class
- Look for Calculations Summaries and Hand-Ins
- Extra Materials in Instructor's web site

Grade book
- Continual, Running Weighted Score
- Blackboard % corresponds to Syllabus letter grade

Lab Scores Posted on Blackboard

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Behavior

Have fun with chemistry, not pranks
Keep floors & aisles clear
Professional labs:
No
- Food (including gum)
- Drinks
- Cosmetics
- Smoking

'cause these can absorb lab chemicals

Instructor Vigorously Enforces No Food, Drink or Gum

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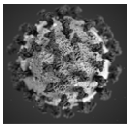
Masks Required In The Lab

College Requirement

Cannot do lab without mask



On Blackboard: Why I Wear A Mask

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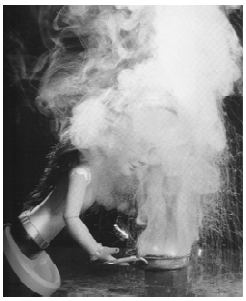
Wear Safety Goggles When Advised In Lab



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Chemistry Department Goggles For Students

North Wall: Next to Coat Rack

Cabinet Location

Cabinet: Close Up

Cabinet: Open

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Respect Flames

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Before Each Class:

Read Lab experiment from Blackboard
Prepare lab notebook: (Beginning with lab 3)
- Title
- Purpose
- Procedure
  - A "To do list" … less than a page

We will discuss lab notebook procedures in Lab 2

Can save in-lab time by doing questions ahead of class

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Lab Report Grading

Before Class

Updated Table of Contents	0.5
Title & Date	0.5
Purpose	1
Procedure	2
Data	4
Calculations	4
Results	4
Conclusion	4
Questions	5

Total = 25 points

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The "Contract"

Grading at the 101 level less rigorous

Labs "should be" an "A" (23-25 of 25)

In exchange for
- liberal grading policy
- detailed feedback

the student is expected to complete the entire lab

If you do NOT do portions of the lab,
I am morally obligated to remove points!

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Missed Labs

There is no make-up in your assigned section
Must arrange to attend other sessions
Totally dependent on “numbers”

- See Blackboard for Lab Schedules
  - Missed Lab = zero points
  - No penalty if another session is attended
  - Must be same week
  - Instructor of record grades the lab

- 4 Missed Labs = Course Failure (F)
- More than 2 make-ups require my permission
- No more than 3 make-ups allowed

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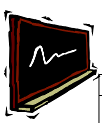

CEM 101
Lab Schedule: Daily Block View
Table in Lab Handouts Folder

	Morning	Afternoon	Evening
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Instructor and Time
For all sections in current semester

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CEM 101 All Lab Sections
Table in Lab Handouts Folder

LAB	Nevius 1 - 3:55	Krus 6 - 8:55	Pawittranon 9 - 11:55	Wissel 1 - 3:55	Taylor 9 - 11:55	Nevius 1 - 3:55	Krus 6 - 8:55	Pawittronon 9 - 11:55	Duranceau 1 - 3:55	DeCormier 9 - 11:55	Taylor 1 - 3:55	Ooms 9 – 11:55	Slicker 9 - 11:55	Zalma 1 - 3:55
1														
2														
3														
4														
5														
6														
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8														
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10														
11														
12														
13														
14														
15														

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Lab Safety Philosophy

In the lab, as in life,
Its what is NOT known,
That poses the greatest risk

So, best accident prevention is
Awareness of risks

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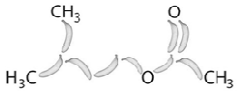
Iso-amyl Acetate



Banana Flavor and Smell
Bee Pheromone: Attack!

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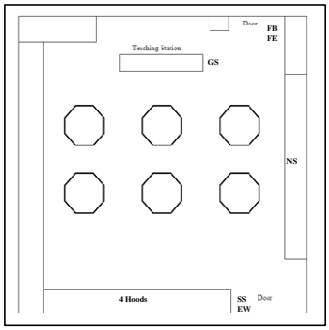
Lab Schematic



Lab Tour (in Blackboard Lab Handouts) highlights individual locations

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There are no “stupid questions” !



The only “dumb question”
is the one that is unanswered ‘cause it was not asked!

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Remember

SHIT HAPPENS

Was written by a chemist

So,
Things will spill,
Things will break!

When something happens,
Step back
& notify the instructor

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When Experiments Don’t Work, Ask For Help!

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Have a Fun Semester!





If it's green or wriggles, it's biology.
If it stinks, it's chemistry.
If it doesn't work, it's physics!


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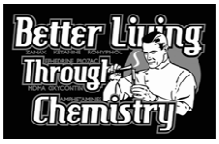
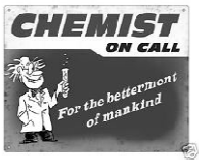


The Scientific Process

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Science Uses Senses to Observe Surroundings

Observe - watch & record
Classify - sort
Measure - quantify (compare)

Collected Data used to:
Infer - conclusion based on deduction
Predict- declare outcome in advance

Communication - share results with others
Interpret - explain observations

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Observing Is Different From Inferring/Assuming

Record Observations

Icebergs on Ford Lake?

Explain / Assume Without Enough Facts

Conclusion dependent on how viewed

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Scientific Method

Observation (watch, collect data)

Hypothesis (tentative explanation)

Experimentation (controlled testing)

Revise hypothesis to fit observations

Test (Observe) revised hypothesis

Repeat until THEORY (tested model) predicts observations

Law- Description (not explanation) of long-term observations

Law - typically a mathematical expression

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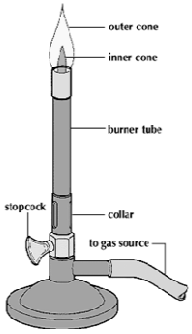
Using the Bunsen Burner



Check gas supply hose for cracks
Connect hose
Match:
Strike match before turning on the gas
Hold match flame to side of top tube
Open gas valve on desk

Striker:
Hold striker above top of burner
(traps gas within the striker cap)
Squeeze handle to generate spark
May need two hands to create spark

If flame "blows out" or you smell gas
Turn off the gas at the desk valve

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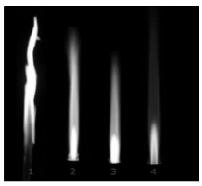
Bunsen Burner Flames

1 = "Hollywood Flame"
Not enough air – incomplete combustion

2 = air valve ~ 1/2 open

3 = air valve almost totally open

4 = air valve totally open
Enough air – complete combustion



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Combustion of Natural Gas

The "Hollywood Flame" (Incomplete Combustion)
Yellow flame … luminous carbon

$CH_4 + O_2 \rightarrow C + 2\ H_2O$ **(Carbon deposit called "carbon black")**

Carbon deposits on cool surfaces

Inadequate Ventilation (Air Supply)

$2\ CH_4 + 3\ O_2 \rightarrow 2\ CO + 4\ H_2O$

CO: toxic carbon monoxide

Complete Combustion (Best flame)
Enough oxygen to consume all the fuel

$CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$

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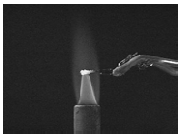
Nichrome Wire Color vs. Temperature

Color	No light	Reddish	Dark Red	Bright red	Yellowish Red	Yellow-White	White
Temp. (°C)	< 500	500–550	650–750	850–950	1050–1150	1250–1350	>1450

You are using Observation of wire color
To Infer Temperature in various parts of the flame



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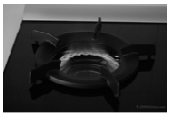
The temperature of any flame Can be manipulated by Fuel / Air ratio



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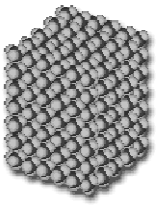
States of Matter



Solid

Liquid

Gas

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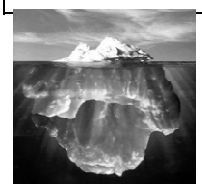
States of Matter - Solid

Form	**Rigid**
Compressibility	**Extremely Low (Exam: not compressible)**
Shape	**Fixed**
Volume	**Constant (Definite)**
Particle Movement	**Held in place by surroundings**



Example: Ice

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States of Matter - Liquid

Form	**Fluid (Flows)**
Compressibility	**Extremely Low (Exam: not compressible)**
Shape	**Variable (Fills Container)**
Volume	**Constant (Definite)**
Particle Movement	**Some attraction, particles move freely beneath surface**

Example: Water

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States of Matter - Gas (Vapor)

Form	**Fluid (Flows)**
Compressibility	**Very High**
Shape	**Variable (Fills Closed Container)**
Volume	**Variable (Fills Closed Container)**
Particle Movement	**Random, Independent**

Example: Steam

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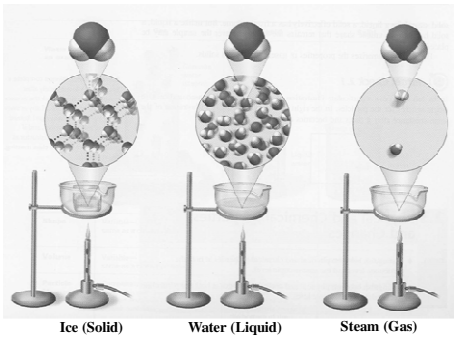
Physical Change

Chemical Entity (H_2O) Unchanged



Ice (Solid) **Water (Liquid)** **Steam (Gas)**

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Changing States of Matter

Requires change in energy content at molecular level

Solid ⇒ Liquid ⇒ Gas

heat (energy) must be added

Gas ⇒ Liquid ⇒ Solid

heat (energy) must be removed (lost)

During Phase Change:
Both states simultaneously exist
Temperature remains constant

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The Lab Today

Observe the Properties of the Bunsen Burner

Fill out States of Matter Exercises (can work as a group)

To save "my time" grading (g):

Blood is not a liquid (It is a "sol" … colloidal suspension of solid in liquid)
Glass is not a solid (It is "amorphous" … between solid and liquid)
Milk is not a liquid (It is a "sol" … colloidal suspension of solid in liquid)
Smoke is not a gas (It is a suspension of a solid in a gas)
Rain is not gas to liquid (Bergeron Process … water vapor → Solid state)
Solid → Gas (Sublimation) Dry Ice (solid Carbon Dioxide, CO_2)
Gas → Solid (Deposition) Frost

Make sure you do questions!

Place lab report in basket on instructor's desk

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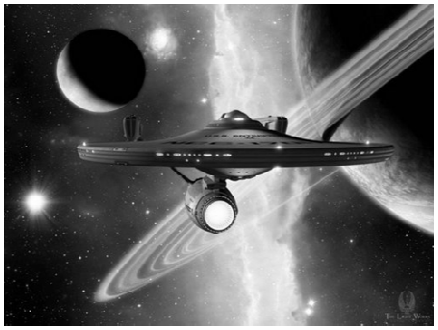
Let's Boldly Go Explore Today's Lab



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