

**Welcome to
Chemistry 101**

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Blackboard > 4000 hours development time

Interactive Material
Practice Quizzes
Exams
Dated Items (changes every semester)
Announcements
Syllabus
Test & Lab Schedules
Class Stats
Department Documents
Lab Handouts

Only You know what you do not understand
Your responsibility to clarify misunderstandings

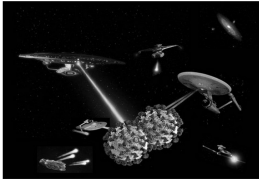
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Web Site Start Page

**Welcome to
Chemistry 101**

Click on [Start Here](#) to enter the site




Key To Success:
Course Materials
Lecture Slides
Lab Briefings
Supplementals

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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	
	Using Instructor Media	
Class Stats		Lab Syllabus
Outcomes		Lab Safety Links
Chemical Dictionary		
Grade Book		DVD Transcripts

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

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

(Black font indicates material found on both)

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Labs ALWAYS start on time

Each lab has a briefing


Miss the briefing → Can't do lab


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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Laptops & Cell Phones



Laptops
Follow Lecture with Power Point
Not for Personal Computing



Cells
Turn off or set to silent mode
No texting during class

Those texting in class will be asked to leave the room

So, classroom attendance will not interfere with texting addiction!

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Texting Severely Compromises Situational Awareness



Officer Comment: "Found phone in hand and head in the trunk!"

Brain Impairment (Inattention Blindness)

When texting, cognitive level ~DUI

US Auto Fatalities:

52 % Involve Cell Phones

37 % Involve Alcohol

Cell Phone Drivers:

More than 100,000 crashes / year

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"Texting" = Serious impediment to learning Epidemic of ADD in High Schools & Colleges



Studies on "texting" show:

Significant contributor to development of ADD

Increased insomnia problems:

Higher risk of mental illness, cancers, and diabetes

Diminished job performance (RIFD Monitoring of WiFi Use)

Diminished ability to "process" info (solve problems)

Diminished social skills

Addiction: IAD (Internet Addiction Disorder)

Alters brain dopamine system

Similar to brain changes seen with drugs of abuse (Cocaine)

Possible link to development of Parkinson's Disease

Cell phone use (based on billing records):

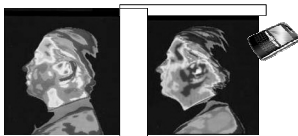
Teen female: 10+ hours / day (15% > 200 texts /day)

Teen male: ~ 8 hours / day

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Thermographic Image of Cell-Phone User



Resting Using Cell Phone

Radio / RADAR (Microwave) frequencies heat biological tissue

We have no biological defenses for EMF exposures

"Clustering" data in humans

The more the exposure, the higher the cancer risk

Those living/working with EMF tend to show higher cancer rate

(Actual risk varies and is not currently understood)

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Cell Phones and Academic Behavior

“Overall, those with high cell phone use tended to have a lower GPA, higher anxiety, and lower satisfaction with life or happiness compared to their peers who reportedly used their cell phones less.

These results add to the argument that students' cell phone use may negatively impact academic performance, mental health, and subjective well-being or happiness.”

Barkley JE, Gates P, Lepp A et al.

International Journal of Behavioral Nutrition and Physical Activity. 2013.

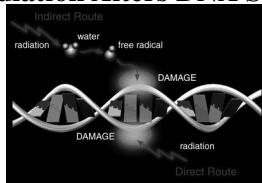
The Zombie Apocalypse



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EMF Radiation Alters DNA Structure



4 year study (7 European nations) of 101 scientific papers :
> 50 % demonstrate DNA damage (genotoxic effects)

Martin Blank

Microwave radiation from cell phone

Raises overall brain temp ~ 1°C

Raises DNA molecule temp ~ 100 °C

DNA strands typically separate at ~ 70 °C

Separated strands more susceptible to damage (mutation)

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2013: WHO reported cell phone/wifi use correlated to 9 cancers:

Brain	Acoustic Nerves	Meninges
Salivary Glands	Eyes	Testes
White Blood Cells	Thyroid	Breast



WHO Cancer Risk Rating: 2B (possible risk)

(DDT, pesticides, Pb, automobile exhaust, dry cleaning fluids)

Brain cancer now major cancer in children & adults < 40 yrs old

Cancers form on the side of head where phone is held



**Currently, most emf/cancer studies controversial
They may suggest trends, but are not definitive**

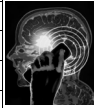
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Some WCC Microwave Energy Measures
(will vary with number / type of devices in use)



Location	$\mu\text{watts} / \text{cm}^2$ *
South Parking Lot	43 - 60
Third Floor Hallway	76 - 9296
Ceiling "Hot Spot"	1680 - 1820
Laptops	830 - 1582
Cell Phone	480 - 820
Remote Keypad	180 - 240
Car Key Fob	1280 - 1420
Smart Electrical Meter	1490 -1986



* ~ 100: potential biological issue
~ 600: Suggested detrimental long term exposure limit

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**"Numbers" Relevant to this class:
Banning Cell Phones Improves Grades**



For all my CEM 101 classes taught prior to the ban:

Class ave: 82
% A's: 38
% B's: 33 > 71

For my CEM 101 classes with the cell phone ban:



Class ave: 89
% A's: 51
% B's: 40 > 91

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Graphing/Advanced Calculators
Cannot be used for exams



Need only a simple calculator:

Add
Subtract
Multiply
Divide
Scientific Notation



Cell Phones NOT acceptable calculator



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Document Types



MS Word or PowerPoint files will not appear the same on all computers
(MS is constantly changing default fonts, margins, spacing, etc)

Text documents and slides are displayed in Adobe PDF (.pdf) format
since this rendering will appear as intended on all platforms and
operating systems

Flash video format (.flv) is used for the videos on the course CD. This has
become the default format for playing videos on most modern browsers.
If your browser does not open the videos, separate stand-alone players
are available for free download.

Search terms for players if your device will not open documents on CD:

For Text/Slides, search for "PDF viewer"

For Videos, search for "flv player"

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What to Print



Only Documents Required:

Lab Handouts

Lab Hand-Ins

Everything Else Optional

You decide what you need

Site has About:

1030 Lecture Slides (in multiple formats)

345 Lab Slides (in multiple formats)

85 Site Guide Slides

40 Information Documents

220 Pages of Lecture Notes

55 Pages of Flashcard Templates

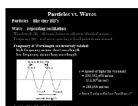
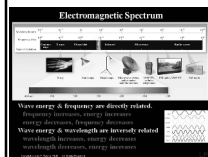
80 Pages of Extra (Optional) Problems



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Slide Formats

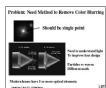


Multiple formats for different printing needs
Dark Background: Best human perception / learning

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Handout Slide Format: Black & White



Primarily for taking notes
3 Slides per page

Color reversal:
minimizes black ink use
lower printing costs

But,
Microsoft Clip Art:
Cannot be exported in B&W
Will print in color
Unless
Printer is only black ink

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Class Syllabus

Read the syllabus carefully

Note Class policies

Lecture Dates & Topics

Testing Center Exam Dates

Typically run 4 days; retest 2 days

Exams taken during class time will be scored as zero

Grading

I round to 2 significant digits



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WCC Requires a Grade for everyone on the roster

At semester's end, I simply convert BB % to a letter grade

If you miss labs or don't take exams & quizzes,
You don't get points

No points → Bad grade



Most semesters, I MUST ISSUE some F's
'cause some students simply stop coming to class

If a problem develops, email me and request a "W" (Withdrawal)

I would rather record a W than an F!



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Blackboard Percentages As Letter Grades



Final Class %	Final Grade	Final Class %	Final Grade
100% – 93%	A	76% – 73%	C
92% – 90%	A–	72% – 70%	C–
89% – 87%	B+	69% – 67%	D+
86% – 83%	B	66% – 63%	D
82% – 80%	B–	62% – 60%	D–
79% – 77%	C+	below 60%	F



“Running Weighted Score” = Course Grade

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Unit Exam Stats (For those completing the exam):



Test	Low	High	100 %	Ave	All Ave*	Low Ave*	High Ave*
1					88	83	91
2					92	88	97
3					82	77	86
4					89	84	92
5					82	77	84
6					82	74	88
6 I					7.5	6.7	8.4
7					85	83	93
7 I					7.9	6.9	8.5
8					89	84	94
8 I					8.7	8.2	9.7
9					83	76	87
9 I					6.7	6.2	8.7
10					86	81	89
10 I					8.9	8.2	9.6
11					86	83	89
Final					74	69	84

*All Ave:
Ave from #
Previous Classes

*Low Ave:
Lowest Ever
Class Ave

*High Ave:
Highest Ever
Class Ave



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Class Percentages

After Exam # & Lab #



Class Ave:
Median:



Withdrawals =

# Students	Percentile	Grades
	90's	A's
	80's	B's
	70's	C's
	60's	D's
	50's	F's
	40's	
	30's	
	20's	
	10's	
	< 10	

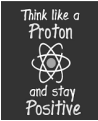



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This Class' Average and Median

After Exam	Average	Median
Start	100	100
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
F1 & F2		






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Unit Exam Dates listed:
Class Syllabus
Testing Center Schedule

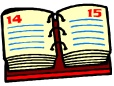
Additionally:
Blackboard Announcement on Monday
Practice quiz done in class on the day before exam starts




Test #01 (Matter, Energy & Measurements)

This test has 20 on-line Blackboard questions (worth a total of 100 points) You may only take this exam one time at the testing center.

This is the Unit Exam ... the Retest is below





Exam dates are inflexible!

No Unit Exam is “optional”


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Retests

Retests allow a second testing attempt for those who:
wrote less than 75
did not take the unit test


If you write higher , the higher score (to max of 75) is retained
If you write lower, the original score is kept

Must take RETEST, not unit exam
BB puts score in different areas
If you take exam, not retest, instructor will not see the score



ReTest #01 (Matter, Energy & Measurements)

This is a 20 question make-up test. The maximum score that can be earned on this test is 75. You may only take this exam one time at the testing center.



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Practice Quizzes (IMPORTANT)

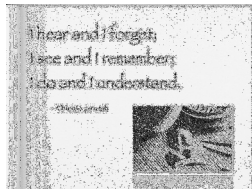
These are “gimme’s”

Only highest score retained

Exams based on practice quizzes

Final exam based on the unit exams

Class success is directly related to the practice quizzes!



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Practice Quiz Points

Blackboard Calculates Everything by %



100 Point Scale	5 Point Scale	BB %	Letter Grade
90-100	5	100	A
80-85	4	80	B-
70-75	3	60	C-
60-65	2	40	D-
50-55	1	20	F
< 50	0	0	F

Can improve scores until:
9 pm on

last day of the semester

At the end of the semester,
1 BB Quiz point can
change your letter grade!

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Learning Resources

Lecture (Slides & Notes on Blackboard)

Text

Instructor

Classmates

Tutoring - LA 258

Web Tutorials



Blackboard Practice Quizzes:

Single, most important “good grade tool”!

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Every Discipline has a language
Symbols & Formulas are
the nouns and verbs of chemistry;
how chemists communicate



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Begin to Memorize NOW
Common Conversion Factors
Names & symbols of common elements
Names, formulas & charges of the polyatomic ions
Lists on CD: Course Documents (Unit 0)
Flash Cards CD: Course Documents

1	H	2	He																	18	Ar	19	K	20	Ca											36	Kr	37	Rb	38	Sr											54	Xe	55	Cs	56	Ba											86	Rn																			
3	Li	Be																	13	Al	14	Si	15	P	16	S	17	Cl	18	Ar	19	K	20	Ca											36	Kr	37	Rb	38	Sr											54	Xe	55	Cs	56	Ba											86	Rn										
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	36	Kr	37	Rb	38	Sr	39	Y	40	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Pb	Bi	Po	At	84	Pol	85	As	86	Se	87	Br	88	Kr	54	Xe	55	Cs	56	Ba	57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu
5	Rb	Sr	39	Y	40	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Pb	Bi	Po	At	84	Pol	85	As	86	Se	87	Br	88	Kr	54	Xe	55	Cs	56	Ba	57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu																						
6	Cs	Ba	57	La	58	Ce	59	Pr	60	Nd	61	Pm	62	Sm	63	Eu	64	Gd	65	Tb	66	Dy	67	Ho	68	Er	69	Tm	70	Yb	71	Lu	72	Hf	73	Ta	74	W	75	Re	76	Os	77	Ir	78	Pt	79	Au	80	Hg	81	Tl	82	Pb	83	Bi	84	Po	85	At	86	Rn																										
7	Fr	Ra	87	Ac	88	Th	89	Pa	90	U	91	Np	92	Pu	93	Am	94	Cm	95	Bk	96	Cf	97	Es	98	Fm	99	Md	100	No	101	Lr	102	Hf	103	Ta	104	W	105	Re	106	Os	107	Ir	108	Pt	109	Au	110	Hg	111	Tl	112	Pb	113	Bi	114	Po	115	At	116	Rn																										

* Lanthanides series
+ Actinide series

CHEMISTRY IS

9	12	7
F	U	N
9A 999402 FLUORINE	9A 9231 UNLITHIUM	9A 6007 NITROGEN

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AIR	QUINTESENCE
WATER	QUICKLIME
EARTH	COPPER
GOLD	SUBLIMATION
MERCURY	SILVER
IRON	MAGNESIA
PRECIPITATION	AQUA PORTIS
LETHARGE	AQUA REGIA
SPIRIT OF SALT	ANTIMONY
PUTREFACTION	DISTILLATION
SAL AMMONIAC	SEPARATION
DISSOLUTION	CALCINATION
LIQUOR HEPATIS	FILTRATION
MULTIPLICATION	LEAD
CINNABAR	VINEGAR
PROJECTION	DISTILLED VINEGAR
VITRIOL	CONGELATION
COAGULATION	SULPHUR
	NITRE



Be Thankful!
Modern Symbols Easier to Learn
Than These Alchemy Symbols

SYMBOLS OF THE ALCHEMISTS AND THEIR SIGNIFICATION.

Fire.	Air.	Water.	Water.	Earth.
Lead.	Tin.	Iron.	Gold.	Copper.
Mercury.	Silver.	Antimony.	Arsenic.	Aqua Vitæ.
Bofax.	To Purify.	Chamber.	Caput Mortuum.	An Oil.
Salt peter.	Magnet.			

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Chemistry, like any new experience, can:

Intimidate

Overwhelm

Or, just be downright scary



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Approach chemistry like anything else that is new

“I think I can!”

soon becomes

“I know I can!”

Which eventually results in

“I did it!”



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Secret to success is never fall behind

‘cause

Each session builds upon the previous

**Learning is best done
in small steps,
rather than the last night
before an exam**



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My Philosophy:

I “teach” you nothing!

Learning is internal

I just act as a guide

You do the work
&
Reap the benefits



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There are no “stupid questions” !



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

The “Dumbest Question”
is the unasked question that shows up later on an exam!!

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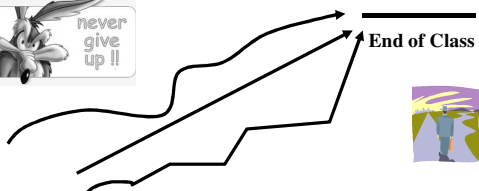
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Learning Chemistry is a “Path-Independent” Process

Acquired Knowledge & Skills



Start of Class




End of Class

Everyone travels a different path

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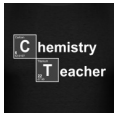
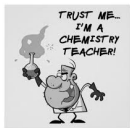

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The great Philosopher



Socratic Method: Asking & Answering Questions

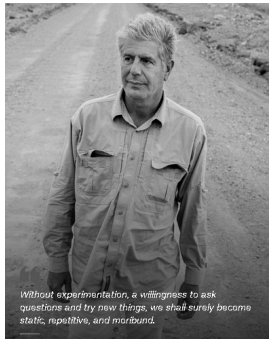
Still one of the best learning tools

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Ask Questions!



The student's job:
Ask Questions

The Instructor's job:
Answer Questions




So,
If you don't ask,
then neither of us
is doing their job!

Without experimentation, a willingness to ask questions and try new things, we shall surely become static, repetitive, and moribund.

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“Eureka Moments”

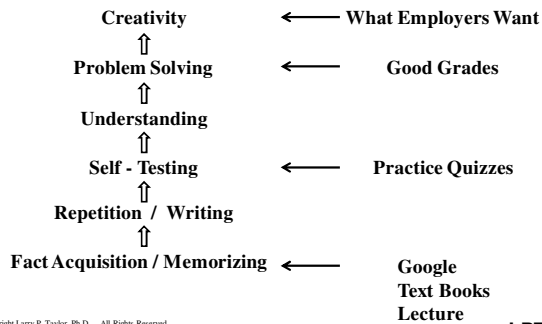
Learning Chemistry is a series of “Eureka Moments”

Eureka → Archimedes, “I have found it!”

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Learning Pyramid



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The "Iceberg Theory" of Teaching

Like an iceberg, most knowledge/skill lies hidden from view:
Instructors can only teach a portion of what they know
Students are only tested on a portion of what they learn



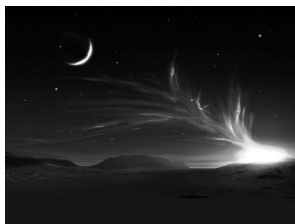
The more you understand, the better your exam (and life) success

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Science of Chemistry

Studies matter and its interactions



Which is everything your senses can perceive!

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Knowledge of chemistry affects daily life

Mechanics - "classic coke" removes stains on concrete floor
First Aiders - dilute ammonia relieves ant sting pain
Parents - kid-toxic lead compounds have sweet taste
Cooking (Recipes) / Making Coffee or tea - kitchen chemistry
Cleaners/Polishers/Stain Removers - household chemistry
Weather - gas densities & behavior of water
Staying Warm - fabric chemical properties
Movies & TV - appreciation of well-done science



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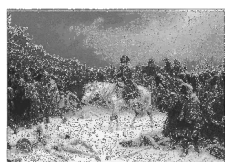
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Lack of Understanding Has Affected History

Napoleon's Buttons

by

Penny Le Couteur & Jay Burreson

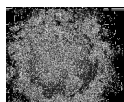


Entered Russia with > 400,000 men
Returned from Russia < 10,000 men

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Science Often Predicts the Inevitable



Increased water temperatures →
More evaporation →
More atmospheric water vapor →
More rain (flooding)
More severe storms

Human destruction of environment
Overuse of anti-biotics
Emergence of "superbugs"
Emergence of virulent virus species
Pandemic inevitable



1994



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**I ASSUME that
Chemistry is NOT your greatest passion**



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**My goal is NOT to make you a chemist
But
To change the way you perceive the world.**



**If that happens,
We both win!**



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**The Ancients believed
If you know "the secret name" of a thing,
Then you have "power" over that object.**

**Knowledge of chemistry will improve
Career path
Quality of life
Long after this semester is over**



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