

Chemistry in the Earth System with Labs

Edgenuity, Inc ()

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Pending

Submission Feedback

APPROVED

Basic Course Information

School(s) Offering This Course:

School Name	Course Learning Environment	Transcript Code(s)	
Edgenuity, Inc ()	Online	Abbreviation	Course Code

Title: Chemistry in the Earth System with Labs

Transcript
abbreviations:

Length of course: Full Year

Subject area: Laboratory Science (D) / Chemistry/Earth & Space Sciences

UC honors
designation? No

Non-honors
equivalent course: {{ getNonHonorsEquivalentDisplayValue() }}

Non-honors
exemption details:

Prerequisites: Algebra I (or another elementary level algebra course) (Required)
None

Co-requisites: None

Integrated
(Academics / CTE)?

No

Does your course
include lab activities
in your course
description?

Yes

Grade levels:

9th, 10th, 11th, 12th

Course learning
environment:

Online

Online course self assessment

A. Content (13)

 0  0

B. Instructional Design (11)

 0  0

C. Student Assessment (7)

 0  0

D. Technology (11)

 0  0

E. Course Evaluation and Support (10)

 0  0

Course Description

Course overview:

This Course Overview is not available on the A-G Course Management Portal. For more information about this course, you need to contact the institution that authored this course.

This laboratory science course is aligned to the Next Generation Science Standards for California Public Schools, and is designed to introduce students to collegiate-level principles and concepts of Chemistry. Concepts discussed include atomic structure, elements and the periodic table, properties of matter, chemical bonding and reactions, stoichiometry, energy in chemical reactions, solutions, acids

and bases, and impacts of chemistry in the real world. Students also conduct a variety of laboratory activities that develop skills in observation, use of scientific tools and techniques, data collection and analysis, and mathematical applications.

Course content:

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Combustion: Part 1

The course includes a variety of laboratory activities. These include wet labs that account for at least 20% of the course, and additional virtual labs that can be used for extended practice. Wet labs are completed in a lab setting and are teacher-supervised, hands-on activities. Students are required to conduct the labs according to the lab procedures provided in the Student Guide and the Teacher Guide for the labs, to analyze outcomes, and to formally write about their findings and possible improvements. Lab materials for the wet lab must be provided by the school.

In addition to student collaboration in hands on laboratory experiments, students regularly engage in higher-order thinking and discuss scientific ideas with other students in a threaded discussion format. The discussion, which is open only to students in each class, is monitored by the teacher, who can ask questions of the group or of individual students. This provides students the opportunity to communicate with each other in order to share understanding, insight, and ideas. Sample collaboration questions that students must discuss via Collaboration Corner are provided in the sample assignments for each unit.

Throughout the course, the student's Course Map, provided through the learning management system, serves as a dynamic and interactive scope and sequence for all course assignments. The Course Map includes course objectives and student learning outcomes, content scope and sequence, and a comprehensive outline of assignments. Students can also access an online digital notebook, or eNotes. They have a full menu of text formatting tools and can return to their notes or print them at any time for review. Additionally, the unique direct instruction video presentations embedded in every lesson throughout the course feature highly qualified, certified instructors presenting instructional content via recorded video. Instructors guide students through concepts and skills with clear and engaging audio and visual supports that include white board demonstrations, bulleted key points, highlighted vocabulary, diagrams and photography. The video tool allows students to pause, go back, and repeat instruction as-needed. They stop at intervals throughout instruction to complete interactive tasks, self-assessing their learning progress and keeping students engaged.

In this unit, students examine physical and chemical properties and changes of matter, as well as the four states of matter and how their properties differ between phases. Students analyze kinetic-molecular theory and its impact on the properties of each of the individual states of matter. Students also examine applications of plasmas in real-world scenarios. In addition, students

describe how energy changes during phase changes and apply graphical analysis to investigate the impact of change in temperature over time on states of matter. Students will also further develop scientific literacy skills through written analysis of the various properties of states of matter and how they impact real-world applications.

Unit Assignment(s):

Summary of Assignment:

Lesson: Liquids

Within this lesson, students examine how kinetic-molecular-theory affects the movement of particles in liquids, including its impact on specific properties of liquids such as melting, boiling, and viscosity. Students also examine the behavior of particles in liquids, including how they affect the properties of liquids. Students then examine how intermolecular forces affect the interaction of particles within liquids and affect a liquid's ability to change states. In addition, students examine unique properties of liquids, such as surface tension and incompressibility, and how they are used in real-world applications. Upon completion of the lesson, students read a scientific article discussing various real-world applications of surfactants, then apply knowledge from the article to assess how the behavior of surfactants is demonstrated in additional real-world scenarios, including the creation of written arguments regarding the effects of surfactants on surface tension and viscosity in different liquids.

Within reading assignments throughout the course, a text mark-up toolset helps students of all reading levels engage with grade-level text. Because students can access the tools they need for any activity, students can adapt the level of scaffolding for content that they find more challenging or less challenging. These tools include:

- Read-aloud: Students can hear any section of text read aloud.
- Translation: Students can have on-screen text translated into their home languages. Supported languages include Arabic, Armenian, Chinese, French, German, Haitian Creole, Hindi, Italian, Japanese, Korean, Filipino, Polish, Portuguese, Russian, Spanish, Thai, and Vietnamese.
- Word Look-up: Students can look up any word on the page. They can read the definitions themselves or hear the definitions read aloud.
- Highlighters: Students are encouraged to highlight on-screen text as they read. Highlighting tools allow students to highlight in up to four different colors. Once students are finished reading, they can collect all their highlighted text by color and insert it into their notes or into any other document.
- Digital Sticky Notes: Students use digital sticky notes to annotate text as they read. These notes allow students to capture thoughts, insights, and questions for later use.

Collaboration Questions:

1. Dentists utilize a variety of different materials in tooth fillings, including amalgams of metals such as silver, tin, and mercury, or composite resins composed of plastic and glass particles. Discuss the advantages and disadvantages of using each of these materials for this purpose.
2. Super absorbent polymers (SAPs) are specialized compounds that are designed to absorb extremely large amounts of liquid, sometimes up to 300 times their own weight. Using scientific evidence, discuss the advantages and disadvantages of using these materials in practical applications.

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Physical and Chemical Changes

Within this lesson, students conduct a series of experiments with substances such as calcium carbonate, hydrochloric acid, potassium iodide, and metal shavings to differentiate between physical changes and chemical changes in materials. Students examine the impact of factors such as physical agitation, temperature, and combination of solutes/solvents on changes of matter. They also record qualitative observations of each experiment, and use the observations to construct explanations of each result. Students then use this knowledge to analyze physical and chemical changes of matter in real-world scenarios, as well as verbally communicate the results of the laboratory investigation in a written lab report that is published within the online virtual classroom environment.

After each lab, students write complete detailed lab reports that demonstrate strong scientific reasoning and writing. In these reports students state the purpose of the experiment, questions posed before the experiment, their hypothesis, and independent, dependent, and controlled variables. They list their materials used and the procedure. They collect and organize data into tables, charts, graphs, etc., checking for accuracy. They interpret their data and graphs, determine whether the data supported or refuted their hypothesis. They describe sources of error and possible ways to improve or further their investigation. And they also write without bias.

All extended writing is completed in the eWriting environment, which is designed to scaffold students through the writing process from pre-writing to the final draft. Students may also access the rubric and checklist. A research tab allows students to gather information about their topic when enabled.

In this unit, students examine the characteristics of energy and heat and how they are exhibited in chemical reactions and thermochemical equations. Students explore energy transformations and the law of conservation of energy, then apply this knowledge to gain a conceptual understanding of how heat flow demonstrates these principles within chemical reactions. Students then investigate how calorimetry can be used to calculate the heat of a chemical process. Students also complete a laboratory activity to gain a comprehensive knowledge of how calorimeters are used to determine specific heat of materials. Students then analyze enthalpy changes in chemical reactions and complete a laboratory activity to gain a comprehensive understanding of Hess' law and its relationship to enthalpy.

Unit Assignment(s):

Collaboration Questions:

1. This lab explores the use of various metals in the creation of cookware. Using scientific evidence, create an argument supporting your view on which material is the best for using in cookware.
2. Cryogenics is an area of study in science that involves the production and effects of extremely low temperatures on various materials. One area of cryogenics (cryochemistry) involves the conduction and study of chemical reactions taking place at these temperatures. Give examples of how cryogenics and cryochemistry could be used to advance humans. What are some of the implications of using cryogenics in practical applications?

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Calorimetry and Specific Heat

Within this lesson, students assemble and utilize a coffee cup calorimeter to measure the specific heat of several metals and determine which is the most appropriate for making cookware. Students heat each metal sample (aluminum, iron, copper, and lead) to 100°C, then collect data on the temperature change of the metal when it is inserted into the calorimeter. After collecting all quantitative data, students then perform mathematical analysis to calculate the specific heat of each metal and determine which would make the most cost-effective and efficient cookware. In addition, students apply their knowledge to analyze the effectiveness of other cooking materials in real-world scenarios.

Lab: Enthalpy

Within this lesson, students assemble and utilize a coffee cup calorimeter to investigate the intermediate reactions of magnesium combustion and calculate the overall enthalpy of combustion for magnesium. Students observe the chemical reaction that occurs between magnesium and hydrochloric acid, and collect data on the temperature change of the hydrochloric acid before and after the addition of the magnesium. They also observe the chemical reaction between magnesium oxide and hydrochloric acid and collect similar data. Students then mathematically analyze the data using Hess' Law to determine the enthalpy of magnesium combustion. In addition, students identify potential sources of error and further develop scientific literacy skills through completion of a lab report on the experiment.

Heat and Energy in the Earth System: Part 1

In this unit, students investigate real-world applications of energy. Students differentiate between potential and kinetic energy and utilize graphical and mathematical analysis to gain a comprehensive understanding of the concepts of work, power, and energy. Students then investigate how energy is transformed and conserved as it changes forms, as well as perform graphical and mathematical analysis of energy transfer diagrams and various energy transfer scenarios to confirm the law of conservation of energy.

Unit Assignment(s):

Summary of Assignment:

Lesson: Conservation of Energy

In the lab activity for the Conservation of Energy lesson, students utilize friction ramps and a marble to examine the relationship between kinetic energy, gravitational potential energy, and heat due to friction in order to verify the law of conservation of energy. Students initially perform the experiment using a low friction ramp and a marble, then perform it again using a higher friction ramp. Students apply potential energy, kinetic energy, distance, and velocity formulas to predict the marble's landing position after it rolls down each ramp and off the end of a table. They then perform additional mathematical analysis to determine the amount of energy converted to heat due to friction in the second experiment.

Collaboration Questions:

1. Thermal energy harvesters utilize differences in temperature between an object and its surroundings to generate low amounts of energy that can be used to power small electronic devices. Give examples of how this technology could advance humans while minimizing any harmful effects.
2. In 2016, use of electric power made up almost 40% of the overall energy usage in the United States alone. What is the importance of creating more efficient uses of electrical energy? Propose possible solutions to help conserve energy worldwide.

Unit Lab Activities:

Labs appear throughout the course focusing on the major concepts presented in the course. Some units include additional labs while other units, such as this one, are shorter and do not contain any labs, but instead focus on activities such as extended reading, writing, research, or projects to explore additional perspectives and real world application of concepts.

Heat and Energy in the Earth System: Part 2

In this unit, students examine the relationship between thermal energy and heat, as well as how this relationship affects various Earth processes. Students differentiate between thermal energy and heat, as well as identify how the energy in particles is related to temperature. Students also compare the processes of conduction, convection, and radiation, as well as identify examples of each type of heat transfer in real-world scenarios. In addition, students plan and complete a laboratory investigation exploring how mass and material type affect thermal energy transfer. Students also examine applications of heat transfer within the Earth's structure, including the impact of heat transfer on plate movement.

Unit Assignment(s):

Collaboration Questions:

1. One of the most common methods used to dispose of large amounts of wastewater is by high-pressure injection into underground wells deep below the surface. What are some of the implications to plate movement that could be associated with this method of disposal?
2. Many states utilize nuclear power to obtain part of their electricity. However, there is debate over the possible long-term impacts of this technology on the environment. Using

scientific evidence, make an argument supporting your position on the use of nuclear power.

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Thermal Energy Transfer

Within this lesson, students plan and conduct an investigation to explore factors that affect thermal energy transfer, such as mass and type of material. Students may explore the process of thermal energy transfer using a virtual experiment and/or a hands-on classroom laboratory procedure. Upon completion of the laboratory investigation, students further develop scientific literacy skills by writing a lab report in which they identify variables, collect and organize their data and observations, analyze and discuss the results, and form conclusions about the hypothesis and how the experiment might be improved.

Summary of Laboratory Assignment:

Lab: Plate Boundaries and Movement

In this lesson, students conduct a laboratory experiment to determine the impact of temperature differences on the movement of the mantle underneath Earth's surface, as well as how this movement affects plate tectonics. Students also utilize experimental methods to analyze how plate movement at different boundaries affects the formation of different features such as mountains, faults, etc. In addition, students further develop scientific literacy skills by verbally communicating the results of the laboratory investigation in a written lab report that is published within the online virtual classroom environment.

Atoms, Elements, and Molecules

In this unit, students begin by comparing and contrasting the charges and sizes of the parts of the atom, then extend their investigation to the relationship between atoms and the periodic table. Students also apply graphical analysis to specific elements in order to create electron configurations and determine quantum numbers for electrons using atomic orbitals, as well as number of valence electrons available for bonding. Students also examine the historical development of the periodic table and analyze the arrangement of the periodic table to determine

properties such as electronegativity, ionization energy, and atomic radius size for specific elements. Finally, students analyze ionic and covalent bonds and investigate the impact of electronegativity and ionization energy on bond formation.

Unit Assignment(s):

Summary of Assignment:

Lesson: Atomic Numbers and Electron Configurations

Within this lesson, students examine the methods that can be used to describe electron arrangement in atoms. Students identify the orbitals in which electrons are located in atoms, and explain how the quantum number set of an electron is determined. Students also compare electron shells and electron sub-shells, and apply mathematical skills to calculate the number of electrons that can be found in a specific electron shell. In addition, students describe the electron configuration and orbital notation of given elements, as well as explain how electron configurations and orbital notation are affected by the Pauli exclusion principle, Hund's rule, and the aufbau principle. Students also describe how dot structures can be used to represent the electrons in an atom.

Collaboration Questions:

1. In cooking, chefs commonly use foods such as flour or cornstarch as thickening agents in sauces and soups. How might the properties of these compounds make them suited for this purpose? Support your answer with appropriate scientific evidence.
2. Organic chemicals are utilized in the food and agricultural industries to aid in pest control. However, there is considerable discussion over the possible impacts of pesticides on humans and other organisms. Give examples of how these chemicals can be used while minimizing harmful effects.

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Ionic and Covalent Bonds

Within this lesson, students investigate how the chemical properties of substances can be used to identify the types of bonds they contain utilizing oil, cornstarch, sodium chloride, and sodium bicarbonate. Students make qualitative observations of each substance, then test the solubility and electrical conductivity of each in order to determine which substances contain ionic bonds and which contain covalent bonds. Students then use this knowledge to analyze applications of ionic

and covalent bonds in real-world scenarios, as well as further develop scientific literacy skills through creation of a scientific lab report of the experimental results, including an analysis of possible errors.

Chemical Reactions: Part 1

In this unit, students explore types of chemical reactions and how balancing of chemical equations demonstrates conservation of mass. In addition, students complete a laboratory activity to analyze the outcome of various types of chemical reactions, and further develop scientific literacy skills through the completion of a scientific lab report for the activity. In addition, students examine chemical reactions involving oxidation and reduction of compounds, including identifying oxidation-reduction reactions and assigning oxidation numbers to atoms in order to determine oxidized and reduced species within individual compounds.

Unit Assignment(s):

Collaboration Questions:

1. The use of alternative resources to power vehicles has rapidly increased over the past several years. Major car manufacturers such as Nissan, Chevrolet, and Tesla now offer vehicles that are fully powered by electric batteries. Using scientific evidence, discuss the advantages and disadvantages of using alternative power sources for vehicles.
2. Flameless ration heaters (FRHs) are small water-activated chemical heaters that utilize oxidation-reduction reactions to provide heat energy for use in primitive situations. Give examples of how FRHs can be used while minimizing any possible harmful effects.

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Types of Reactions

Within this lesson, students conduct a series of experiments with substances such as copper (II) sulfate, lead (II) nitrate, and sodium carbonate to classify types of chemical reactions. Students are provided the reactant, product, and/or reaction type for four separate experiments, then must determine the missing pieces of each experiment utilizing the given information. Students also

record qualitative and quantitative observations for each experiment and evaluate the data in order to construct explanations of the results. Students then apply knowledge to analyze and classify chemical reactions in real-world scenarios.

Chemical Reactions: Part 2

In this unit, students examine the mole concept and its applications to stoichiometry. Students apply mathematical analysis to determine molar masses and convert between moles and mass of reactants and products in chemical reactions. Students also investigate various factors that impact reaction rate and chemical equilibrium, including temperature, concentration, and pressure. In addition, students explore dynamic equilibrium and how it is related to LeChatelier's principle. Finally, students complete laboratory activities to gain a comprehensive understanding of the impact of temperature and particle size on reaction rates, as well as further develop scientific literacy skills through the completion of a scientific lab report for each activity.

Unit Assignment(s):

Summary of Assignment:

Lesson: Stoichiometric Calculations

Within this lesson, students examine the importance of molar mass and mole ratios in calculating the amounts of reactants needed and products made in a chemical reaction. Students also calculate mass of substances using mole-to-mass conversion factors and calculate moles of substances using mass-to-mole conversion factors. In addition, students use balanced chemical equations to calculate the mass of a product given the mass of a reactant in a given chemical reaction, as well as to calculate the mass of a reactant given the mass of a second reactant.

Collaboration Questions:

1. Catalysts are utilized in many chemical reactions to lower activation energy and increase reaction rates. Scientists are currently investigating ways to utilize electrocatalysts (catalysts involved in electrochemical reactions) to convert molecules found in greenhouse gases into renewable fuel resources. What are the implications associated with this research?
2. Enzymes are specialized substances produced within a living organism that help to increase the rate of a biochemical reaction. Researchers have been able to implement methods that allow the creation of artificial or synthetic enzymes in a laboratory environment. These "synzymes" can be used in a variety of practical applications. Report on three of these

applications. Include at least two impacts on humans and methods of addressing these impacts.

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Reaction Rate

Within this lesson, students investigate the impact of temperature and particle size on the overall rate of the chemical reaction between water and a sodium bicarbonate tablet. Students conduct a series of experiments in which they change the water temperature to observe its impact on reaction rate, as well as break the tablet into different particle sizes to observe how it impacts the reaction rate. Students then perform mathematical analysis of the collected data to determine which factor has the greatest impact overall. In addition, students analyze collected data to determine the relationship between temperature and reaction rate, as well as between particle size and reaction rate, and to identify potential sources of error.

Chemistry of Climate Change: Part 1

In this unit, students will begin their investigation of the relationship between chemistry and earth processes, including the impacts of chemistry on climate changes. Students will examine how the chemistry of earth's atmosphere and oceans have changed over geologic time, as well as interactions between the four spheres of the Earth system, including the cycles of matter. Students will then differentiate between short- and long-term environmental changes, including factors that impact climate, and examine how these factors impact ecosystems.

Unit Assignment(s):

Summary of Assignment:

Lesson: Environmental Changes

In this lesson, students investigate various short- and long-term changes that occur within the environment, including natural changes and human-induced changes. Students differentiate between short-term and long-term changes, and examine examples of each including earthquakes,

drought, oil spills, invasive species, global warming, and habitat destruction. Students also identify how these changes affect organisms and ecosystems, including analyzing real-world scenarios to predict possible effects of environmental changes.

Summary of Assignment:

Lesson: Factors That Affect Climate

In this lesson, students investigate various factors that impact climate, including seasons, temperature, and precipitation. Students also differentiate between tropical, temperate, and polar zones, as well as examine how distance from water and water currents circulate air and change temperature in marine and continental climate regions. Finally, students describe how factors such as wind, mountain ranges, and monsoons impact precipitation.

Collaboration Questions:

1. Various methods have been utilized over time to obtain natural gas and petroleum. One of the most controversial methods currently utilized to obtain these resources is hydraulic fracturing, or “fracking.” Using scientific evidence, make an argument supporting your view of fracking.
2. The Deepwater Horizon oil spill was one of the most devastating chemical spills to date in the United States. In order to aid in the cleanup efforts, oil-consuming microorganisms were utilized as a form of bioremediation. Give examples of additional ways to implement bioremediation in environmental cleanup, including possible harmful effects of its use.
3. The changes occurring to Earth’s biosphere due to the increase in global temperatures over the last century are well-documented. Report on concerns about the future impact of global warming on Earth’s biosphere. Include at least two impacts to specific organisms and possible solutions for remediating those impacts.

Unit Lab Activities:

Labs appear throughout the course focusing on the major concepts presented in the course. Some units include additional labs while other units, such as this one, are shorter and do not contain any labs, but instead focus on activities such as extended reading, writing, research, or projects to explore additional perspectives and real world application of concepts.

Chemistry of Climate Change: Part 2

In this unit, students continue their investigation of the relationship between chemistry and earth processes, specifically focusing on how interactions between various elements and spheres impact the climate of the Earth over time. Students compare and contrast the various climate regions found on the Earth, as well as identify the characteristics used to classify these climate regions. Students also conduct a laboratory investigation to determine how differences in heat between land, water, and air impact the climate of a specific area. In addition, students examine how Earth's climate has changed throughout history, and analyze causes of short- and long-term climate change. Finally, students examine the impact of human activities on ecosystems, and how these activities contribute to problems such as pollution and acid rain.

Unit Assignment(s):

Summary of Assignment:

Lesson: Human Impact on Resources

Within this lesson, students examine the negative and positive impacts of various human activities on the environment, including urbanization, desertification, mining, habitat restoration, and dam construction. Students also analyze how factors such as forest fires, volcanic eruptions, farming, industry, construction, and the burning of fossil fuels contribute to pollution, smog, and acid rain. In addition, students identify how the EPA affects air and water quality, as well as conduct a cost/benefit analysis of various conservation policies and solutions.

Collaboration Questions:

1. The utilization of renewable energy resources such as solar, wind, and hydroelectric power versus nonrenewable resources such as coal, natural gas, and oil is a topic of serious debate in the current economy. Given the possible environmental impacts, defend your stance on the continued use of renewable or nonrenewable energy resources.
2. Pieces of debris found in the ocean may end up in a marine trash vortex such as the Great Pacific Garbage Patch. Discuss at least two impacts of the debris accumulation on marine life and propose a possible solution to remediate the impact.

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Differential Heating on Earth's Surface

Within this lesson, students examine the differences in how quickly heat is transferred to various Earth materials, specifically soil, sand, water, and air, as well as how this transfer is affected by the angle of "sunlight." Students also investigate how differences in temperature between land, air,

and water surfaces affect the formation of coastal winds and the climate of various regions. In addition, students further develop their scientific literacy skills by recording qualitative and quantitative observations for each experiment and evaluating the data in order to construct explanations of the results.

The Dynamics of Chemical Reactions and Ocean Acidification

In this unit, students examine the properties of mixtures and solutions, as well as how various factors impact solubility in solutions. Students differentiate between heterogeneous and homogeneous mixtures, as well as compare and contrast the three main types of solutions. In addition, students investigate the factors that impact the solubility of a substance, then complete a laboratory activity to gain a comprehensive understanding of the relationship between temperature and solubility. Students also identify properties of acids and bases and explore the effects of hydrogen and hydroxide ion concentration on pH. Finally, students complete a laboratory activity to gain a comprehensive understanding of how solution pH is examined using indicators, and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Unit Assignment(s):

Collaboration Questions:

1. The ocean plays an intricate role in helping to regulate the carbon dioxide levels in our atmosphere. However, due to increases in industrial and agricultural activity throughout history, the amount of carbon dioxide absorbed by the ocean has increased over time. Report on concerns about this increase. Include at least two impacts on humans and possible solutions for remediating these impacts.
2. The use of synthetic fertilizers in the agricultural industry aids in increasing the yields of a variety of crops. However, the runoff of nutrients provided by these chemicals into water resources can lead to eutrophication. As if you are a scientist advising an agriculturally-based community, choose the method you would propose as a solution to address this issue.

Unit Lab Activities:

Summary of Laboratory Assignment:

Lab: Solubility

Within this lesson, students investigate the relationship between temperature and solubility of a solute using sugar and water. Students measure how many teaspoons of sugar are able to dissolve in cold water, then change the temperature of the water and observe how much additional sugar is able to dissolve in the solvent before it becomes saturated in a series of three additional experiments. Students then perform mathematical and graphical analysis of the data to determine if there is a direct relationship between the temperature and solubility of a solute. In addition, students apply their knowledge to analyze solubility in real-world scenarios.

Summary of Laboratory Assignment:

Lab: Measuring pH

Within this lesson, students investigate the pH of a variety of acids and bases using both a universal pH indicator and a red cabbage pH indicator. Students initially collect data from several solutions composed of various concentrations of hydrochloric acid, sodium hydroxide, and/or distilled water by performing mathematical analysis to calculate the pH of each and then testing the individual solutions with pH indicator paper. Students then retest the solutions using the red cabbage indicator to confirm it is calibrated correctly, and finally use the red cabbage indicator to conduct pH tests on several common household acids and bases. Students collect qualitative and quantitative data on each household solution to determine the acidity or basicity of each.

Course Materials

Multimedia

Title	Author	Director	Name of video series	Date	Website	Medium of Publication
Edgenuity Course Map	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Edgenuity Instructional Videos	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource

Title	Author	Director	Name of video series	Date	Website	Medium of Publication
Edgenuity eNotes	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Edgenuity eWriter Tool	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Edgenuity CloseReader Interactive Reading Environment	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Interactive Periodic Table	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Collaboration Corner	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Teacher-Led Online Discussion Forum
Interactive Labs	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource

Other

Title	Authors	Date	Course material type	Website
Surfactants	Edgenuity Staff	2014	Informational Text	[empty]
Wet Lab Guides	Edgenuity Staff	[empty]	Instructional Guides	[empty]

Supplemental Materials

Title	Content
No course materials have been added to this course.	

Additional Information

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