**Magnet Chemistry Syllabus**

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This course is designed to be a general introduction to chemistry and covers the topics listed below. This course will provide a foundation of chemical concepts, vocabulary, and problem solving skills. The course outline shown below is intended to be a guideline for the topics covered and shows an approximate order in which they will be covered. The order of topics is subject to slight modifications if necessary.

**Course Outline:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit** | **Title** | **Chapters** | **Standards**  **Addressed\*** |
| 1 | Intro. to Chemistry and Properties of Matter | Safety; 1-3 | SC2 |
| 2 | Atomic Structure | 4, 24 | SC1 |
| 3 | Electrons & the Periodic Table | 5-6 | SC1 |
| 4 | IUPAC Nomenclature & Chemical Bonding | 7-8 | SC2 |
| 5 | Chemical Reactions | 9 | SC3-4 |
| 6 | The Mole & Stoichiometry | 10-11 | SC3 |
| 7 | Thermochemistry, Kinetics, and Equilibrium | 15-17 | SC5 |
| 8 | Gases, Solutions, Acids & Bases | 12-14, 18 | SC5 |

***\*The Georgia Performance Standards are listed on page 2 of this syllabus. They can also be found at the following address:***

[***http://academics.cobbk12.org/wp-content/uploads/2018/07/Cobb-Chemistry-Standards-for-2018-2019.pdf***](http://academics.cobbk12.org/wp-content/uploads/2018/07/Cobb-Chemistry-Standards-for-2018-2019.pdf)

**SC1 Atomic Structure**

***Obtain, evaluate, and communicate information about the use of the modern atomic theory and periodic law to explain the characteristics of atoms and elements***

a. Evaluate merits and limitations of different models of the atom in relation to relative size, charge, and position of protons, neutrons, and electrons in the atom.

b. Construct an argument to support the claim that the proton (and not the neutron or electron) defines the element’s identity.

c. Construct an explanation based on scientific evidence of the production of elements heavier than hydrogen by nuclear fusion.

d. Construct an explanation that relates the relative abundance of isotopes of a particular element to the atomic mass of the element.

e. Construct an explanation of light emission and the movement of electrons to identify elements.

f. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms (i.e. including atomic radii, ionization energy, and electronegativity).

g. Develop and use models, including electron configuration of atoms and ions, to predict an element’s chemical properties.

**SC2 Bonding and Compounds**

***Obtain, evaluate, and communicate information about the chemical and physical properties of matter resulting from the ability of atoms to form bonds.***

a. Plan and carry out an investigation to gather evidence to compare the physical and chemical properties at the macroscopic scale to infer the strength of intermolecular and intramolecular forces.

b. Construct an argument by applying principles of inter- and intramolecular forces to identify substances based on chemical and physical properties.

c. Construct and explanation about the importance of molecular-level structure in the functioning of designed materials.

d. Develop and use models to evaluate bonding configurations from nonpolar covalent to ionic bonding.

(*Clarification statement*: VSEPR theory is not addressed in this element.)

e. Ask questions about chemical names to identify patterns in IUPAC nomenclature in order to predict chemical names for ionic (binary and ternary), acidic, and inorganic covalent compounds.

**SC3 Reactions**

***Obtain, evaluate, and communicate information about how the Law of Conservation of Matter is used to determine chemical composition in compounds and chemical reactions.***

a. Use mathematics and computational thinking to balance chemical reactions (i.e., synthesis, decomposition, single replacement, double replacement, and combustion) and construct an explanation for the outcome of a simple chemical reaction based on the outermost electron state of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

b. Plan and carry out an investigation to determine that a new chemical has been formed by identifying indicators of a chemical reaction (e.g., precipitate formation, gas evolution, color change, water production, and changes in energy to the system).

c. Use mathematics and computation thinking to apply concepts of the mole and Avogadro’s number to conceptualize and calculate

* percent composition
* empirical/molecular formulas
* mass, moles, and molecules relationships
* molar volumes of gases

d. Use mathematics and computational thinking to identify and solve different types of reaction stoichiometry problems (i.e., mass to moles, mass to mass, moles to moles, and percent yield) using significant figures.

e. Plan and carry out an investigation to demonstrate the conceptual principle of limiting reactants

**SC4 Reaction Rates and Equilibrium**

***Obtain, evaluate, and communicate information about how to refine the design of a chemical system by applying engineering principles to manipulate the factors that affect a chemical reaction.***

a. Plan and carry out an investigation to provide evidence of the effects of changing concentration, temperature, and pressure on chemical reactions.

b. Construct an argument using collision theory and transition state theory to explain the role of activation energy in chemical reactions

c. Construct an explanation of the effects of a catalyst on chemical reactions and apply it to everyday examples.

d. Refine the design of a chemical system by altering the conditions that would change forward and amount of products at equilibrium

**SC5 Thermodynamics and Gas Laws**

***Obtain, evaluate, and communicate information about Kinetic Molecular Theory to model atomic and molecular motion in chemical and physical processes.***

a. Plan and carry out an investigation to calculate the amount of heat absorbed or released by chemical or physical processes.

b. Construct an explanation using a heating curve as evidence of the effects of energy and intermolecular forces on phase changes.

c. Develop and use models to quantitatively, conceptually, and graphically represent the relationships between pressure, volume, temperature, and number of moles of a gas.

**SC6 Solutions and Acids and Bases**

***Obtain, evaluate, and communicate information about the properties that describe solutions and the nature of acids and bases.***

a. Develop a model to illustrate the process of dissolving in terms of solvation versus dissociation.

b. Plan and carry out an investigation to evaluate the factors that affect the rate at which a solute dissolves in a specific solvent.

c. Use mathematics and computational thinking to evaluate commercial products in terms of their concentrations (i.e., molarity and percent by mass)

d. Communicate scientific and technical information on how to prepare and properly label solutions of specified molar concentration.

e. Develop and use a model to explain the effects of a solute on boiling point and freezing point.

f. Use mathematics and computational thinking to compare, contrast, and evaluate the nature of acids and bases in terms of percent dissociation, hydronium ion concentration, and pH.

g. Ask questions to evaluate merits and limitations of the Arrhenius and Bronsted-Lowry models of acid and bases.

h. Plan and carry out an investigation to explore acid-base neutralization.

**Course Requirements**

1. Be diligent in your efforts to stay current in the course. It is in your best interest

to develop and maintain a system that works best for YOU. I do not perform

notebook checks, but it would be to your advantage to organize your class

materials in some form or fashion.

2. Keep up with all your graded assignments. Homework problems and

problems discussed in class will reappear on quizzes and tests.

3. Lab safety is very important!! We will be covering safety rules at the very

beginning of the semester. Once these rules have been mastered, I will

expect you to abide by them at all times while in the laboratory area.

Failure to do so will result in a lowering of your grade and a possible

administrative referral!!

4. Calculator! By the second Monday of class, you need to have a scientific

calculator. You need to bring your calculator to class EVERYDAY!!!!

**Course Resources**

1. *Textbook*. You will be offered a textbook for this course; however, we will not

use this as a primary resource. The textbook is primarily to be used as a

supplementary resource for you. We will only have a classroom set of textbooks;

however, each student will have access to a digital copy of the textbook accessible

via the Internet.

2. *In-class Handouts*. I will be providing you many materials in class in the form of

handouts that will contain valuable information. These will also be available in

electronic format. (See below)

3. *Class website (www.drcodychem.weebly.com)*. On this website you will be able to

view and download all content for this course including PowerPoint presentations,

in-class handouts, and worksheets. My goal is to update the site unit by unit so

that all materials will be available to you on the first day of the new unit.

4. *WebAssign*. Most of your homework assignments will be assigned via this online

homework platform. The purpose of WebAssign is for you to be able to do your

homework and receive feedback at any time. The purpose of homework

assignments is for you to better understand the material, not to penalize you.

**Academic Integrity Policy**

Academic integrity within the school and within the Magnet program in

particular is taken very seriously. Any case of academic misconduct will

result in academic referral and possible expulsion from the Magnet program.

This includes all assignments given for academic credit (e.g. lab reports,

tests, quizzes, homework/classwork assignments, etc.)

**Makeup Policy**

If you are absent, the following policy is in place with regards to making up any missed assignments. You have two (2) days to meet with me upon returning to class to set a date to make up any work that you have missed during your absence. If you do not meet with me during this two day window your grade will be lowered 10 points per day (this includes all assignments: tests, labs, HW/CW, etc.). *It is your responsibility to meet with me, I will not seek you out in order to set a date to make up any missing assignments*.

**Retake Policy**

In general, it is not expected that students in the magnet program will not need to retake any quizzes or exams. However, the following policies will hold for this class:

Exams: Any students scoring **between 70 and 80%** on an exam may make test corrections with the teacher to bring their test grade up to a max score 80%. Any students scoring **below 70%** on an exam may make test corrections with the teacher and then retake a new version of the exam to bring their grade up to a max score of 80%

*A max score of 80% has been determined based on the Magnet Program’s*

*probation cut off for this class.*

Quizzes: Students may retake any quiz **once** in an attempt to bring their grade up to 100% on the quiz; in order to retake, students must make corrections to the original quiz *in different ink and without erasing the original answers*. The student must also have a parent/guardian sign the quiz and then return this to the teacher. Then, the student may retake a new version of the quiz

**Late Work Policy**

Late work will be accepted will be accepted for a 10 pt. deduction for each day (maximum 3 days late) submitted after the due date. Nothing will be accepted from prior units with the possible exception of lab reports.

**Grading Scale:**

|  |  |
| --- | --- |
| Homework & class work  Quizzes | 10%  10% |
| Labs | 25% |
| Tests | 40% |
| Final Exam | 15% |

**Cobb County Schools Grading Scale:**

90-100 = A 80-89 = B 74-70 = C 70-73 = D 69 and below = F

**Lab Safety:**

This is the only area of class management where the student has no second chances. I take the safety of every student very seriously, and expect each lab participant to do the same. Safety requirements for each lab will be discussed prior to the start of each lab. If a student fails to act or conduct their experiment in a safe manner, it is grounds for detention and a parent/teacher conference (phone or physical). If the action is grave, the student will be immediately referred to administration.

If you have any problems, concerns, or questions, please do not hesitate to ask. I am here to help!!! The success of ALL my students is a priority for me. I look forward to a great semester.

**Questions I Should Ask Myself to Ensure Maximum Success in Magnet Chemistry:**

1. Do I have copes of notes from class lectures?

2. Have I compiled answers for worksheets given in class and checked them for

accuracy?

3. Have I completed all WebAssigns? Do I understand all the questions and answers?

4. Have I asked questions in class and received satisfactory answers to them?

5. Have I come in for extra help before or after school for things I am still unsure

about?

6. Have I consulted the textbook for additional information on concepts and for

additional practice problems to work on?

I have read this course syllabus and understand the student is responsible for knowing the information and following all of the course rules and regulations. A copy of the course syllabus can be found on the class website at any time.

The course syllabus must be signed by the student and a parent, then returned to Dr. Cody by **08/06/18.** Please tear off this page and keep the syllabus for your records.

Student Name Student Signature

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Parent Name Parent Signature

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Parent E-mail address

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