

Elizabethtown Area
School District
Chemistry in Your World

Course Number: 319

Length of Course: 1 semester

Grade Level: 11-12 Required

Total Clock Hours: 120

Length of Period: 80 minutes

Date Written: June 11, 2007

Periods per Week/Cycle: 5

Written By: Theresa Swenson

Credits (if app.): 1.0

Weighting: 1.0

Prerequisite: Algebra Module I and Algebra I Module 2 (Algebra I students should take 322 Chemistry)

Course Description:

Chemistry is the study of matter and the changes it can undergo. In this course students will explore the chemistry around us that occurs on an everyday basis. This is a hands-on, lab-based course, which means that most expectations will be met through lab work and reports. This course is not appropriate for students who plan to pursue a nursing career or attend a post-secondary institution.

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I. Overall Course/Grade Level Standards

Students will KNOW and be able TO DO the following as a result of taking this course.

- A. Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.
- B. Analyze scale as a way of relating concepts and ideas to one another by some measure.
- C. Assess and apply patterns in science and technology.
- D. Evaluate experimental information for appropriateness and adherence to relevant science processes.
- E. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.
- F. Apply concepts about the structure and properties of matter.
- G. Apply and analyze energy sources and conversions and their relationship to heat and temperature.
- H. Apply the principles of motion and force.
- I. Apply concepts of models as a method to predict and understand science and technology.
- J. Apply the elements of scientific inquiry to solve multi-step problems.

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II. Content

Major Areas of Study

List all units of study below:

<u>Unit</u>	<u>Estimated Time</u>	<u>Materials</u>
1. Measurements in Chemistry	8 Blocks	Handouts, Lab equipment, Lab supplies
2. Matter and Its Properties	8 Blocks	Handouts, Lab equipment, Lab supplies
3. Energy and Matter	4 Blocks	Handouts, Lab equipment, Lab supplies
4. Atomic Theory and Structure	12 Blocks	Handouts, Lab equipment, Lab supplies
5. The Periodic Table	6 Blocks	Handouts, Lab equipment, Lab supplies
6. Chemical Bonding	7 Blocks	Handouts, Lab equipment, Lab supplies
7. Nomenclature	2 Blocks	Handouts, Lab equipment, Lab supplies
8. Chemical Equations and Reactions	2 Blocks	Handouts, Lab equipment, Lab supplies
9. Water and Solutions	15 Blocks	Handouts, Lab equipment, Lab supplies
10. Gas Laws	8 Blocks	Handouts, Lab equipment, Lab supplies
11. Crystals and Other Solids	3 Blocks	Handouts, Lab equipment, Lab supplies
10. Acids and Bases	10 Blocks	Handouts, Lab equipment, Lab supplies

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Name of Course: Chemistry in Our World

Name of Unit: Measurement in Chemistry

Essential Question for the Unit: What do we need to know to solve problems in chemistry?

Unit Objectives/Key Questions	Priority	Aligned to Course Standard	Aligned to PA Standard
A. What is the SI system of metric units and how is it used in chemistry?	E	A, B	3.1.12.A, 3.1.12.D
B. How are calculations impacted by the accuracy of measuring devices and the precision of the measurements?	E	E	3.1.12.C, 3.2.12.B, 3.7.12.B
C. How is experimental data collected and analyzed in chemistry?	E	C, D, E	3.1.12.C, 3.2.12.B, 3.7.12.B
D. How do you apply accuracy and precision to density measurements of various substances?	E	D, E	3.1.12.C, 3.2.12.B, 3.7.12.B

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Name of Course: Chemistry in Our World

Name of Unit: Matter and its Properties

Essential Question for the Unit: How can you tell if a chemical reaction is occurring?

Unit Objectives/Key Questions	Priority	Aligned to Course Standard	Aligned to PA Standard
A. How is matter classified?	E	A, F	3.1.12.A, 3.4.12.A
B. How are chemical and physical changes/properties distinguished?	E	C, F	3.1.12.C, 3.4.12.A

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Name of Course: Chemistry in Our World

Name of Unit: Energy and Matter

Essential Question for the Unit: What factors determine the existence of each element? .

Unit Objectives/Key Questions	Priority	Aligned to Course Standard	Aligned to PA Standard
A. How do you describe the transfer of chemical energy to heat energy?	C	C, G	3.1.12.C, 3.4.12.B
B. How is light energy related to electron energy levels?	I	G, H	3.4.12.B, 3.4.12.C

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Name of Course: Chemistry in Our World

Name of Unit: Atomic Theory and Structure

Essential Question for the Unit: How does the number and arrangement of neutrons, protons and electrons in an atom affect its properties?

Unit Objectives/Key Questions			
A. How was the atomic theory developed?	I	C, F, I	3.1.12.B, 3.1.12.C, 3.4.12.A
B. What does the modern model of the atom look like?	E	A, C, F, I	3.1.12.A, 3.1.12.B, 3.1.12.C, 3.4.12.A
C. What is the significance of nuclide/isotope notation?	C	C, F	3.1.12.C, 3.4.12.A
D. What is an electron configuration and why is it important?	E	A, C, F	3.1.12.A, 3.1.12.C, 3.4.12.A

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Name of Course: Chemistry in Our World

Name of Unit: The Periodic Table

Essential Question for the Unit: How is the periodic table of the elements organized? .

Unit Objectives/Key Questions			
A. What properties of the elements exhibit periodicity?	E	A, C, F	3.1.12.A, 3.1.12.C, 3.4.12.A
B. Why do elements exhibit periodicity?	I	A, C, F	3.1.12.A, 3.1.12.C, 3.4.12.A
C. How is the periodic table of the elements organized?	E	A, C, J	3.1.12.A, 3.1.12.C, 3.2.12.C

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Name of Course: Chemistry in Our World

Name of Unit: Chemical Bonding

Essential Question for the Unit: How are sodium chloride and water different?

Unit Objectives/Key Questions			
A. What similarities/differences exist between ionic and covalent bonding?	E	A, C, F	3.4.12.A, 3.1.12.A, 3.1.12.C
B. How are ionic and covalent compounds diagrammed using valence electrons?	I	A, C, F	3.1.12.C, 3.4.12.A, 3.1.12.A

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Name of Course: Chemistry in Our World

Name of Unit: Nomenclature

Essential Question for the Unit: What is the language of chemistry?

Unit Objectives/Key Questions			
A. How are compounds containing two elements named?	E	C, F	3.4.12.A, 3.1.12.C
B. How are acids named?	E	C, F	3.4.12.A, 3.1.12.C
C. How are compounds containing polyatomic ions named?	E	C, F	3.4.12.A, 3.1.12.C

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Name of Course: Chemistry in Our World

Name of Unit: Chemical Equations and Reactions

Essential Question for the Unit: Why is it important to balance and classify
chemical equations?

Unit Objectives/Key Questions			
A. How are chemical equations balanced?	E	A	3.1.12.A
B. How is a given chemical reaction classified?	I	A, C, G	3.4.12.B, 3.1.12.A, 3.1.12.C
C. How are the products of a chemical reaction predicted from analysis of the reactants?	I	D, F	3.4.12.A, 3.2.12.B

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Name of Course: Chemistry in Our World

Name of Unit: Water and Solutions

Essential Questions for the Unit: Why is water so special?

Unit Objectives/Key Questions			
A. How do the properties of various compounds affect their solubility?	I	C, D, F	3.4.12 A, 3.1.12 A, 3.1.12 C
B. How do solutes affect the physical properties of water?	E	C, D, F	3.4.12 A, 3.1.12 A

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Name of Course: Chemistry in Our World

Name of Unit: Gas Laws

Essential Question for the Unit: Why are gases so difficult to keep in a container?

Unit Objectives/Key Questions			
A. What are the important units and conversions necessary for measuring temperature, pressure and volume?	E	B	3.1.12.D,
B. What are the relationships between pressure, temperature, volume and the amount of a gas in a system?	E	A, E, F, I, J	3.4.12.A, 3.1.12.A, 3.1.12.B, 3.2.12.B, 3.2.12.C
C. How are real gases and ideal gases the same/ different?	I	A, F	3.4.12.A, 3.1.12.B

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Name of Course: Chemistry in Our World

Name of Unit: Crystals and Other Solids

Essential Questions for the Unit: Why do some solids form cubes and other solids form octahedrons?

Unit Objectives/Key Questions			
A. How are crystalline solids formed and what factors affect their structure?	I	A, D, F, J	3.4.12 A 3.1.12 C

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Name of Course: Chemistry in Our World

Name of Unit: Acids and Bases

Essential Questions for the Unit: What is the difference between an acid and a base?

Unit Objectives/Key Questions			
A. How are acids and bases defined and what are their properties?	C	C, I	3.4.12A 3.1.12A 3.1.12C
B. What is pH and what are the different ways to measure it?	C	C, I	3.1.12.C 3.2.12.B

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III. Course Assessments

Check types of assessments to be used in the teaching of the course.
(Provide examples of each type.)

- | | |
|---|--|
| <input type="checkbox"/> Objective Tests/Quizzes
<input type="checkbox"/> Constructed Responses
<input type="checkbox"/> Essays
<input checked="" type="checkbox"/> Reports
<input type="checkbox"/> Projects
<input type="checkbox"/> Portfolios
<input checked="" type="checkbox"/> Presentations
<input checked="" type="checkbox"/> Performance tasks
<hr style="border: 0; border-top: 1px solid black; margin-top: 10px;"/> | <input type="checkbox"/> Response Journals
<input type="checkbox"/> Logs
<input type="checkbox"/> Computer Simulations
<input type="checkbox"/> Research Papers
<input type="checkbox"/> Class Participation
<input type="checkbox"/> Notetaking
<input type="checkbox"/> Daily Assignments
<input type="checkbox"/> Writing Samples
<hr style="border: 0; border-top: 1px solid black; margin-top: 10px;"/> |
|---|--|

Provide copies of common assessments that will be utilized for all students taking this course. Overall course/grade level standards will be measured by a common course assessment. Unit objectives will be measured on an ongoing basis as needed by the classroom teacher to assess learning and plan for instruction. List common assessments below and recommended date/time frame for administration (at least quarterly).

Name of Common Assessment	When given?
1. Unit Concept Map, Poster or Model	At the end of each units
2. PowerPoint presentation on Final Essential Question	At the end of the course
3.	
4.	
5.	
6.	

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IV. Expected levels of achievement

Current grading scale:

“A⁺” 98% - 100%

“A” 95% - 97%

“A⁻” 92% - 94%

“B⁺” 89% - 91%

“B” 86% - 88%

“B⁻” 83% - 85%

“C⁺” 80% - 82%

“C” 77% - 79%

“C⁻” 74% - 76%

“D⁺” 71% - 73%

“D” 68% - 70%

“D⁻” 65% - 67%

“F” 64% - 0%

PA Proficiency Levels
Advanced
Proficient
Basic
Below Basic

Attach rubrics, checklists, or other documentation noting how levels of proficiency will be determined for common assessments. The following scoring documents have been developed for this course:

Chemistry in Our World
Assessment
Gases
60 points

Instructions:

- 1) Each student must make their own concept map.
- 2) You may use the Inspiration Software, Microsoft Word, the outlines included with this packet, or hand-draw your map. You will earn extra points (see rubric) for using the Inspiration software to generate your concept map.
- 3) You will have access to computers on Tuesday, January 10-Thursday, January 18.
- 4) Using the vocabulary list on the next page, decide on what subtopics you will use in your concept map.
- 5) Choose appropriate concepts or vocabulary words to associate with each subtopic. You must use a total of at least 30 phrases or words in the vocabulary list to construct your concept map.
- 6) Make sure your concept map is neatly arranged and easy to understand.
- 7) Make sure all the words on your concept map are spelled correctly.
- 8) Put your name and date on your concept map.
- 9) Your concept map on “Gases” is due Friday, January 12.
You may turn in your concept map early.

H He Li Be B C N O F Ne Na Mg Al Si P S Cl Ar K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe Cs

Rubric for Your Concept Map on “Gases”

	POINTS
1. Correct identification of appropriate subtopics.	0 - 4
2. 1 point for each vocabulary word or concept used correctly.	0 - 30
3. Construction of your concept map using the computer (not using the pre-printed outline or hand-drawing your map).	2
4. Use of pictures to make your map more interesting and informative.	0 - 5
5. Final concept map is informative and easy to understand	0 - 10
6. Neatness, correct spelling (1 point deducted for each spelling or grammatical error	0 - 9
MAXIMUM TOTAL	60

BONUS Use of appropriate additional words or phrases that are NOT included in the vocabulary list to enhance your map. 0 - 5

H He Li Be B C N O F Ne Na Mg Al Si P S Cl Ar K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe Cs

Chemistry in Our World

Final Project: What is Chemistry?

Your final exam for this course will be a unique “project” rather than a written exam. The project will be a PowerPoint presentation that is worth 14% of your grade, just like a written final exam. You will each complete your own project and turn it in on the day of your scheduled final exam for this course. Copying another students’ project or portion of a project is unacceptable, and both projects will be penalized: if you share the project, you will also share the grade.

STEP 1: Your Essential Question to be answered is “What is Chemistry?” To refresh your memory, a summary of the units we studied in class are:

Measurement in Chemistry
Matter and Its Properties
Energy and Matter
Atomic Theory and Structure
Periodic Table and Periodic Law
Chemical Bonding
Chemical Formulas, Equations and Reactions
Properties of Gases
Nuclear Chemistry

STEP 2: Design a PowerPoint presentation that summarizes “What is Chemistry?” You should have at least 10 Power Point slides, not including an introductory or conclusion slide. You may have more than 10 slides.

STEP 3: Write a one page TYPED summary of your PowerPoint presentation. It should include the most important points you used to answer the question “What is Chemistry?”

STEP 4: Submit your PowerPoint presentation for peer review on the day of your scheduled final exam for class. You do not have to present your PowerPoint presentation unless you want to; Dr. Swenson will do it for you if you like. You and your classmates will be given critique forms to give your opinions on each others’ projects, which will be turned in with your project. The critique forms will be the same as the rubric; critiques must have your name on them in order for them to be considered.

Rubric for Final Project					
	Score				
	0	1	2	3	4
Written Summary Points:	No summary	Handwritten with improper grammar and sentence structure, more than 3 misspellings.	Typed, improper grammar and sentence structure, more than 3 misspellings; or handwritten with 1-3 mistakes; much off topic information	Typed, improper grammar and sentence structure; 1-3 misspellings; or handwritten without mistakes; not entirely clear	Typed, proper grammar and sentence structure, no misspellings.
Content Points:	Content has nothing to do with the essential question.	Content on the essential question is incomplete and/or most content is incorrect.	Content related to essential question but some content is incorrect.	Adequate job; all content pertains to the essential question and is correct.	Content is complete and well organized; essential question is summarized clearly and accurately.
Appearance (Design graphics, pictures, special effects) Points:	No graphics on any slides.	Less than the correct number of slides/ minimal design graphics or special effects were used.	Less than correct number of slides, but design graphic or special effects were used.	Correct number of slides; clear attempt was made to construct a neat and clear project.	Correct number of slides; it is clear that an extraordinary effort was put into creating slides.
Originality and Use of Time Points:	PowerPoint is a copy or a plagiarism of another students' project.	Minimal effort was put into the project; time not used effectively.	Adequate effort put in, but time could have been used more effectively.	Adequate effort was put into the project; overall result is interesting.	Extraordinary effort was put into the project; result is a WOW!

No show for final exam: 25% penalty _____

Peer Review: 20% _____

Grading Scale			
Points	Percent Grade	Points	Percent Grade
20	100	10	50
19	95	9	45
18	90	8	40
17	85	7	35
16	80	6	30
15	75	5	25
14	70	4	20
13	65	3	15
12	60	2	10
11	55	1	5

20% of your point total will be from the peer review sheets. 80% of your point total will be from Dr. Swenson's assessment of your PowerPoint slides and your written summary.