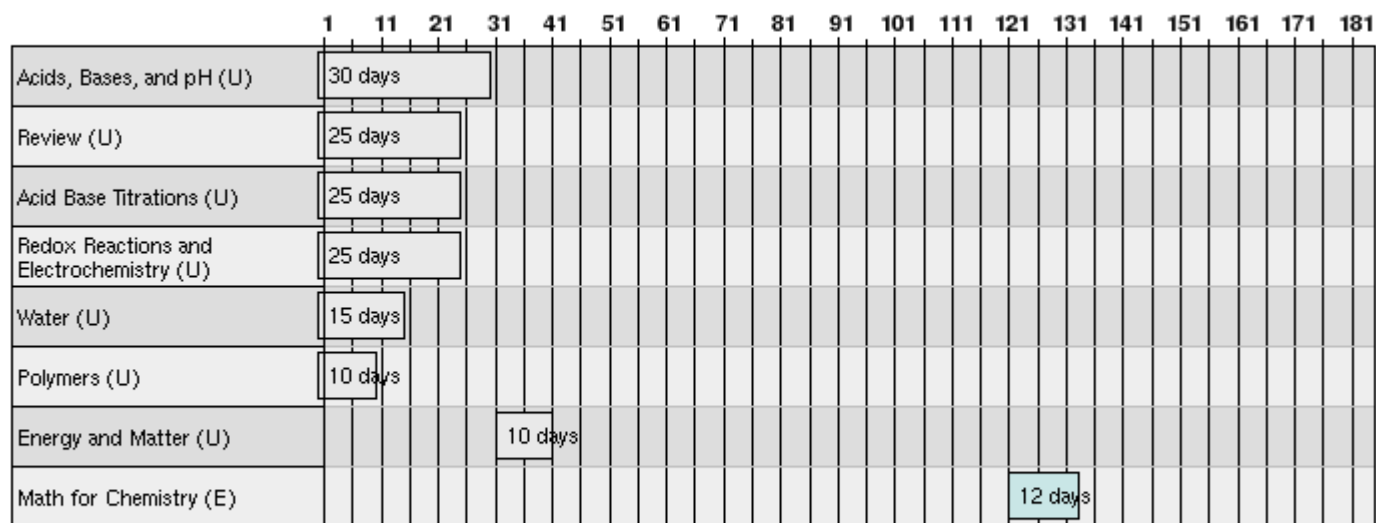


# Folder: Science

Group/District: PENNSYLVANIA

## Course Map Timeline Chemistry II



Essential (E)  
  Important (I)  
  Compact (C)  
  Unranked (U)

Topic: Acid Base Titrations

Days: 25

Subject(s):

Grade(s):

Key Learning: Titrations are useful to a chemist because it allows for the calculation of acid and base strengths.



Unit Essential Question(s):

How can titration be useful to Chemistry?

Concept: <b>Types of Acid-Base Reactions</b> <u>S11.C.1.1.2, S11.C.1.1.3</u>	Concept: <b>Buffers</b> <u>S11.C.1.1.2, S11.C.1.1.3</u>	Concept: <b>Acid-Base Titration</b> <u>S11.C.1.1.2, S11.C.1.1.3</u>
Lesson Essential Question(s): What happens when the various types of acids and bases react with each other? (A)	Lesson Essential Question(s): How does a buffer work? (A)	Lesson Essential Question(s): How do I perform an acid-base titration? (A)
Vocabulary: Neutralization Reaction, Salt, Ionic Equation, Spectator Ion, Net Ionic Equation	Vocabulary: Buffer, Acid Rain, Antacid	Vocabulary: Titration, Standard Solutions

Additional Information:

Attached Document(s):

Vocab Report for Topic: Acid Base Titrations

Days: 25

Subject(s):

Grade(s):

**Concept: Types of Acid-Base Reactions**

Neutralization Reaction -

Salt -

Ionic Equation -

Spectator Ion -

Net Ionic Equation -

**Concept: Buffers**

Buffer -

Acid Rain -

Antacid -

**Concept: Acid-Base Titration**

Titration -

Standard Solutions -

Topic: Acids, Bases, and pH

Days: 30

Subject(s): Science

Grade(s): 11th, 12th

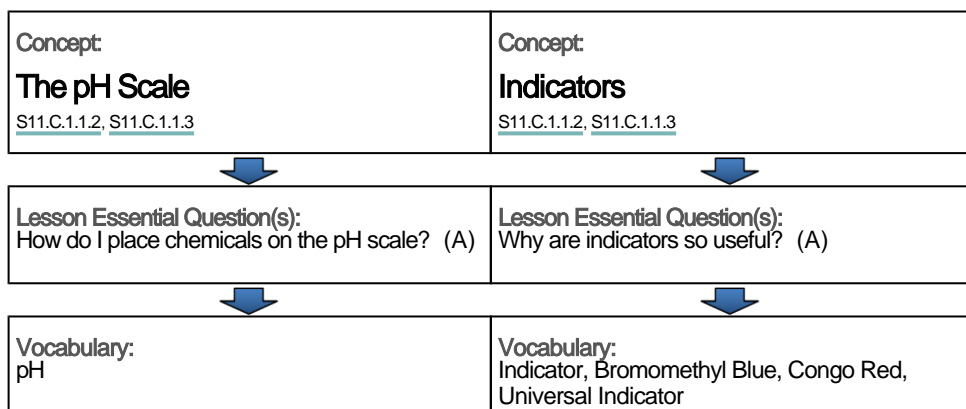
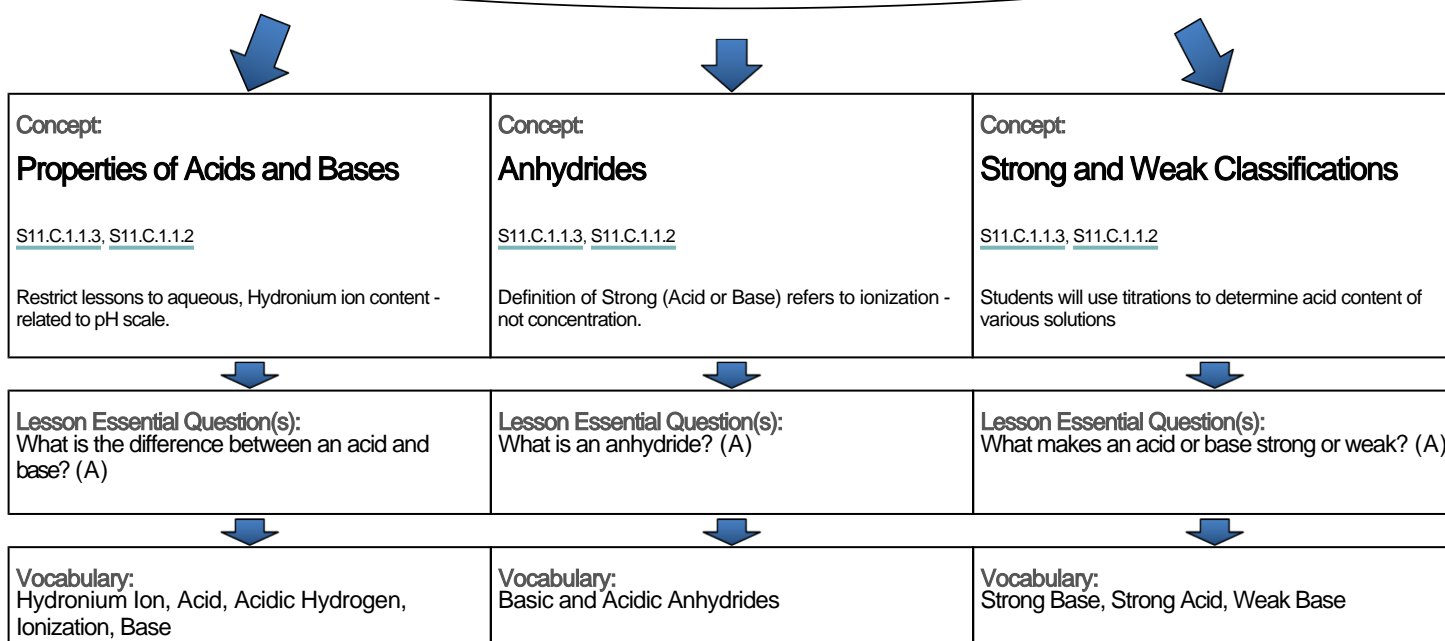
## Key Learning:

Characteristics and reactions of acids and bases are common in everyday experience and used extensively in quantitative chemistry.



## Unit Essential Question(s):

What are Acids and Bases?



Topic: Acids, Bases, and pH

Days: 30

Subject(s): Science

Grade(s): 11th, 12th

Additional Information:

Attached Document(s):

Vocab Report for Topic: Acids, Bases, and pH

Subject(s): Science

Days: 30

Grade(s): 11th, 12th

**Concept:**

Properties of Acids and Bases

Hydronium Ion -  
Acid -  
Acidic Hydrogen -  
Ionization -  
Base -

**Concept:**

Anhydrides

Basic and Acidic Anhydrides -

**Concept:**

Strong and Weak Classifications

Strong Base -  
Strong Acid -  
Weak Base -

**Concept: The pH Scale**

pH -

**Concept: Indicators**

Indicator -

Bromomethyl Blue -  
Congo Red -  
Universal Indicator -

Topic: Energy and Matter

Days: 10

Subject(s): Science

Grade(s): 10th, 11th

Key Learning: Every chemical reaction contains energy. That energy can move in various ways.



Unit Essential Question(s):

How does energy move within a chemical reaction?

Concept:  
**Energy Transfer in Systems**

S11.C.2.1.2

Concept:  
**Calorimetry**

S11.C.2.1.2

Concept:  
**Economics of Energy**

S11.C.2.1.2

Lesson Essential Question(s):  
How do you describe the transfer of one form of energy to another form? (A)

Lesson Essential Question(s):  
How does a calorimeter measure energy change (A)

Lesson Essential Question(s):  
What affects does the use of energy have on the economy? (A)

Vocabulary:  
endothermic, exothermic, Law of Conservation of Energy, Entropy

Vocabulary:  
calorie, kilocalorie, Calorie

Vocabulary:  
Fossil Fuels

Concept:  
**Photosynthesis**

S11.C.2.1.2

Lesson Essential Question(s):  
How is energy transferred in the photosynthesis process? (A)

Vocabulary:  
photosynthesis

Additional Information:

Attached Document(s):

Vocab Report for Topic: Energy and Matter

Subject(s): Science

Days: 10

Grade(s): 10th, 11th

**Concept: Energy Transfer in Systems**

endothermic -

exothermic -

Law of Conservation of Energy -

Entropy -

**Concept: Calorimetry**

calorie -

kilocalorie -

Calorie -

**Concept: Economics of Energy**

Fossil Fuels -

**Concept: Photosynthesis**

photosynthesis -



Topic: Math for Chemistry

Days: 12

Subject(s): Science

Grade(s): 12th

**Key Learning:**

A basic understanding of mathematics is useful not only in the laboratory but also at the shopping mall, on the highway, in the kitchen, and on the playing field.



Unit Essential Question(s):

**What skills do I need in my mathematical tool kit to be successful this year?**



Concept:

**Algebra Review- Exponents, Scientific, Metric System, SI Notation, Notation, Polynomial Equations**

S11.A.1.3.1



Concept:

**Mathematical Uncertainties**

S11.A.1.3.1



Concept:

**Graphing Data**

S11.A.1.3.1



Lesson Essential Question(s):

What tools do I need to place in my toolkit from previous Algebra classes? (A)



Lesson Essential Question(s):

Are measurements ever exact? (A)

What is the difference between accuracy and precision? (A)



Lesson Essential Question(s):

How do I put my laboratory data into graphical form? (A)



Vocabulary:

Exponents, Scientific notation, Decimal Notation, Metric System, SI, Base Units, Meter, Second, Kilogram, Derived Units

Vocabulary:

Precision, Accuracy, Parallax, Significant Digits

Vocabulary:

Linear Relationship, Slope, y-intercept, Quadratic Relationship, Inverse Relationship

Additional Information:

Attached Document(s):

Vocab Report for Topic: Math for Chemistry

Days: 12

Subject(s): Science

Grade(s): 12th

**Concept:**

Algebra Review- Exponents, Scientific, Metric System, SI Notation, Notation, Polynomial Equations

- Exponents -
- Scientific notation -
- Decimal Notation -
- Metric System
- 
- SI -
- Base Units -
- Meter -
- Second -
- Kilogram -
- Derived Units -

**Concept:**

Mathematical Uncertainties

- Precision -
- Accuracy -
- Parallax -
- Significant Digits -

**Concept:**

Graphing Data

- Linear Relationship -
- Slope -
- y-intercept -
- Quadratic Relationship -
- Inverse Relationship -

Topic: Polymers

Days: 10

Subject(s): Science

Grade(s): 11th, 12th

## Key Learning:

The Chemistry that defines a polymer, various types of polymers, and their uses.

Note: Referenced Lesson Plans are found in the attachments listed under the Learning Map in the Review Unit



Unit Essential Question(s):

What is a Polymer?

Concept:

### Polymeric Reactions

Examine the types of reactions that are used to manufacture and categorize polymers

Concept:

### Polymers categorized by poly-functional nature of monomers

Di-functional monomers yield 'plastics' while tri-, quatra- etc- functional monomers crosslink to yield thermosets.

Lesson Essential Question(s):

What is a polymerization Reaction? (A)

Lesson Essential Question(s):

Why don't some plastics melt? (A)

Vocabulary:

Free Radical Chain Reaction (Initiation / propagation / termination),  
Condensation Reaction (Di-, Tri-functional), Polymer (Poly-, -mer),

Vocabulary:

Thermoplastic / thermoset, Crosslinking / Vulcanized

Additional Information:

See attachments Chem2wk(37-38)

Attached Document(s):

Vocab Report for Topic: Polymers

Subject(s): Science

Days: 10

Grade(s): 11th, 12th

**Concept:**

Polymeric Reactions

Free Radical Chain Reaction (Initiation / propagation / termination) -  
Condensation Reaction (Di-, Tri-functional) -  
Polymer (Poly-, -mer) -  
-

**Concept:**

Polymers categorized by poly-functional nature of monomers

Thermoplastic / thermoset -  
Crosslinking / Vulcanized -

Topic: Redox Reactions and Electrochemistry

Days: 25

Subject(s):

Grade(s):

Key Learning: Redox reactions are based upon the movement of electrons between different elements.



Unit Essential Question(s): **How are the electrons moving in a redox reaction?**

Concept: <b>Oxidation-Reduction</b> <u>S11.C.1.1.1, S11.C.1.1.3</u>	Concept: <b>Applications of Redox</b> <u>S11.C.1.1.1, S11.C.1.1.3</u>	Concept: <b>Electrolysis</b> <u>S11.C.1.1.1, S11.C.1.1.3</u>
Lesson Essential Question(s): How do electrons move within redox reactions? (A)	Lesson Essential Question(s): Where do we see redox reactions in everyday life? (A)	Lesson Essential Question(s): How does an electrolytic cell work? (A)
Vocabulary: Oxidation-Reduction Reaction, Oxidation, Reduction, Oxidizing Agent, Reducing Agent	Vocabulary: Blast Furnace	Vocabulary: Electrical Current, Electrolysis, Cathode, Anode, Cation, Anion

Concept: <b>Galvanic Cells</b> <u>S11.C.1.1.1, S11.C.1.1.3</u>
Lesson Essential Question(s): How does a galvanic cell work? (A)
Vocabulary: Potential Difference, Voltage, Galvanic Cell, Lead Storage Battery

Additional Information:

Attached Document(s):

Vocab Report for Topic: Redox Reactions and Electrochemistry

Days: 25

Subject(s):

Grade(s):

**Concept: Oxidation-Reduction**

Oxidation-Reduction Reaction -

Oxidation -

Reduction -

Oxidizing Agent -

Reducing Agent -

**Concept: Applications of Redox**

Blast Furnace -

**Concept: Electrolysis**

Electrical Current

-

Electrolysis -

Cathode -

Anode -

Cation -

Anion -

**Concept: Galvanic Cells**

Potential Difference -

Voltage -

Galvanic Cell -

Lead Storage Battery -

Topic: Review

Days: 25

Subject(s): Science

Grade(s): 11th, 12th

Key Learning: Many of the concepts from Chemistry I must be applied to Chemistry II.



Unit Essential Question(s):

What do I need to remember from Chemistry I?

<p>Concept: <b>History of development of the atomic structure</b></p> <p><u>S11.C.1.1.1, S11.C.1.1.2, S11.C.1.1.4</u></p> <p>Review various past theories and how they were determined</p>	<p>Concept: <b>What do the 'numbers' mean?</b></p> <p><u>S11.C.1.1.1, S11.C.1.1.2, S11.C.1.1.3, S11.C.1.1.4, S11.C.1.1.6</u></p> <p>Develop understanding of Atomic number, atomic mass, mass number and isotopes and how to determine them</p>	<p>Concept: <b>What does Quantum mean?</b></p> <p><u>S11.C.1.1.1, S11.C.1.1.3, S11.C.1.1.5, S11.C.1.1.6</u></p> <p>Develop understanding of the Quantum theory of atomic structure</p>
<p>Lesson Essential Question(s): How do we know what the atom is like? (A)</p>	<p>Lesson Essential Question(s): Why are atoms different? (A)</p>	<p>Lesson Essential Question(s): Why doesn't the atom just collapse? (A)</p>
<p>Vocabulary: Atom, Electron, Proton,</p>	<p>Vocabulary: Isotope, Atomic Number, Atomic Mass,</p>	<p>Vocabulary: Continuum, Quantum, Electron Configuration, (shells, orbitals, etc), Octet Rule</p>

Additional Information:

Attached Document(s):

Vocab Report for Topic: Review

Subject(s): Science

Days: 25

Grade(s): 11th, 12th

**Concept:**

History of development of the atomic structure

Atom -  
Electron -  
Proton -  
-

Neutron

**Concept:**

What do the 'numbers' mean?

Isotope -  
Atomic Number -  
Atomic Mass -  
-

Mass Number

**Concept:**

What does Quantum mean?

Continuum -  
Quantum -  
Electron Configuration,( shells, orbitals, etc) -  
Octet Rule -



Topic: Water

Days: 15

Subject(s): Science

Grade(s): 11th, 12th

Key Learning: Water had unique properties that are worthy of significant study.



Unit Essential Question(s):

What is different about water and why?



<p>Concept: <b>Structure of the water molecule</b></p> <p><u>S11.C.1.1.2, S11.C.1.1.3</u></p> <p>Understand that the separation of charge due to electronegativity accounts for water's properties</p>	<p>Concept: <b>Physical Properties of Water</b></p> <p><u>S11.C.1.1.2, S11.C.1.1.6, S11.C.1.1.3</u></p> <p>Have students relate observations about water with the structure</p>	<p>Concept: <b>Dissolving Properties of Water</b></p> <p><u>S11.C.1.1.2, S11.C.1.1.6, S11.C.1.1.3</u></p> <p>Define solubility as a match between the solvent and the solute</p>
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<p>Lesson Essential Question(s): What does a Water Molecule look like? (A)</p>	<p>Lesson Essential Question(s): Why is the boiling point of water so abnormally high? (A)</p>	<p>Lesson Essential Question(s): What types of substances will dissolve in water? Why? (A)</p>
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<p>Vocabulary: , Hydrogen Bonding</p>	<p>Vocabulary: Capillary action, Surface tension, Specific Heat</p>	<p>Vocabulary: Dissociation</p>
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Concept:  
**Solution Concentration**

S11.C.1.1.6



Lesson Essential Question(s):  
How can I calculate how strong a solution is? (A)



Vocabulary:  
Unsaturated Solution, Saturated Solution, Supersaturated Solution, Heat of Solution, Osmosis, Colloids, Tyndall Effect

Additional Information:

Attached Document(s):

Vocab Report for Topic: Water

Subject(s): Science

Days: 15

Grade(s): 11th, 12th

**Concept:**

Structure of the water molecule

-

Electro negativity

Hydrogen Bonding -

**Concept:**

Physical Properties of Water

Capillary action -

Surface tension -

Specific Heat -

**Concept:**

Dissolving Properties of Water

Dissociation -

**Concept: Solution Concentration**

Unsaturated Solution -

Saturated Solution -

Supersaturated Solution -

Heat of Solution -

Osmosis -

Colloids -

Tyndall Effect -