

Elizabethtown Area
School District
Chemistry

Course Number: 322

Length of Course: 1 semester

Grade Level: 10-12 Required

Total Clock Hours: 120

Length of Period: 80 minutes

Date Written: June 11, 2007

Periods per Week/Cycle: 5

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Theresa Swenson

Credits (if app.): 1.0

Weighting: 1.0

Prerequisite: Algebra I or Algebra 1A/1B with instructor recommendation

Course Description:

This course introduces the student to the basics of chemistry, and prepares them to take college-level chemistry. Topics include measurement, matter, atomic theory, the periodic table, chemical bonding, chemical nomenclature, chemical equations and reactions, the mole concept and stoichiometry, and gases.

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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	Text, Lab equipment, Lab supplies
2. Matter and Its Properties	8 Blocks	Text, Lab equipment, Lab supplies
3. Energy and Matter	4 Blocks	Text, Lab equipment, Lab supplies
4. Atomic Theory and Structure	12 Blocks	Text, Lab equipment, Lab supplies
5. The Periodic Table	5 Blocks	Text, Lab equipment, Lab supplies
6. Chemical Bonding	6 Blocks	Text, Lab equipment, Lab supplies
7. Nomenclature	10 Blocks	Text, Lab equipment, Lab supplies
8. Chemical Equations and Reactions	7 Blocks	Text, Lab equipment, Lab supplies
9. Gas Laws	10 Blocks	Text, Lab equipment, Lab supplies
10. Stoichiometry and Quantitative Chemistry	15 Blocks	Text, Lab equipment, Lab supplies

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Name of Course: Chemistry

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

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

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

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	Priority	Aligned to Course Standard	Aligned to PA Standard
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

Name of Unit: The Periodic Table

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

Unit Objectives/Key Questions	Priority	Aligned to Course Standard	Aligned to PA Standard
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

Name of Unit: Chemical Bonding

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

Unit Objectives/Key Questions	Priority	Aligned to Course Standard	Aligned to PA Standard
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

Name of Unit: Nomenclature

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

Unit Objectives/Key Questions	Priority	Aligned to Course Standard	Aligned to PA Standard
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

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	Priority	Aligned to Course Standard	Aligned to PA Standard
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

Name of Unit: Gas Laws

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

Unit Objectives/Key Questions	Priority	Aligned to Course Standard	Aligned to PA Standard
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

Name of Unit: Stoichiometry and Quantitative Chemistry

Essential Question for the Unit: How are problems quantitatively solved that involve chemical reactions?

Unit Objectives/Key Questions			
A. What is a mole and how is it used in chemistry?	E	A, B, I	3.1.12.A, 3.1.12.B, 3.1.12.D
B. How are quantitative problems solved that involve chemical equations?	E	B, D	3.1.12.D, 3.2.12.B
C. How is the percent composition of a chemical reaction determined?	I	B	3.1.12.D
D. What is the difference between empirical and molecular formula, and how are they determined?	C	F, J	3.2.12.C, 3.4.12.A

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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 checked="" 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 type="checkbox"/> Presentations
<input type="checkbox"/> Performance tasks

<hr style="width: 100%;"/> | <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

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|---|---|

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. Final Exam	At the end of the course
2.	
3.	
4.	
5.	
6.	

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IV. Expected levels of achievement

Current grading scale:

“A ⁺ ” 98% - 100%	“C” 77% - 79%
“A” 95% - 97%	“C ⁻ ” 74% - 76%
“A ⁻ ” 92% - 94%	“D ⁺ ” 71% - 73%
“B ⁺ ” 89% - 91%	“D” 68% - 70%
“B” 86% - 88%	“D ⁻ ” 65% - 67%
“B ⁻ ” 83% - 85%	“F” 64% - 0%
“C ⁺ ” 80% - 82%	

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: