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Chemistry with Lab

***Please Note: If you are switching to this course mid-year, be aware of any changes to the grading and make adjustments on the grading sheets you are already using.**

Please review the FAQs and [contact](#) us if you find a problem.

Credits: 1

Prerequisite: Algebra 1, High School Biology

Recommended: 11th

Test Prep: [CLEP](#) This course covers the basic material for a high school chemistry course. The CLEP covers two years worth of material. Those wishing to take the CLEP will have to do significant additional study.

Course Description: This curriculum includes topics such as matter, atomic theory, the periodic table of the elements, bonding, chemical equations, chemical bonding, stoichiometry, gas laws, acids, bases, and salts, reaction rates, thermonuclear and nuclear chemistry, and equilibrium. Students learn through texts, videos, online tutorials, as well as through hands-on and virtual laboratory experiments. A midterm and final exam will be given. This course is based on [Georgia Virtual Learning's High School Chemistry](#) course but uses other resources throughout. All the pdfs not listed with a separate source are from this GVL course, though they may have gotten them from a different source themselves. (Thank you to Holly Dunn and especially Liz Mogg for all their help with preparing this course.)

[Materials List](#) for home labs

Also, a [scientific calculator](#) is required, particularly for performing pH calculations in Unit 11. Learn how to use it!

Note: This course may require more study and practice than other courses due to the complexity of some aspects. The final exam will be created from your tests from throughout the course. Hold onto your tests and use them for review. (That's always a good practice.)

Day 1(*)

1. (*)Print out your [first quarter grading sheet](#) or use the [Excel](#) version.
2. Keep in mind that your success in Chemistry will be directly proportional to the amount of effort you invest. The complexity of some of these subjects may require additional study and practice on your part.
3. Laboratory safety is important. Although many labs are online, students will be conducting some labs at home. Please wear personal protective equipment such as safety glasses and gloves when needed.
4. Assignments

1. Save your written work as a record of what you did in this course.
2. Please, no cheating or plagiarizing.
1. What is [Chemistry](#)? Visit this website and read through what chemistry is all the way through what chemists do.
2. As you can see, chemistry is a very important part of many professions, from research scientists to physicians. Believe it or not, even chefs need to understand chemistry, as they are constantly changing matter from one form to another, using mixtures, reactions, heat, and so on.
3. The first unit on the Georgia Virtual site is a review of many concepts learned in High School Biology and a few from Algebra 1.
4. You will be using a computer graphing program in this course as well as a scientific calculator. Try to get one. If you can't, you can use an app or one found on your computer or on the internet.

Day 2*

1. *Print the [key terms](#) for the first unit.
2. Review the terms and then complete the [crossword puzzle](#). You can click on the boxes and type in the words.
 - You can check your puzzle by clicking on the key picture.
1. Give yourself 5 points for completing the assignment.

Day 3

1. Briefly review the [types of graphs](#).
2. You are going to be [creating graphs and answering questions](#). First, install the program or decide what you will use. There is a tutorial link for learning how to use it. Go through the steps.
 1. It is suggested you install the Graphical Analysis program. You may need your parents help with this. (I was able to install and complete the examples myself, so it is doable.) The directions and link are all on the page above.
 2. If you have a tablet you can use: Vernier Graphical Analysis. If the GVL program does not work for you, you can use these: for [Mac](#) and for [Chrome](#).
 3. However, you could use any graphing program, even Excel, or just your hand and some [graph paper](#).
1. Once you are set, scroll down to the "[Now You Try It](#)." (linked in #2)
 1. Graph the data and answer the questions without looking at the answers until you answer them. You can see the answers by highlighting them, click and drag or double click over them. They are right next to the word "Answer."
1. Give yourself 10 points for completion of the day's activities.

Day 4*

1. Do a quick practice using [different kinds of graphs](#). (Don't spend a lot of time here.)
2. Do you recognize the different types of graphs and how they are used? Do the [two activities](#).

3. Although you learned about the scientific method in biology and possibly other previous sciences, we are going to review it here. It will assist you mentally when you complete a laboratory assignment and report.
4. *Print the [note taking guide](#). ([source](#))
5. Watch the [video about the scientific method](#). It is 30 minutes long. Take notes on your pages as you watch.
6. Complete the self-assessment below the video. Give yourself a point for each blank you get correct.
7. Record your score out of 28. (potential for extra credit)

Day 5

1. Try the [Quantitative vs. Qualitative](#) activity on page 2 of this pdf and the section on observations and inferences. ([source](#))
 - Scroll down to check your answers.
1. Which is an observation and which is a conclusion?
 - The milk tastes sour. (Answer: observation)
 - The sour milk must be spoiled. (Answer: conclusion)
 - gas blown on the candle was carbon dioxide because the flame went out (Answer: conclusion)
 - Lemon juice is an acid and tastes sour. All acids must taste sour. (Answer: conclusion)
 - The temperature of the liquid is 33 degrees Celsius. (Answer: observation)
 - The wire is copper since it is copper colored & conducts electricity. (Answer: conclusion)
 - When the powder was added to the water, it fizzed. (Answer: observation)
 - It must be about to rain because the sky is getting dark. (Answer: conclusion)
 - What is the purpose of the candle wick? (Answer: fuel for the flame, holds the flame)
 - As a candle burns, it becomes shorter. Where does the wax go? (Answer: some melts, some burns off into gas)
 - Record up to 5 points. Take off a half point for any incorrect answer. There are ten in total.
1. Watch this lab safety rap video under the Management Tips called "[Lab Safety](#)." It is a little silly but pay attention to personal protective equipment and procedures in case of an accident.
 - Wear gloves, goggles and some sort of smock or apron in case of spills.
 - Never smell directly from a container. Wave your hand above it with your nose a short distance away until you catch a whiff ONLY IF the lab requires you to smell the solution. Do not smell anything unless directed.
 - If you get anything in your eye or eyes, immediately flush with water for at least 10 minutes. Get your parents' attention immediately and he or she can call poison control if needed.
 - Do NOT do any laboratory assignments without adult supervision.

- Wear shoes and preferably long pants in case of spills.
 - Keep long hair pulled back.
 - Wash your hands immediately if you get a chemical on them.
 - Do not wear jewelry.
 - Be careful where you have equipment placed.
 - Clean up properly. Most of your labs will allow solutions to be washed down the drain. Keep the water running for at least 30 seconds to flush the sink adequately.
 - Take data during the lab. Do not wait until the lab is over as you may forget the data. Feel free to use scratch paper that you can then transcribe to your lab notebook.
1. Note: There is a lab on Day 10. Start gathering the materials needed for that day. (ruler, measuring tape, meter stick or yard stick, 2 different sized cups, bathroom scale that can weigh items at least between 1 and 20 pounds, measuring cup, large book, full two liter bottle or gallon of milk, large pot or pan)

Day 6*

1. Complete this [scientific method lab](#).
 - Here is the [lab link](#) on the page.
1. Record 40 points for completion. Take off 5 points for any section of the lab left unfinished.

Day 7*

1. Read [How to Write a Lab Report](#).
2. *Print the [Scientific Notation Note Taking Guide](#).
3. Watch the [video on scientific notation](#). Try to take notes and answer the questions before they give you the answer. You should have learned this material in Pre-Algebra/Algebra 1, so hopefully this will be a good review.
4. Refer to [these notes](#) if you are having a difficult time figuring out the answer and for the video quiz answers at the end. Do not print these. It's 28 pages long and is just what's in the video.
5. Complete the [self-assessment and practice](#) on page 8. Score up to 6 points for the practice questions (the ones in the boxes).
 - Here's the [extra practice](#) with scientific notation. Only use if it's needed.
 - Here's the [answer key for the extra practice](#).
1. Record your score out of the 6 practice questions.
2. If you are having a difficult time with this section, try working some of the problems again. You could also go to [Khan Academy](#) and find the scientific notation sections to learn more and practice.

Day 8*

1. *Print the [Scientific Measurement Note Taking Guide](#).
2. Watch the [video](#).

- Use the [Scientific Measurement Video Notes](#) if you are having trouble. The quiz answers from the video are not in the notes. (You do not need to print these notes out.)
1. Study the rules for significant figures under the video.
 2. Try the self-assessment and quiz group.
 3. Record your score from the quiz group out of 4 total.
 4. Do the significant figures exercise. Review the rules above it for any wrong answers.
 5. Watch the [music video](#). It may be silly, but it has important information.

Day 9*

1. *Print the [Metric Conversions Video](#) note taking guide.
2. Watch the [video](#) and take notes.
 1. Refer to these [notes](#) if you need to for help with the quiz answers at the end of the video.
1. Look at the examples and do the [You Try It!](#) on your own paper.
2. Check your [answers](#). The answer key shows you how the answer was calculated, if you had any trouble. Rework any problems you got incorrect. Take note of the units that must cancel out to arrive at the correct answer. Knowing what has to cancel will help you deduce how the problem must be set up.

Day 10(*)

1. (*)Complete the problems on [Metric Conversions](#).
2. Check your [answers](#).
3. (*)Complete the [Measurement Lab](#).
4. Write a [lab report](#). Note that this lab may not have a conclusion because you are taking measurements and converting them. No physical or chemical changes are observed. You will NOT be submitting your lab report to us.
5. Score the lab out of 20 points, for thoroughness and neatness. It needs to be complete and easily readable.

Day 11

1. Do the [Self-Assessment and Practice](#) in the boxes on page 10.
2. Record your score out of 6 total.
3. Review the unit for a test tomorrow. Practice some of the math problems and know about types of data. Understand the scientific method and lab safety.

Day 12(*)

1. (*)Complete the [Unit 1 Test](#).
2. Check your [answers](#).
3. Score each answer correct out of 45. (chance for 5 points extra credit) (50 total answers out of the 30 questions)

Day 13**

1. You will be starting the next unit, Matter. Read through the [introduction](#).
2. *Print out the [key terms](#).
3. You can work on your terms by using this [crossword puzzle](#).
4. *Print the Study of Matter [note taking guide](#).
5. Watch the [Study of Matter video](#). You can use the [video notes](#) for study and for video quiz answers at the end.

Day 14

1. Watch this video on [properties of matter](#). (density)
2. Here's [another](#). (malleability, brittleness, phase change)
3. Here's a third video on [sublimation and deposition](#).
4. Here's a final video on [chemical vs. physical properties](#) and reactivity.
5. Take notes.

Day 15*

1. Review your notes.
2. *Print the [note taking guide](#) about the classification of matter.
3. Watch the video on the [types of matter](#) and take notes.
 - Use the [video notes](#) for review and to check the answers for the quiz questions at the end of the video.
1. Look over the flow chart and notes from today to review the concepts.

Day 16

1. Study the [flow chart](#) and notes from yesterday and watch the video.
2. Answer the questions.
 - What's it called when a solid turns directly into a gas?
 - What's the name of the variable changed directly by the scientist?
 - What is the name of something created by two or more elements combined chemically?
 - Answers: (sublimation, manipulated variable)
1. Answer the [questions](#). Use your notes if needed.
2. Record your score out of 17.
3. Here are several activities to practice classifying matter. Do at least the first one. Keep doing the next one until you are getting them all right.
 - Take the [quiz](#). If you get one wrong, it will give you a hint. Learn from this!
 - Play the [chemical mixture game](#). Drag the item on the conveyor to the correct category above. Try to do several levels. (It's okay if you can't do this because it's a Flash game. There are several others practicing the same type of thing.)
 - Place the [foods](#) into the correct categories.
 - Place the [items](#) into the correct categories.

Day 17*

1. *Print the [note taking guide](#).

2. Watch the [Separation of Mixtures](#) video. Pause the video as needed and write down your observations before proceeding. This video has a lot of math problems. Please take your time and rework ones with which you have trouble. End of video quiz answers (C-density, A-magnetism, B- $D=m/v$, C- 5 g/mL, A- float). Be sure you understand the answers.
3. I do not plan on completing the remainder of this page about high fructose corn syrup. Feel free to complete it on your own time. Just be aware that chemistry is used to produce food additives, good or bad.
4. Get your supplies for the lab for Day 20: 3 fun-sized candy bars of different kinds (Snickers, Milky Way, and 3 Musketeers recommended for their rectangular prism shape-don't have to be small sized), ruler, calculator, magnifying glass (optional)

Day 18*

1. Review your notes from yesterday.
2. Try the [Compounds and Mixtures Activity](#).
3. *Print out the first page of the [lab handout](#).
4. You'll be following these [directions](#).
5. Complete the [virtual lab](#). **Use the 25 mL graduated cylinder** for the three metals. The 10 mL one in the instructions is too small.
6. Complete your chart and handout. (Metal 1, 2, 3 = Metal A, B, C) When you are finished, you can fill in your metal choices on the computer screen and check your answers.
7. Begin your lab report in your lab notebook. You may complete the report on Day 19.

Day 19

1. Complete the lab report.
2. Record your score out of 20 points.
3. Study your notes thus far for a quiz tomorrow.

Day 20(*)

1. Complete page 6 as a [quiz](#). Answer the questions in the boxes and then continue down the page. Take off a half a point for each hint you use. No peeking at answers until you tried.
2. Record your score out of 12. (Score up to one point for each answer.)
3. Review definitions and concepts that are giving you trouble.
4. Watch the [video on states of matter](#). This video promotes the old-Earth viewpoint. Talk to your parents about their beliefs.
5. Draw pictures or write to describe the different states of matter.

Day 21

1. Click on [States](#). Answer the questions.
 - Record your observations by recording the temperature and illustrations of each substance in the three states of matter. You can change the substance and the

state on the right hand side of the simulation. How does it compare to your predictions? (5 points)

- Describe what happens to kinetic energy of the molecules when temperature increases. What type of relationship exists between kinetic energy and temperature? (direct or inverse) (5 points)
 - Write a summary paragraph to demonstrate you have mastered the learning goal. Be sure to incorporate both concepts of the learning goal:
 - How temperature relates to the kinetic energy of molecules.
 - How the molecules in a solid, liquid and gas compare to each other.
 - Score up to 10 points.
 - Explain how a change in temperature affects the pressure inside a container.
1. Record your score out of 20 points.
 2. It says the scientists believe that in the beginning there was just energy, no matter. Do you know what the first thing God created was? Light! Do you know what light is? It's moving energy. Remember that God didn't create the stars (sun) until the fourth day.
 3. Read about the plasma state and changes of state using the links below. They are brief.
 - [plasma state](#)
 - [changes of state](#)

Day 22(*)

1. Answer the [questions](#).
 - Complete the [matching activity](#).
 - Complete the [crossword puzzle](#).
1. Score up to 5 points per each section for completing them correctly, even if you need to fix something.
2. Record your total out of 15 points.
3. Try to answer the [questions](#).
4. Study your materials for this chapter. Know definitions and be able to recognize examples of them. Know the density equation and be able to work problems.

Day 24

1. Complete your [Unit 2 test](#).
2. Check your [answers](#).
3. Record your score out of 32. Add a point for each correct extra credit question.

Day 25***

1. *Print the [key terms](#). You will be studying these terms throughout the unit.
2. *Print the [note taking guide](#).
3. *Print out a [periodic table](#). Keep this available through the whole course.
4. Keep the [online periodic table](#) bookmarked (or choose another you like online). You'll want to be able to easily access it.
5. Read through the [page](#) on the new unit, Atomic Theory, and watch the video. (quiz answers: D, B, B, C, D, C, B)

6. Here is the list of lab materials you'll need for this unit: funnel or cone-shaped paper made into a funnel (with a small opening), metric ruler, compass for drawing circles, sheet of large paper (at least 40 cm square-may use newspaper or tape several pieces of paper together), dried beans or peas (at least 100), plastic container.

Day 26

1. Complete the [Rutherford Scattering Simulation](#).
 - Click on Plum Pudding Atom. Click to turn on the Alpha Particles. Click on Traces to watch their path. Make observations.
 - Reload the page and click on Rutherford Atom. Do the same thing with each option on the top left.
 - What's happening? Why?
 - like charges are repelling
1. Watch the video on [atomic theory timeline](#).
2. Study what you have learned thus far on atomic theory.

Day 27

1. Try the [matching](#) exercise.
2. Record your score out of 7.
3. If a hypothesis is proven false, is the experiment a failure? (Answer: No! Something was learned. The hypothesis then can be altered and the experiment tried again.)
4. Visit the interactive site [BBC Bitesize about Atoms and Atomic Structure](#).
 - Read through the pages. Pay attention to the last few pages which introduce several new concepts.
 - Remember that a compound includes the number of atoms of each element in that compound. For example, CO contains one carbon atom and one oxygen atom. CO₂ contains one carbon and two oxygen atoms. H₂O contains two hydrogen and one oxygen.
 - A chemical reaction is displayed similar to a mathematical problem with each side having the same mass. Remember that matter cannot be created nor destroyed in a reaction, therefore, the number of atoms must also be equal in number, but not necessarily in arrangement. Reactions will be covered more in depth at a later date.
1. Try the [test](#).
2. Record your score out of 7. (potential for 3 extra credit points)

Day 28

1. Read through [Matter-Atoms from Democritus to Dalton](#) by scrolling down and try the comprehension checkpoint questions throughout. Be sure you are familiar with Dalton's theory.
2. Try the [quiz](#).
3. Study the 4 items in Dalton's Atomic Theory. Try to recite them and explain them to your parents.

Day 29*(*)

1. *Print the [note taking guide](#). ([source](#))
2. Watch the [video](#) on the Structure of the Atom. Take notes. (answers: C,B,C,B,A,A,C)
3. (*)Print the worksheet and [complete the chart](#) ([source](#)) or copy it and complete it in your notebook. Use your periodic table if needed.

Day 30

1. Try the [isotope problems](#).
 - To calculate an average, you would multiply each mass times the decimal form of the percent for each isotope.
 - Then, add together those values. This is also shown in the answer.
 - Complete question 3 using the periodic table.
1. Check your [answers](#).
2. Write a physical and chemical property of a piece of paper. (Answer: example-made from wood, burns)
3. What identifies an atom? (Answer: its atomic number)
4. What makes up the majority of an atom's weight? (Answer: protons and neutrons)
5. An atom is equal when it has the same number of protons as what? (Answer: electrons)
6. Record your score out of 7 for the problems and questions.
7. Read more about isotopes: [one](#), [two](#).
 - Again, it introduces a new concept, radioactive decay. Just be aware that some isotopes are unstable and give off protons, making a totally new element with another element or particle released. Remember that when the atomic number changes, it becomes an entirely new element. Look at the examples that show this.

Day 31*

1. *Print the [note taking guide](#).
2. Watch the [video](#) on Electrons in the Atom. Take notes. (answers: A,A,C,A,B,D,A)
3. Play the [game](#).

Day 32

1. Do you remember the 4 items in Dalton's Atomic Theory? Who was Neils Bohr? Max Planck? What is the equation used for the wave description of light? Check your notes to see if you were right.
2. Learn a little bit about [wavelength and frequency problems](#).
3. Can you find the wavelength of a radio wave with a frequency of 90 MHz? (Answer: 3.3m)
4. Watch the [flame test video](#) to see how wavelength and frequency in waves is used to identify metals. It is an experiment and the screen is black for a bit.
5. Here's an [electron review](#). Watch the first four minutes and twenty-seconds.

Day 33**

1. *Print the [note taking guide](#) and the [energy levels chart](#).
2. Watch the [video on electron distribution](#) and take notes and fill in what you can of the chart. Copy the diagonal rule when prompted. (answers: B,C,B,B,D,A,C)
3. Look at this page for [review of orbitals](#).

Day 34

1. Answer the questions that follow.
 - You will follow the directions and use this site on [electron distribution](#).
 - Choose s orbitals and state its shape.
 - Choose p orbitals and state the shape of the px orbit.
 - Choose d orbitals and state how many lobes a typical d orbital has.
 - Choose f orbitals and state how many orbitals are in the f sublevel.
 - Answers (from GVL: sphere, dumbbell, 4, 7)
1. Try [Quiz 1, 3 and 4](#) from this site.
 - The key to this is add up the number of electrons in the configuration (the raised numbers after the letters, which is the atomic number/number of electrons.
 - For Quiz 3 and 4, count the number of electrons as before, then look the final number up as the atomic number on the periodic table where you will find the chemical symbol or name)
 - How did you do? Practice more with these quizzes if you are having trouble.
1. Use your electron configuration chart from yesterday to try Quiz 5 at the same site above. Remember to put a number and letter in the first box and the number of electrons of that orbital in the raised box. How did you do?
2. Study your electron configuration chart from yesterday. Can you duplicate it? The orbitals are labeled s, p, d, f. Sometimes it is useful to make up an acronym to memorize this order. For example, I made up **SuPer Dim Flashlight**. It contains those letters (which I capitalized) in the correct order.

Day 35

1. Try to write out the electron configuration chart from memory.
2. Complete [page 16](#) using your notes for help if you need to.
3. Complete the Orbital Diagram in blue for a grade. Use your periodic table to assist in finding the atomic number and element. Hint: Each half-arrow represents one electron. Note that electrons fill the orbital spaces one at a time, then fill in the second electron to make a pair as the number of electrons increases.
4. Record your score out of 14.
5. Do the Quiz Me's below for a grade.
6. Record your score out of 7.
7. **Gather the materials noted on Day 25 for your lab tomorrow. You will need at least 100 dried beans or peas.**

Day 36

1. Complete the [lab](#). (You could use the graphing application you saved from the first unit or create your own graph.)
2. Complete the lab report using the [lab report directions](#).
3. Score your lab out of 20 points. You can use the [grading rubric](#) as a guide (and even divide your score by 5 to get it out of 20).
4. Can you duplicate the electron configuration chart?

Day 37

1. Use your notes to study all of the information you have learned in this unit. In addition to the historical aspects, be able to use the wavelength formula from memory, calculate atomic number, mass, number of electrons, protons, neutrons, etc. from a chart. Study your electron configuration chart and be able to reproduce it. Be able to do an orbital diagram for a given element. Practice, practice.
2. Try [quizzes 6, 7, 8, and 9](#). Use your periodic table as needed.
3. Use the activities from this unit for review such as this [matching activity](#).

Day 38

1. Complete your [test](#). You may use your periodic table and electron configuration chart if needed.
2. Check your [answers](#). Score 2 points per **answer** (some questions have more than one answer.) There are 39 answers all together for a total possible of 78.
3. Record your score out of a total of 74 points. Add any extra credit to your score, not the total, 2 points per answer.

Day 39*

1. Read through this [introduction](#) to the next unit, the Periodic Table.
2. *Print the [key terms](#). ([source](#))
3. *Print the [note taking guide](#). ([source](#))
4. Watch the [video](#) on the history of the periodic table.
 - Take notes.
 - When the class on the video pauses to do their element organization, you do the same.
 - Take the first 15 elements and try to organize based on the final term of the electron distribution (valence electrons). For example, the elements ending in 1s's would go together, 2s's would be together, 2p's, etc. Organize with increasing atomic number.
 - Pay attention in the video to how to use the periodic table when figuring out electron distribution. This will help you tremendously.
 - Pause the video when prompted and really try to complete the exercises.
 - Remember what he says about the d-block having the first number as one less than you would think from the periodic table. If the d-block is in the 5th row, you would start that block with the number 4. For example, Iron (Fe) with atomic

number of 26 in the fourth row, would use “3d” rather than a 4. You would use one less than 4, which would be 3.

1. This section takes a lot of practice. The “Noble Gas Distribution” makes it easier, since you use the noble gas before the element in question, and the remainder of the electron distribution. It’s like shorthand of the chemistry world.
2. Here are the answers for the video quiz. (answers: B,C,B,C,B,C,B)

Day 40

1. Review the [Noble Gases configurations](#).
2. Who did what? [Match](#) the accomplishments to either Mendeleev or Moseley.
3. Continue on page 4. Try the Noble Gas distribution below the matching. Don’t forget to put the noble gas (located before the element on the periodic table) in brackets, then write out the remainder of the configuration. Check your answers.
4. Do the questions in the boxes for a grade.
 - Record your score out of 7.
1. Note the [chemical symbol](#) corresponds to its Latin name. Try to familiarize yourself with these oddball symbols. It will help when you come across them in the future. (There is no additional work to submit for a grade.)

Day 41*

1. *Print the [note taking guide](#) and the [blank periodic table](#) from the sidebar. You also need colored pencils or something like them.
2. Watch the [video](#) on the Organization of the Periodic Table. There is additional information on the elements in the table besides the electron distribution.
3. Here are the answers to the video quiz. (answers: A,C,B,B,B,C,B)
4. Practice the [periodic table](#). Click on More Options and choose the first 36 elements from the top corner of the box below the periodic table.
 - Use your periodic table to help you with the chemical name/chemical symbol game if needed.
1. And a little just for fun, here’s a Harvard lecturer [singing the elements](#). But maybe it will [inspire you to learn it too](#).

Day 42

1. Complete all the [matching exercises](#) on page 6. You can watch the video if you like.
 - Complete the practice sections using your periodic table. Valence electrons are the TOTAL number of electrons in that outer energy level.
 - For example, Oxygen has 6 because it has $1s^22s^22p^4$. You add up the digits for the highest level number (in this case, 2). Remember that an energy level is all of the electrons in that level number.
 - For example an element with electrons in the 1s, 2s, and 2p use 2 energy levels (not 3). An element with electrons in 1s, 2s, 2p, 3s, and 3p, uses 3 energy levels (not 5).
1. Try the matching again if you need additional practice.

2. Practice using [Building Elements](#).

Day 43

1. Another elements song! Take a [listen](#) and learn about their uses.
2. Answer the [questions](#). Use your notes and the periodic table if needed.
3. What is the noble gas distribution for phosphorus? (Answer: $[\text{Ne}]3s^23p^3$)
4. What is the noble gas distribution for barium? (Answer: $[\text{Xe}]6s^2$)
5. Answer the [questions](#) and note how many you got correct.
 - Record your score out of 9 for those plus the noble gas questions above.
1. Do this [element quiz](#). Don't worry if you get some questions wrong.

Day 44*

1. *Print the [note taking guide](#) and the [Predicting Ionic Charges](#) worksheet.
2. Watch the [video](#) and take notes. Don't worry about doing the classroom project in the video. Pay attention to the trends and the scientific explanations as to WHY the trends exist. Some are more obvious than others and based on information you already know.
3. Ionic charges: Remember the noble gases on the right of the periodic table are stable, that is, their valence energy levels are full. The other atoms on the chart "want" to be stable, too. To accomplish this, the atoms will lose or gain electrons to try to achieve that state of the noble gas before or after as far and the number of electrons, with the outer-most level full. The elements closer to the left of the periodic table will want to lose electrons (it's easier to lose 1, 2, or 3 electrons than gain 5, 6, 7, or 8). In the video, he hints that losing electrons is like giving to others, which is a positive thing. So, when an atom loses electrons, it has a positive charge. Also, think about it. If you **lose** negatively-charged electrons, you now have more positive protons in the nucleus, giving the atom an overall **positive**. Does that make sense? If you **add** negatively-charged electrons, you end up with more electrons than protons, giving the atom a more **negative** charge.
4. Here are the video quiz answers. (answers: B,C,D,A,B,C,C)
5. Complete the Predicting Ionic Charges chart. Check your answers by moving the cursor over the chart on the website.
6. Record up to 20 points for completing the chart.

Day 45

1. Study your periodic chart "cheat sheet" and the trends involved. Do you understand WHY the trends are what they are? You must know the definitions of the property to be able to understand why.
2. Complete the [questions](#) for a quiz grade.
 - Record your score out of 22.
1. Complete the [matching](#).
2. Try the ScienceGeek [review quiz](#). Mistakes aren't problems. They are opportunities to learn. Take advantage of them!
3. Study what you have learned so far.

4. This is the end of the first quarter. Calculate your quarterly grade. Your goal is to get an A. If you didn't, what do you need to do differently to get a higher score next time?

Day 46(*)

1. (*)Print the [second quarter grading sheet](#) or use the Excel version.
2. Play the [game](#). Select the periodic table game. (Flash)
 - o Part of the game is to choose the number of valence electrons of an element. Then make it an ion.
 - o Remember to add or subtract electrons so that it is in a stable, ground state (full valence level).
 - o Do the dot level section and electron configuration. The others have questions that have not been covered.
1. Play [Which One Doesn't Belong](#).
2. Complete page 12 for more practice. **The Cl ion matching near the bottom is incorrect. Both should be negative one, which is not a choice.** Use your periodic table/tables.

Day 47

1. Complete the [graphical comparison lab](#). ([pdf version](#)) Print off the graphs and put them in your lab notebook. (You don't turn it into us.)
2. Answer the questions in complete sentences making sure to restate the question in each answer. Your answers should make clear what the question was.
3. Grade your lab based on the provided [rubric](#). (Divide your score in half.)
4. Record your score out of 50.

Day 48

1. Study what you have learned in this unit. Revisit pages if you need extra practice.
2. Be sure you can do electron configurations, valence levels, noble gas distribution, and figure out stable ion. **Remember the Cl ion question in the card matching is incorrect.** Know about Mendeleev and Moseley. Your test is on Day 49.
3. If you feel like you got a handle on this and aren't going to use your time studying, here are some [Periodic Table puzzles](#). (Warning! The second page is the answers. Stay away until you are ready and have fun!)

Day 49

1. Take the [Unit 4 test](#).
2. Check your [answers](#). (3 points for each answer)
3. Record your score out of 90. (potential 4 points extra credit)
4. Obtain [lab materials](#) for unit 5. (These are all listed on the materials list at the top of the course.)

Day 50***

1. You are starting a new unit today, Bonding.

- How is it that every substance in the universe is made from different combinations of only 118 known elements? Through bonding! Elements combine to form ionic compounds, covalent compounds, also known as molecules, and metals. ([source](#))
1. *Print the [table of electronegativities](#). You will need this for today and future use.
 2. *Print the [key terms](#).
 3. *Print the [note taking guide](#).
 4. Watch the [video](#) and take notes.
 5. Answers to the video element bonding results (ionic, polar covalent, ionic, non-polar covalent, polar covalent)
 6. Answers to the end of video questions (A,B,B,A,A,B,D)

Day 51*

1. Go through the [ionic bonding](#) activity.
2. Watch the [music video](#), "What Kind of Bonds Are These?"
3. Go through the [questions](#) on the rest of the page after the videos.
4. Complete the [lab](#). Pay attention to the fact that you don't have to use all the items listed. Read through all the directions before you start.
 - *Print or create your own [data table](#).
1. Begin the lab report.

Day 52*

1. Complete the lab report from yesterday.
2. Score your lab based on the rubric, [100 points](#), and then divide your score in half.
3. Record your score out of 50.
4. **Print the [note taking guide](#) and [video problem set](#).
5. Watch the [video](#). Follow along in your notes and take additional notes as needed. Pause the video and do the practice problems. Check your answers with the video.
 - Remember that when you do DOT DIAGRAMS, add dots to the symbol, you must place a dot for each side before putting a second dot on a side. For example, Aluminum will have one dot on three sides, not two dots on one side and one on another. Nitrogen will have a dot on each of the four sides, then add an additional dot for each side until you get 5 total (or the specific number of valence electrons on the periodic table).
 - Lewis structures are different. Keep practicing.
 - Quiz answers are: (B,B,D,C,C,B,C)
1. Record 20 points for completing the practice problems from the video.
2. Record 10 points for completing the assignments.

Day 53

1. Practice [electron dot diagrams](#) in the middle of page 16. Check your answers in the matching below.

2. Watch the [review video](#). This teacher tells his students to complete the dot diagram by filling in two dots (electrons) on one side (representing the s² orbital) then fill in one on each of the other sides before coming back and filling in the second dot (electron) on those three other sides (representing the p⁶ orbital). That is another (and probably more correct) way to complete the dot diagram. Be aware that Georgia Virtual does NOT do this in the exercises and quizzes. So it will also not be done on the test. Just be aware of this difference. You can skip the history lesson around the ten minute mark. (You watched the beginning of this already. You can watch it again if you want the review, or you can skip to 4:20.)

Day 54

1. Practice Lewis Structures from day 52 for extra practice.
2. Complete the [activities](#) on the page.
3. Check your [answers](#).
4. Record 20 points for completing the assignments without cheating and with correcting and understanding your mistakes.

Day 55*

1. Study your notes for the test tomorrow. Be familiar with the types of bonds and the relationship with electronegativity. You will be able to use your [electronegativity](#) table so print it off from if you didn't already on Day 50.
 - If wanted, here a couple of sites for review. [One](#) [Two](#)
1. Know how to do Dot Diagrams, Lewis Structure diagrams, and Lewis Structure ion diagrams. Practice with ones from the unit.

Day 56

1. Page 18 will be your [test](#) as follows: Do the top part of the page and use the matching to check your answers. (6 points) Answer the multiple choice questions. (6 points) Do the matching activity. (5 points) Skip the dot diagrams. Draw the first 5 Lewis Structure diagrams. Use the video below it to check your answers. (5 points) Take your time, use your periodic table and electronegativity chart.
2. Score 2 points each and record your total out of 44 points.

Day 57***

1. You will begin a new unit today on Chemical Formulas and Equations. Please continue to practice the Lewis Structure diagrams and dot diagrams if you continue to have trouble. Chemistry builds on itself all year, so keep practicing. Retest if needed.
2. *Print the [Ionic Charge Chart](#).
3. You are going to be learning about chemical reactions.
4. *Print and read over the [key terms](#).
 - You can try the [crossword puzzle](#) if that helps you think through the key terms.
1. *Print the [Ionic Formula note taking guide](#).

Day 58

1. Watch the first [video](#) on Ionic Formula Writing.
 - Quiz answers:(B,B,D,B,D,A,B)
1. Go to the [ChemFiles Ionic Formula Activity](#) and create your formula. When the charges are equal, the bell dings and then you can click on a new compound. The charges on each ion will help you determine how many you need. They need to balance. Just do a couple.
 - If you can't do this, we're just seeing that molecules are balanced. There is an equal number of positive and negative charges.

Day 59

1. Watch the two videos on ionic formula writing: [one](#), [two](#).
2. Complete this [worksheet](#). This is like the balancing activity from Day 58. Try to do the formulas on your own (the charges are given) before [checking the answers](#).

Day 60*

1. Try to do the [tables again](#). You will have to use the printout to find the ternary compound charges. Practice looking them up.
2. Complete the [matching activity](#). Match the element with the corresponding cation or anion that it forms when it seeks an ionic bond.
3. *Write the [formulas](#). Check your [answers](#).

Day 61*

1. *Print out the [Ionic Puzzle Pieces](#) and put them together. Write the formulas for:
 - sodium and chlorine
 - sodium and oxygen
 - sodium and nitrogen
 - magnesium and chlorine
 - magnesium and oxygen
 - magnesium and nitrogen
 - aluminum and chlorine
 - aluminum and oxygen
 - aluminum and nitrogen
 - Record 10 points for completing the assignment.
1. Answer the [box questions](#) on page 4.

Day 62*

1. *Print the Molecular Formula Writing [note taking guide](#).
2. Watch the [video](#) on Writing Molecular Formulas and an Introduction to Organic Molecules. (Answers: D,D,B,B,B,D,B)

Day 63*

1. *Print the [Molecular Compounds handout](#) and complete it.

2. Check your [answers](#).
3. Record 20 points for completion.
4. Complete [page 5](#) through the blue vocabulary section on Organic Compounds.

Day 64

1. Complete the rest of [page 5](#).
2. Record 10 points for completing the task.
3. Go to [Chemical Formulas](#) and complete the interactive and try the quiz at the end. Hopefully, it isn't confusing. Remember, ionic formulas are between metals and non-metals (with positive and negative charges), molecular compounds are usually between non-metals (including organic compounds) without charges and uses prefixes.

Day 65*

1. *Print the [Naming Compounds note taking guide](#) and the [Naming Compounds Handout](#).
2. Watch the first [video](#) and take notes. At the first pause, complete [the first two assessments directly under the video](#), which covers ionic formulas and naming ionic compounds.
3. The quiz questions at the end of the video are also found at the bottom of page 6 (linked in 2). Check your answers with the interactive.
4. After the video, complete the next two assessments on page 6 which deal with molecular compounds.

Day 66

1. Complete the Naming Compounds Handout. (printed on Day 65)
2. Check your [answers](#). Note that ionic compounds have metals and non-metals and have charges that must cancel out. They are named differently than molecular compounds, which are bonded non-metals and use prefixes.
3. Go to the [Naming Compounds practice](#) and click on "Text Only" to begin. Work through some problems for extra practice.

Day 67

1. Practice more naming compounds.
 - o [one](#)
 - o [two](#)
1. Play [Chemgame Tutor](#). (Flash) Play the naming game. Use your charts.
2. We are going to split up this unit into two parts. You will have a test tomorrow on naming ionic and molecular compounds. Review your material and practice. Be sure you understand how to name compounds with metals that have multiple cations (like lead (II) or lead (III)...). Remember that an ionic compound could begin with ammonium (NH₄) as in ammonium nitrate, etc. It is the only cation listed on your chart.
3. Study your prefixes for covalent and inorganic compounds. Practice!

Day 68*

1. *PARENTS ONLY-Print the [test](#). ([source](#)) Only print out page 1 as the answers are on the second page. Or print page 2 also for ease of grading.
2. Complete the test. You may use your periodic chart and ion charges chart.
3. Check your [answers](#). Score up to five points each with a total of 100 points possible. Take off 5 points total if the student has to use notes for help with prefixes.
4. Record your score out of 100.

Day 69*

1. *Print the [word equations and balancing note taking guide](#).
2. Watch the [video](#) on chemical equations and balancing. You can find the answers in the multiple choice boxes at the [bottom of the page](#). The true/false question on the Law of Conservation of Mass appears to be a wrong answer. It should be "true." (I've reported this. Maybe they will fix it.)
3. Try the [self-assessment practice areas](#) of page 7. Balance the equations and check. (You won't go past the boxes on the page.)

Day 70

1. Use the [Balancing Act](#) activity to practice. ([alternate](#))
2. Try this [quiz](#).
3. Record your score out of 5 points.

Day 71

1. Complete the lab on [metals in an aqueous solution](#). (Flash)
2. Here are your [directions and charts](#). Use the link in number one, not the one in the directions. If you are having trouble, please reload the page.
3. You will finish your lab report on Day 72.

Day 72

1. Complete the lab. Complete your lab report.
2. Grade your [lab report](#) and divide your score in half.
3. Record your score out of 50 points.

Day 73*

1. *Print the [note taking guide on types of reactions and predicting products](#).
2. Watch the [video](#) and take notes on Types of Reactions and Predicting Products. Check your video quiz answers with the multiple choice questions in the boxes on [page 10](#).

Day 74

1. Complete the [first two assessments](#) on page 10. In the first one, use your printed charts to help you write the compounds, then balance the equation. Check your answers when you are done. Use your notes to determine the type of reactions.
2. Record a score of 16 for completing the exercise.
3. Review material learned thus far.

Day 75

1. Practice more with [reaction identification](#).
2. Write the activity series of metals on the back of your periodic table. You will need this for your test.
3. Study all of your material since the last test (Day 68) for a test on Day 76. Be able to identify whether a reaction will occur or not using the metal activity series. Know the 7 diatomic elemental molecules from your notes. Know the states of metals, nonmetals, ionic and covalent compounds in reactions and their exceptions. Know your 5 reaction types and be able to give a standard formula (using variables or example).

Day 76

1. This is a two part test. Complete the [reaction identification](#) activity. (The equations may not be identical to when you practiced before.) Take note of the number of correct answers.
 - Your score is out of 15 points total here.
1. On [page 11](#), complete the portion BETWEEN the first exercise in blue and the crossword puzzle. (Activity Series, Word Equations, Predicting Products)
 - Record up to 21 points here. Score up to three points for each, so that you can award partial credit.
1. List the five reaction types and give a standard formula using variables (A, B, etc.) or an example if you can't remember the other. 5 points for knowing the names and 5 points for the example or formula for each.
 - Score up to 10 total points here.
1. Record your score out of 46 total test points.

Day 77*

1. You will begin the next unit, Mass Relationships in a Compound.
2. Be sure you have your periodic table and ionic charge chart for this unit. Make sure your periodic table includes mass for each element.
 - In this module, you will be introduced to the concept of the mole. No, not the dermatological condition or the burrowing rodent, but a term coined by chemists and adopted by the International System of Units as the base unit for measuring the amount of a substance. Calculating moles involves using the molar mass. From that simple calculation, you will build many more conversions that will enable you to solve much more complicated chemical problems in this module and in the next one as well. ([source](#))
1. *Print out the [key terms](#). Begin memorizing Avogadro's Number (6.02×10^{23})
2. *Print the [note taking guide](#) on the introduction to the mole.
3. Watch the [video](#) on the mole and molar mass. Pause the video as needed to complete the problems. Use a scientific calculator to complete the math to save a little time. Review scientific notation on Day 7 if you need a refresher. (Note: the screen with the

answer to the problem containing calcium iodide has an error: Avogadro's number is written incorrectly, however, the answer is correct)

4. Here are the solutions for [Problem Set 1](#) and the [Problems of the Day](#). The key to solving these problems is making sure the appropriate units cancel. Pay attention to this step as it will help you set up problems correctly!
5. Check your [answers to the video quiz](#) on page 4.

Day 78

1. Complete the self-assessment, [Part 1: Molar Mass](#) on page 3.
2. Then complete Part 2: Mole Conversions. Stop after that section.
3. Record 10 points for completion.

Day 79

1. Complete the [Mole Practice problems](#) on page 3. Try the problems before checking your answers.
2. Record 10 points for completion.

Day 80

1. Practice more problems using this [worksheet](#).
2. Check your and [answers](#).

Day 81-83*

1. *Complete the [Mixed Reception Student Activity \(Worksheets\)](#). Can you solve the crime using what you have learned thus far?
2. Score up to 4 points for any answer you found for #1-10. Score up to 2 points for any answer you found in the second section.
3. Record 46 points for solving the mystery and having fun doing it.
 - o Check the student submitted answers. [answer key](#)

Day 84*

1. *Print the [note taking guide](#) on percent composition and empirical formula.
2. *Watch the [video](#) and take notes. *Print and complete the video labs: [one two](#).
3. Check your answers to the video labs: [one two](#).
4. Check your [answers](#) to the video quiz with the questions on page 8.

Day 85

1. Practice with [finding percentages](#) to refresh yourself with the concept.
2. Go to the [tutorial](#) on finding chemical formulas from mass percentages and click on the text only. It is a walkthrough of this concept.
3. Complete the sections under [self-assessment and practice](#) on page 6. Check your answers.

Day 86*

1. Complete [additional practice](#) with this worksheet.
2. Check your [answers](#).
3. *Print the [percent sugar lab](#) worksheet. Use nutrition facts from food labels in your kitchen.
4. Begin the lab. Here is a link for [nutrition data](#).

Day 87

1. Complete the lab and lab report. (Use the [rubric](#) for grading)
2. Divide your score in half and record your score out of 50.

Day 88**

1. *Print the [note taking guide](#) on molecular formulas and hydrates.
2. *Also print the video [lab data sheet](#).
3. Watch the [video](#) and complete the exercises. Pause the video as needed. Check your [answers](#) with the video lab solutions under the video.
4. Check your [video quiz answers](#) with those on page 10.

Day 89*

1. *Print the virtual lab [directions and data chart](#).
2. Begin the lab. Plan time to complete the lab and lab report tomorrow.
3. Here is the link to the [virtual lab](#) on determining the formula of a hydrate. (Just holding an [alternative](#) here, or [replacement](#))

Day 90

1. Complete the [lab](#) and report.
2. Grade your lab report using this [rubric](#).
3. Record your score out of 50. (Divide your total in half.)
4. This is the last day of the quarter. Calculate your quarterly score and midterm grade (if applicable).

Day 91(**)

1. (*)Print the [third quarter grading sheet](#) or use the [Excel](#) version.
2. (*)Practice more with [molecular formulas](#) and hydrates using the worksheet.
3. Check your [answers](#).
4. Study and practice what you have learned in this unit. You will have a test on Day 92 covering this material. Be sure you know how to solve the various problems. Know the definitions. You can use [page 9](#) for review if you want to. Scroll down for extra problems and a video.

Day 92

1. For your test, go to [page 13](#).
 - Complete the top definition section for 6 points total.
 - Work problems 1-8 for 5 points each. (40 points for section)

1. Scoring – give partial credit for problems that may not have correct answers, but set up correctly, etc. at your discretion.
2. Record your score out of 46.

Day 93***

1. You will begin a new unit today, Stoichiometry.
 - “Stoichiometry is the calculation of the quantities of reactants and products in a chemical reaction. Using molar masses and mole ratios found in balanced chemical equations, conversion factors are set up so that units cancel. Using the cancelled units as a guide, stoichiometry problems follow predictable patterns. The Law of Conservation of Matter is the basis of all stoichiometry. Using the Law of Conservation of Matter and the knowledge of basic stoichiometry, limiting reactants and excess reactants can be calculated. Limiting reactant problems have many practical applications, including recipes in cooking, cleaning products, and even gasoline consumption in your vehicle. Every reaction can be used to calculate a theoretical yield. The actual yield can be measured through experimentation. Using these values, percent yield for any chemical equation can be calculated.” ([source](#))
1. **Because chemistry builds on previous concepts, please continue to review previous units with which you are having trouble.**
2. *Print the [key terms](#).
3. **Print the [note taking guide](#) and the [video lab handout](#).
4. Watch the [video](#) and pause while completing the assignments.
5. Check the [answers](#).

Day 94

1. Watch [Mark Rosengarten's tutorial video](#) on moles and stoichiometry.
2. Complete [page 4](#) but stop at the Quiz Me's at the bottom. (I believe one of them is wrong based on the video from yesterday.)
3. Record 20 points for completing the assignment.

Day 95

1. (*)Practice more with the [worksheet](#) on moles and mole mass.
2. Check your [answers](#).
3. Record 15 points for completing the assignment.

Day 96*

1. *Print the [note taking guide](#).
2. Watch the [video](#) on mass stoichiometry and take notes. Pause the video as needed.
3. Check your video quiz [answers](#) on page 10.

Day 97

1. Complete the [self-assessment and problem set 1](#) at the bottom of page 5.

2. Complete [page 6](#). Take your time and go step by step. Check your answers.
3. Record 20 points for completing the assignment.

Day 98

1. Complete [page 7](#) word problems with data charts.

Day 99*-100

1. *Print the [lab questions](#). Answer the questions as you work through the lab.
2. Complete the [virtual lab](#). You will need to open a free account on the website listed to save your work. More will be done with this lab in a future unit.
 - You'll likely need to click on "More Info" under the videos to read the text instead of watching it.
 - Do through Module 3. Then skip to Module 5.
 - (just ignore this: holding this here, [future lab for Module 4](#))
 - For Module 6, you will do this lab instead.
 - [directions lab](#)
1. This lab may take hours. Use today and Day 100 to complete this lab.
2. Record 50 points for completion.

Day 101

1. Complete the [Stoichiometry tutorial](#). (Flash – You can read the text below it if you can't use it.)
2. Complete the tutorial on the "[The Stoichiometry of Product Formation and Percent Yield](#)."
3. Also go through the "[Limiting Reagents](#)." This is a new concept that will be discussed further tomorrow. It is even more math intensive and builds on what you have been learning. Please follow the steps as the instructor does and make sure you place your units properly so they cancel.
4. Record 10 points for completing the day's material.

Day 102*

1. *Print the [note taking guide](#) on limiting reactants.
2. Watch the [video](#) on Limiting Reactants, pause as needed, and take notes.
3. Check your [answers](#) to the video lab below the video.
4. Check the [video quiz answers](#) near the bottom of page 13.

Day 103

1. Complete the [limiting reactants activity](#) lab.
2. Answer the [questions](#) on the top half of page 13.

Day 104

1. Review using [page 15](#).

2. Use the activity [Reactants, Products and Leftovers](#). Start with sandwiches and then from the bottom of the screen go then to molecules and then the game.

Day 105

1. Review by answering these [questions](#).
2. Problems 10, 11, 13-15 may be a challenge. Try them anyway.
3. Check your answers at the bottom of the page.

Day 106

1. You will have a test tomorrow on this chapter. Know how to write formulas and calculate the various types of problems learned thus far. This includes percent composition, percent yields, and limiting reagents. Practice with [problems](#) in the unit by going through the different tabs along the top of the page.

Day 107

1. Take your [test](#).
 - Click on Chapter 6. Hit the “previous” tab until you get to the beginning of the textbook problems.
 - Complete only the ODD problems. Show your work in your notebook!
1. Check your [answers](#). (Score up to four points each. You may give partial credit for incorrect answers if it has part of the problem worked properly.)
2. Record your score out of 100 points total.

Day 108*

1. You will begin a new unit today, Gas Laws. You will step away from what you have been working on and instead use mathematical equations to solve problems. Continue to review past units as you will pick up again on this material in the future.
2. *You will not have to memorize equations, so print the [Gas Laws Formulas](#) sheet.
3. Read through [page 1](#) and be sure you have access to the lab materials listed.
4. *Print the [key terms](#). Begin familiarizing yourself with these terms.
5. *Print the [note taking guide](#) kinetic theory.
6. Watch the [video](#) on gas laws and atmospheric pressure.
7. Check the video quiz answers at the bottom of [page 4](#) in the boxes with multiple choice questions.

Day 109

1. Play with this interactive and describe the relationship between each of these: pressure, temperature, density (as container shrinks density grows, as container grows density goes down).
2. Complete the [experiments](#) at home.

Day 110**

1. Complete the [Self-assessment and Practice](#) on page 4.

2. **Print the [note taking guide](#) on Boyle's Law and [lab worksheet](#).
3. Watch the [video](#) on Boyle's Law and Charles' Law. Complete the lab worksheet as you go.
4. Check your [answers](#) with the "quiz me" at the bottom of page 7.

Day 111

1. Watch the [Boyle's Law animation](#).
2. Scroll down and complete the Boyle's Laws [problems](#) on the rest of page 5.
3. Complete page 6 on [Charles' Laws](#).
4. Record 10 points for completing the day's work.

Day 112**

1. Learn about [gas pressure affecting balloons](#).
2. Complete [page 7](#) until the "Quiz me" section that was done on day 110.
3. **Print the [note taking guide](#) on the behavior of gases and Graham's Law video [lab handout](#).
4. Watch the first [video](#) on the behavior of gases.
5. Check your [video quiz answers](#) with the "quiz me" on page 12.
6. You will check your lab answers tomorrow.

Day 113*

1. Scroll down and check your [lab answers](#) on page 8. Rework any you had trouble with.
2. Learn about [Graham's Law](#). Answer the review questions.

Day 114

1. Complete the [problems](#) on page 10.
2. Complete the [self-assessment](#) on page 12.

Day 115

1. You will have a test on this unit tomorrow. You will be able to use your equations handout, periodic table, and other handouts you have used in the past if needed.
2. Know how to complete the various equations. Know definitions and be able to explain the various laws.
3. Practice with [problems](#) from any of the pages of the unit.

Day 116

1. Go to [page 13](#).
2. Begin at the first question with the big question mark and continue through to the crossword puzzle, but do not complete the puzzle. This is your test. Score 5 points each, 80 points total. (It's possible to receive partial credit.)
3. Record your score out of 80.

Day 117

1. Review all of the past units. Use your past tests to prepare for your midterm exam on Day 119.

Day 118

1. Review all of the past units. Use your past tests to prepare for your midterm exam on Day 119.

Day 119

1. Take your [midterm](#).
2. Check your [answers](#).
3. Record your score out of 20.

Day 120**

1. You will begin a new unit today, Solutions.
2. Read through [pages 1 and 2](#). Begin to familiarize yourself with the terms.
3. *Print the [key terms](#).
4. Make sure you have the ingredients for the lab on Day 121.
5. *Print the [note taking guide](#).
6. Watch the [video](#) on solutions.
7. Check the video answers in the "[Quiz me](#)" questions at the bottom of page 3.

Day 121

1. Review your notes and answer the self-assessment and practice on [page 3](#). Use your notes if you need to.
2. Go to page 5 and [begin the rock candy lab](#) on solubility. The material will have to sit for a few days.
3. Begin your lab report to save on time when you finish the lab.

Day 122**

1. **Print the [note taking guide](#) on solubility and [lab data chart and questions](#).
2. Watch the [video](#) and complete the video lab.
3. Check your [lab answers](#) on the same page and the video quiz answers in the "Quiz Me" questions on page 7.

Day 123

1. Complete [page 6](#). You may want to watch the [video](#) at the bottom of the page first.
2. Practice more [solubility curves](#).

Day 124

1. Learn more about [sugar and crystals](#) for your lab.
2. Finish the [lab](#) from page 5.
3. Finish your lab report.
4. Score your report normally.

- Record your score out of 50.

Day 125*

- Answer the [top questions](#) on page 7.
- *Print the [note taking guide](#) on molarity and colligative properties.
- Watch the [video](#) and take notes.
- Check your [answers](#) to the video quiz near the bottom of page 10.

Day 126

- Watch the [video](#) on molarity and [complete](#) the rest of the page under the videos.
- Complete page 9. Note the difference in [Molarity vs Molality](#).
- Give yourself 20 points for completing today's work.

Day 127

- Study your notes and complete [page 10](#). Also re-answer the questions under the quiz me from the video the other day for extra practice.
- Practice with some [molarity problems](#). The answers are at the bottom of the pdf.
- Record 20 points for completion.

Day 128

- Work through these stoichiometry problems.
 - [chemical remediation of arsenic](#)
 - [solution stoichiometry](#)
- Score up to 5 points for completion.

Day 129

- Complete page 13 for [review](#).
- You will have a test on Day 130 on the material in this unit. Know how to read a solubility curve and complete molarity problems. Know the definition of solubility. Practice writing chemical formulas as you may have to write a chemical formula from words given.

Day 130*

- Students may use their periodic table and other material they have used in past tests.
- *PARENTS: Print page 1 from these two links: [one](#) and [two](#). (Page 2 shows the answers.)
- Students are to complete numbers 1-5. The last one on each page is extra credit. 5 points each. (50 points this section, 15 possible extra credit here)
- *PARENTS: [Print pages 1 and 2](#) from this link. (Page 3 shows the answers)
- Score 2 points per blank. (50 points this section, potential for extra credit)
- Record your score out of 100.

Day 131

1. You will begin a new unit today, Acids, Bases, and Salts. Please use this time to review material and practice from previous units. Make sure you can name compounds, calculate molarity, and determine formulas and chemical equations. Again, chemistry builds on previous concepts, so please master these skills. (There will also be a final at the end of the course. You'll want to be prepared.)
2. **You will need a scientific calculator able to perform log calculations.**

Day 132*

1. Read through [page 1](#) on Acids and Bases. Be sure you have the material listed.
2. *Print the [key terms](#). Begin familiarizing yourself with them.
3. Complete the [crossword](#) at the bottom of page 2. Use your notes. Some of the definitions will not make much sense yet, but you will learn about them in this unit.
4. Record 10 points for completion.
5. Practice items listed on Day 131 if you need additional practice.

Day 133*

1. *Print the [note taking guide](#) on the introduction to acids and bases.
2. Watch the [video](#) and take notes.
3. Check your [video quiz answers](#) with the "Quiz Me" questions on page 4.

Day 134

1. Complete the remainder of [page 3](#).
2. [Experiment](#) with acids and bases.
3. Need to [read](#) about it?
4. STOP-Figure out your third quarter grade. Save all of your labs and written work for your records. You could also use "print screen" to record a snapshot of some of your online quizzes or videos.

Day 135(*)

1. (*)Print out your [fourth quarter grading sheet](#) or use the [Excel](#) version.
2. Complete the remainder of [page 4](#). Do the quiz me questions again to see if you remember what you have learned thus far.
3. A key thing to remember is that an acid usually has a H in front, a base has an (OH), and a salt has neither (although a salt may have O and H, just not together as a hydroxide ion).
4. Give yourself 20 points for completion of the work.

Day 136

1. Read this article on [chemistry and cooking](#) (on the left.)
 - o Learn one technique of molecular gastronomy and tell or write about it.
1. Explore the [Science of Cooking](#) website. Take note that most cooking involves physical and chemical reactions to make delicious food!

2. Not mentioned is the fact that once food enters our bodies, our digestive systems uses chemical reactions to break down food so our bodies can use the vitamins, minerals, proteins, fats, and carbohydrates in the food. So, literally, you are what you eat!

Day 137*

1. *Print the [notes](#) for the pH indicators video.
2. Watch the [video](#) and complete the remainder of page 6. ([alternate video link](#))
3. Check your [answers](#) with the “Quiz Me’s” on page 10.
4. Be sure you have your experiment supplies for tomorrow’s lab. Use parental guidance in locating some of these caustic materials. Also, if you cannot obtain particular substances, your parent may have to adjust the grading rubric accordingly so you do not lose credit for conducting the experiment.

Day 138

1. Practice [pH calculations](#).
2. Complete the [lab](#).
3. Begin your lab report.

Day 139

1. Finish your lab report.
2. Score your lab according to the rubric on the lab page, up to 10 points for the write up and up to 54 points for the data.
3. Record your score out of 64.
4. Learn about and [complete the calculations](#) on page 8. Try the questions at the bottom.
5. Practice [pH and pOH calculations](#).

Day 140

1. Complete the [virtual lab](#) on page 9. Here’s the [full screen version](#) of the simulator.
2. Record up to 25 points. (I think there are 25 boxes and answers for you to complete.)

Day 141

1. Complete [page 10](#).
2. Record 10 points for completion.
3. Practice more using the link used on Day 139 if you need it.

Day 142*

1. *Print the [note taking guide](#) on neutralization reactions.
2. Watch the [video](#) and complete the rest of the page. ([alternate video link](#))
3. Check the [video quiz answers](#) with the “Quiz Me” on page 13.

Day 143

1. Complete the [virtual lab](#) following these [directions](#). (Flash based-when there’s a non-flash version, it should be found [here](#))

2. Complete a lab report.
3. Score it according to the rubric on the page and then divide your score in half.
4. Record your score out of 31.

Day 144

1. You will have a test on Day 145 on this unit. Study your notes and practice the various types of problems learned. Practice your [calculations](#). Know what colors litmus paper turns when reacting to acids and bases. Be able to name acids, bases, and salts.
2. You can use [page 13](#) to review.

Day 145

1. Go to [this page](#).
2. Complete the page beginning at the blue box.
3. The crossword puzzle is 1 extra credit point for each correct puzzle answer.
4. Scoring: begin at 100 and take 2 points off for each missed question.
5. Add 1 point for each extra credit answer.
6. Record your score out of 100. (potential for extra credit)

Day 146*

1. You will begin a new unit today, Thermochemistry.
2. Read through [page 1](#).
3. *Print off the [key terms](#). Begin to familiarize yourself with these terms.
4. Complete the [crossword](#) at the bottom of page 2.

Day 147*

1. *Print the [note taking guide](#) on thermochemistry.
2. Watch the [video](#) and take notes. ([alternate](#))
3. Check the video quiz [answers](#).

Day 148

1. Learn about [energy storage and transfer](#). Watch the video and participate as needed. (This is Flash. If you can't do it, [read about it](#) all here.)

Day 149

1. Learn about [fevers](#). Please close this site after reading the article.
2. Learn why you [sweat](#).
3. Learn about [homeostasis](#). You can use the different "revise" links to learn.
4. Record 20 points for completing the assignment.

Day 150

1. Go through [page 5](#). Familiarize yourself with the formula and solving problems where you calculate the change in energy.

2. Make sure to actually try the practice problems. Practice makes progress. Just looking at the answers makes you lazy.

Day 151

1. Complete [page 7](#) on potential energy. If you don't understand the answers, review using previous videos.
2. Record 10 points for completion.
3. Learn about [chemistry and energy](#).

Day 152

1. Learn about the [heat of fusion and the heat of vaporization](#).
2. Go through page 8 on [bond energy](#). Make sure to practice with the practice problem.

Day 153*

1. *Complete the virtual lab.
 1. [Heat Exchange between Metal and Water](#) *([printout](#))
 - Use this page with a video of the [simulation](#) if you can't use flash.
1. Complete the printed worksheet. Answer all questions and fill in all charts.
2. Record up to 50 points for completing the lab.

Day 154

1. Complete page 9 on [calculating energy change](#).
2. Complete page 10 on [solving thermochemistry problems](#).

Day 155

1. Go through page 11 on [potential energy](#).
2. Go through page 12 on [heating curves](#).

Day 156

1. You will have a test on Day 157 on this unit. Study all material in this unit. Be able to read the graphs you have learned and solve thermochemical problems. Be able to determine the characteristics of endothermic versus exothermic reactions. Be able to define activation energy and be able to explain thermodynamic questions. Know [key terms](#).
2. You can use page 13 to [review](#).

Day 157

1. Complete this page for your [test](#).
2. Score 2 points for each CORRECT answer.
3. Record your score out of 65 points. (potential for 3 points extra credit)

Day 158*

1. You will begin a new unit today, Nuclear Chemistry.

2. Read through the introduction to this section.
 - Nuclear chemistry is the subfield of chemistry dealing with radioactivity, nuclear processes and nuclear properties. An isotope is an atom of an element with a different number of neutrons. A radioactive isotope or radioisotope is an isotope that is unstable and may decay emitting alpha, beta, or gamma rays. Each of these three types of decay is depicted using a chemical equation. Radioactive elements have a known half-life, which is the time it takes for half of the sample to decay. Using this known half-life, it is possible to determine many things about a radioactive sample, and even possible to determine the age of pre-historic fossils. Nuclear fusion is the combination of 2 or more nuclei and results in a release of energy. Nuclear fission is the splitting of a heavy nucleus into two similar sized nuclei. Fission results in hundreds of millions of electron volts of energy. ([source](#))
1. *Print the [key terms](#).
2. Begin familiarizing yourself with the terms and complete the [puzzle](#).

Day 159*

1. *Print the [note taking guide](#) on nuclear science.
2. Watch the [video](#) and take notes.
3. Check your [answers](#).

Day 160

1. Carefully read through information about [alpha, beta, and gamma decay](#). Practice the problems they give you.
2. Practice more radioactivity [problems](#).
3. Record 10 points for completion.

Day 161

1. Watch these videos on the [detection of radioactivity](#) and the [charge of decay particles](#).
2. Read through the page including the information about [fusion and fission](#). Click on "View" to see the simulations.

Day 162*

1. *Print the note taking guide on [types of nuclear reactions](#).
2. Watch the [video](#) and take additional notes.

Day 163

1. The next topic is half-life. This section will mention dates supposing the earth to be millions of years old. Here's one [article](#) about it, if you are interested in reading about dating from a scientific Christian perspective. I think this quote from the article is really the important fact when it comes to many differences science supposedly has with the Bible.

- “Dr. Willard Libby, the founder of the carbon-14 dating method, assumed this ratio to be constant. His reasoning was based on a belief in evolution, which assumes the earth must be billions of years old. Assumptions in the scientific community are extremely important. If the starting assumption is false, all the calculations based on that assumption might be correct but still give a wrong conclusion.”
 - Assumptions-They are the jumping off point for every investigation. In college when I had to write a proof that $1 + 1 = 2$ (it took two pages I think!) I had to start with the assumption that there was such a thing as 1. You have to start somewhere. So when one group assumes the universe is endless and billions of years old and one group assumes the universe was created and had its boundaries set in place thousands of years ago, you end up with different conclusions. Can you understand how that happens?
1. Watch this Khan Academy video on [half-life](#).
 2. Go through this [page on half-life](#).
 3. Practice with [half-life](#).
 4. Record 10 points for completion

Day 164

1. [Practice](#) more.
2. Use the [video](#) for review as well as these [questions](#) and this [crossword](#). ([source](#))

Day 165*

1. *Print out the [directions](#) and complete the [lab](#).
2. Use this completed worksheet as your lab report. (No need to write a separate report.)
3. Record up to 50 points for completion.

Day 166

1. Study all you have learned for a test on Day 164. Know how to determine alpha, beta, and gamma decay. Understand how to calculate half-life and explain nuclear fusion vs. fission.

Day 167*

1. *Print the [test](#) and complete it except skip # 11.
2. Check your [answers](#).
3. Start with 100 and take off up to 3 points for each incorrect answer (each item in the charts is 3 points as well.)
4. Record number correct out of 100.

Day 168*

1. You are beginning your last unit, Reaction Rates and Equilibrium.
2. Read through [page 1](#) and [page 2](#).
3. Work on [learning the terms](#). ([source](#))

4. Read through [page 3](#). Save the video for Day 169.

Day 169*

1. *Print the note taking guide on [reaction rates](#).
2. Watch the [video](#) and take additional notes.
3. These should be your [video answers](#).

Day 170

1. Read through [page 4](#), but you are not completing the assignment at the bottom.
2. Watch the video about a [grain silo explosion](#).
3. Watch this Khan Academy video on [reaction rates and equilibrium](#). There are a few math errors, as noted, but watch it anyway.
4. Complete [page 5](#).
5. Check your answers.
6. Record 10 points for completing the page.

Day 171

1. Go through [page 6](#).
2. Begin working on [page 7](#). You can finish on Day 172 with the video.

Day 172**

1. *Print the note taking guide on [Le Chatelier's Principle and Keg](#).
2. *Also print the [video lab](#) sheet for filling in the data charts and answer questions.
3. Watch the [video](#) and take additional notes.
4. Check your [answers](#).

Day 173

1. Watch this Khan Academy [video on Le Chatelier's Principle](#). Note that he introduces an equation regarding pressure. Disregard the equation as far as memorizing, but be aware of the concept and predicting chemical reaction shifts.
2. Complete [page 8](#).
3. On Day 180 you'll be having a final that will cover the whole course. Review your vocabulary and equations as you are able to be prepared.

Day 174*

1. *Complete the [exploring equilibrium lab](#). Use the video of the [reaction rates simulator](#) and follow the directions.
2. You do not have to write out a lab report, but answer the questions thoroughly for credit.
3. Score up to 2 points per question.
4. Record your score out of 20. (potential for extra credit)

Day 175

1. Review the material learned thus far for your last test. Know Le Chatelier's Principle and how to predict reactions and equilibrium based on different stresses. Understand collision Theory and how to explain it. Know key terms.
2. Watch the [video](#) for review.

Day 176

1. Complete the page for your [test](#).
2. Score 2 points for each correct answer. 54 points possible.
3. Record your score out of 46. (potential for extra credit)

Day 177

1. Review for your final on Day 179.

Day 178

1. Review for your final on Day 179.

Day 179

1. Take your [final exam](#).
2. Check your [answers](#). Each is worth three points. You may award partial credit where appropriate.
3. Record your score out of 120. (potential for extra credit)

Day 180

1. Congratulations on completing High School Chemistry!
2. As your last assignment, write a very brief essay (10-12 sentences) on what was the most interesting thing you learned or did this year in chemistry. Relate this type of activity to any profession who may use this concept. (ie. Radiation chemistry to produce power in a nuclear power plant, or archeologists using carbon dating to find the age of artifacts.)
3. Score 20 points for completion of this essay.
4. Calculate the score for your final quarter and for the year.