Semester 1-2

CHEMISTRY

Mr. Brian Fain: bfain@pps.net

Welcome to Chemistry!

Welcome to Chemistry! This course is designed to prepare you for any career of your choice, to be an informed citizen of the world, and for college science courses in your future. Below are some answers to some important questions about the course, so I ask that you read it with your parent or guardian before signing it.

WHAT DO I NEED EACH DAY?

- Binder with Chemistry tab (for handouts)
- 2 pencils and 2 black or blue pens
- Chemistry Spiral Notebook
- Completed Homework (if assigned)

HOW IS MY WORK GRADED?

You earn your grade through a proficiency grading system. This is outlined more toward the end of this packet, but here are the highlights: 30% of your grade is based on your daily work. This includes all things you will practice and do **in order to learn:** like homework, practice problems, weekly quizzes, notes, keeping a glossary, answering lab questions, exit tickets, online comments, etc. .

70% of your grade is based on Assessments of Learning Targets. This includes things like unit tests, lab reports, and presentations. This is the big stuff - it is how you show that you know not only the basic concepts, but that you can synthesize and apply a variety of concepts together. These will be the evidence you use to earn your grade in the class. The good news is that these assessments can be re-done if needed.

GRADE REPORTS?

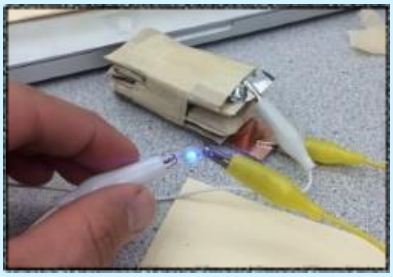
Check your grade online regularly on Synergy. I will update as often as possible, and will send emails to your parents/guardian when needed. I will also provide you feedback online. Keep in mind, I need time to grade work so sometimes there are a few days in between turning work in and the grade showing up online. See the attached explanation of the grade policy for more information.

WHAT IF I NEED HELP?

Come to FLEX for tutorial sessions after school. I will update my availability on the website and on my door. These FLEX tutorial sessions are for any and all science related school work - for ANY student. Check the google classroom for extra help if I'm unavailable!

Preview of the first 3 units...

Unit 1: Hot Stuff! What do particles of matter do when they are heated and cooled? How do you make ice cream best?

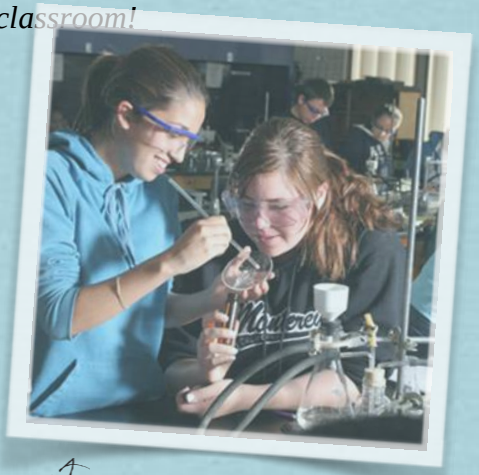


Unit 2: Atomic Structure and Periodic Table . How do we know what atoms look like and how do we predict things about elements? How do you design a better battery?

Unit 3: Nuclear Chemistry..What does it mean when something is radioactive? What is nuclear energy and what are the dangers and advantages? (photo: Reed College Reactor

LABORATORY-BASED LEARNING

✳ *Chemistry is all about learning how and why stuff interacts with other stuff - we do this by experiencing it and by doing science in a laboratory classroom!*



If you miss a lab experience, it is really difficult to make it up! Check the class calendar, and come prepared. We have to use our short time together wisely!

Can I turn in late work?

If it is an excused absence, absolutely! However, make up work for unexcused absences will only be accepted at the teacher's discretion. Just remember that classwork and homework, while only 30% of your grade, are **THE ONLY WAY** to learn the stuff on the assessments and tests.

Students need to be present in class every day. You are responsible for making up all work missed while you are absent in order to receive a grade for that work. Make up work is difficult to complete, especially for labs that require special set up. Therefore, regular attendance is mandatory.

What happens if I am absent or tardy?

When students are tardy they miss the instructions for the whole day's work! This is frustrating for everyone else who was there on time. If you are tardy (more than five minutes) please come in quietly **with a pass** and wait patiently for information that you missed. All school and district rules and expectations as well as the consequences will be followed in this class! Please refer to your student planner for questions regarding these items. We will construct a class contract together regarding specific expectations of all of us throughout the year. Stay tuned!

Class Rules?

1. Come to Class
2. Do your Work
3. Be Cool (i.e. be safe, respectful, and responsible)

Chemistry Syllabus

Course Objectives: In this full year course, students will experience and demonstrate chemistry proficiency through the following units with the use of demonstrations, lab experiments, reading, projects and discussion. Each unit has clearly defined learning targets developed by PPS, the Portland Metro STEM Partnership, and Cleveland staff. All are based on specific performance expectations from the Next Generation Science Standards.

UNIT 1 HOT STUFF: KINETRIC MOLECULAR THEORY AND INTRODUCTION TO CHEMISTRY (10 days)

- I can use graphs, equations, and particle diagrams to explain the relationship between temperature and the kinetic energy of particles (from NGSS HS-PS3-2 and HS-PS3-4) *Keystone: Engineering Ice Cream*

UNIT 2 FIREWORKS: ATOMIC STRUCTURE, PATTERNS IN THE PERIODIC TABLE (10 days)

- I can use the patterns in the periodic table to justify my predictions about atomic structure and properties of elements, and explain how these trends in atomic structure and properties are used in the design of fireworks (from NGSS HS-PS1, HS-PS3-3) *Keystone: Engineering Sparklers*

ENGINEERING BETTER BATTERIES: *I can work in a team to invent an LED flashlight with a chemical battery out of common materials that is portable and rechargeable, and explain how to build it in a YouTube video, including the reasons behind my design choices (from HS-PS3-3, HS-ETS1-2 and HS-ETS1-3)*

UNIT 3 CANCER AND NUCLEAR CHEMISTRY (8 days)

- I can use equations, pictures, and words to model the processes of fission, fusion, and radioactive decay and apply these models to real-world problems. (from NGSS HS-PS1-8) *Keystone: Radon Project*

UNIT 4 CONSUMER PRODUCTS: CHEMICAL BONDING AND INTERMOLECULAR FORCES (10 days)

- I can plan and conduct an investigation of different substances' properties in order to argue from evidence the type and relative strength of the forces that hold their particles together. (from NGSS HS-PS1-3, HS-PS2-6, HS-ETS1-3, and HS-ETS1-4). *Keystone: Engineering Candy*

UNIT 5 FIRE! CHEMICAL REACTIONS AND COMBUSTION (10-12 days)

- I can experimentally determine, and use evidence to develop models for, the balanced chemical equation for a reaction using what I have learned about atomic structure, periodic trends, and chemical and physical properties. (from NGSS HS-PS1-7, HS-PS1-2) *Keystone: Rockets*

ENGINEERING PROJECT: INVENT A COLORIMETER: *I can work in a team to design and invent a device that enables us to reliably measure the concentration of specific water contaminants, and explain how it works (from NGSS HS-PS3-3 and HS-ETS1-2)*

UNIT 6 SPORTS MEDICINE: THERMOCHEMISTRY AND ENERGY 8 days)

- I can design a hot or cold pack, within given goals and constraints, and justify my design choices using experimental data, as well as a model based on chemical potential energy stored in bonds. (from NGSS HS-PS3-3, HS-PS1-4 and HS-ETS1-3 and HS-ETS1-2) *Keystone: Hot and Cold Packs in Sports Medicine*

UNIT 7 RATES, EQUILIBRIUM, AND CHANGE (10-12 days)

- I can design and conduct an investigation of the effects of temperature and concentration on reaction rate, and argue from evidence how these variables change the rate of the reaction. *Keystone: Acid Rain*
- I can refine the design of chemical systems by performing various chemical reactions and applying a stress to the system at equilibrium, and then use models to argue from evidence what caused the observed or measured changes (from NGSS HS-PS1-6) *Keystone: Equilibrium and Human Health*

UNIT 8: CLIMATE CHANGE CAPSTONE PROJECT (10 days)

- I can design and conduct an experiment that models and measures the effect of pH changes on an aquatic ecosystem; and, justify my analysis of the data using graphs and diagrams, including future implications for the modeled system using other scientific data.

Grading

Grading, Mastery, and Learning Targets:
Grades in this class are based on proficiency. This means that the grade a student earns in this class depends primarily on that student demonstrating, in a variety of ways, that they have learned specific content or mastered requisite skills. In essence, they have to really show what they know to earn a grade. What a student is required to learn is clearly outlined for the student in the form of "Learning Targets." All Learning Targets are based on the Next Generation of Science Standards, Oregon state standards, and Common Core Literacy Standards.

Classwork, Homework and Skills:
30% of a student's grade is based on work students do to prepare themselves to demonstrate their mastery or understanding of the Learning Targets. This includes homework, activities done in class (classwork) and success skills. Classwork could include things like laboratory investigations, modeling, question or problem sets, discussions, concept maps, participation in class activities, and informal presentations. Success skills include things like on-time work completion, organization, preparedness for class, and practical lab skills. Students can use this work and feedback on it to judge their day to day progress toward mastery of a Learning Target.

Assessments and Learning Target Mastery:
70% of a student's grade is based on demonstrating mastery of Learning Targets. A student's mastery of a Learning Target is demonstrated through one or more assessments. Assessments are designed to allow students to demonstrate to the teacher that they have mastered the Learning Targets in each Unit. And, if student does not first succeed on the assessment of a specific Learning Target, they will be allowed to re-assess to demonstrate proficiency, within two weeks of the first attempt. In addition, students can earn a better score on a past learning target on the semester and final exam.

Assessments can take many forms: traditional tests or essays, lab reports, presentations (oral, video, animation or podcast), and one-on-one conversations with teachers are all examples of assessments that could be used. The nature of the Learning Target being assessed determines the type of assessments. Students are also encouraged to propose their own methods of assessment to the teacher. For example, a student who struggles with test anxiety might propose that she be allowed to demonstrate understanding of the of content in a presentation with the teacher and another staff member.

For each assessment, the teacher will assess a student's level of mastery of a specific Learning Target using a 1-7 scale. To see the document outlining what each numbered score means for each category, check out this link: https://tinyurl.com/y929vxae. Below are the descriptors for what each numbered score means on an assessment.

Score	Description
7	**Expert:** Near perfect demonstration of understanding or skill; applies learning target understanding or skill to novel situation to solve a problem
6	**Exceeds Target.** Strong demonstration of understanding or skill; slight errors involved in applying learning target understanding or skill to novel situation to solve a problem
5	**Met Target:** Good demonstration of key concepts, understanding or skills of the learning target for the unit; a few errors allowed; you are able to synthesize the individual supporting targets from the lessons and demonstrate the overall learning target
4	**Apprentice:** You have mastered the simpler content, such as the individual supporting targets for each lesson, but still need to show you understand the more complex or difficult content, and.
3	**Novice:** You needed significant help to master the simpler content, such as the individual supporting targets, and did not master the more complex content or understanding or skills in the overall learning target for the unit.
2	**Developing:** Evidence of inadequate or incomplete understanding, concepts, or skills, errors throughout assessment
1	**Little or No Evidence** of understanding, concepts, skills

Grading

Translation to Letter Grades:
Throughout a semester, a student will be assessed, and given the opportunity to re-assess, on Learning Targets. There are limits to these opportunities, however. For instance, a student will be allowed up to two re-assessments before a parent conference is required. Each re-assessment score will be weighted less than the first attempt, at 90%. This discourages students from manipulating the opportunity to reassess, and to try their best to get it right the first time. If a student does not have an excused absence for an assessment day, they may still take the assessment but will only be allowed a maximum score of a 4/7 (C). Also, if a student wants to re-assess on a particular learning target they did not pass the first time, they will need to do this within two weeks, and show evidence of studying (note cards, test corrections, etc) before being allowed to take the assessment. These opportunities will be mostly available outside of class time.

For each Target the student will be given a score on the 1-7 scale. Their scaled score over the semester will be determined by averaging the scores for each Learning Target assessment. For example, if a student earns a 4 on the first target, a 5 on the second, and a 6 on the third, the overall score for semester one will be a 5/7. This assessment grade (70% of the cumulative grade) will be translated into a letter grade/percentage. This is combined with the classwork/homework grade (30% of the cumulative grade) to produce the overall grade for the semester. The scale is translated into letter grades using the chart below.

Overall Weighted Average Semester Score (all categories)	Percent			Semester Letter Grade
7	95	97	100	A+
6	90	90	94	A
5	80	85	89	B
4	70	75	79	C
3	60	65	69	D
2	50	55	59	F
1	0	25	49	F

EXAMPLE:

Sophia Student earned the following scores on her assessments first semester:
Learning Target 1: 5
Learning Target 2: 4 (first attempt), 6 (second attempt), weighted average: 4.7
Learning Target 3: 6
Average: 5.2

Her averaged score on the practice work for the semester was 4.9.

Overall Grade: (5.2x0.7)+(4.9x0.3) = 3.6 +1.5 = 5.1 = B

Safety Contract

Science is a hands-on laboratory class. Many laboratory activities require the use of hazardous chemicals, materials, and equipment. Safety in the science classroom is the number one priority for students, teachers, and parents. To ensure a safe science classroom, a list of rules has been developed for this science safety agreement. Read through these rules carefully. After reviewing the rules, please sign the signature page indicating you have read, understood, and will comply with these rules and expectations.

I. Safety Guidelines

1. Perform only those experiments and procedures authorized by the instructor.
2. Be prepared for experiments. Pay attention to laboratory safety instructions and be sure you understand what you are doing before you start. If you don't, ask!
3. Conduct yourself in a responsible manner at all times. No horseplay, or other fooling around.
4. Wear goggles as directed by the instructor. Additional safety equipment may be required by the instructor, like gloves and an apron.
5. Tie hair back that reaches to the shoulders.
6. Do not wear baggy clothing that may interfere with your ability to participate in the lab
7. Do not eat food, drink beverages, or chew gum in the laboratory area.
8. Work areas and equipment should be kept clean and tidy. Bring only materials specified by your instructor to the work area. Put other things like backpacks and purses under the desk or in a cubby
9. Dispose of all waste materials in an appropriate manner as designated by the instructor. Some materials are hazardous to put down the drain.
10. Read chemical labels very carefully. Make sure that you have the correct substance in the correct concentration.
11. Do not return chemicals to their original containers unless you are specifically instructed to do so.
12. Handle all chemicals with care. Never taste a chemical. Check odors when instructed to do so by gently wafting some of the vapor toward your nose by hand.
13. Never take chemicals, supplies, specimens, or equipment out of the laboratory without the knowledge and consent of the instructor.
14. Never work alone in the laboratory without adult supervision.
15. Do not enter the laboratory stockroom(s) or storage areas without specific permission from your instructor.
16. Transport chemicals, materials and equipment properly as directed by the instructor.
17. Regarding hazardous materials: From time to time we will use hazardous chemicals in the laboratory. You will be taught how to safely handle these during the beginning of a lesson. However, if you touch or spill a hazardous chemical on your skin, eyes, or clothes, or inhale hazardous fumes from a chemical reaction, inform Mr. Fain **immediately** or have your lab partner inform Mr. Fain **immediately**
18. Never point the open end of a test tube being heated at yourself or others.
19. Clean up after yourself! Clean all equipment after a lab and return it as you found it.

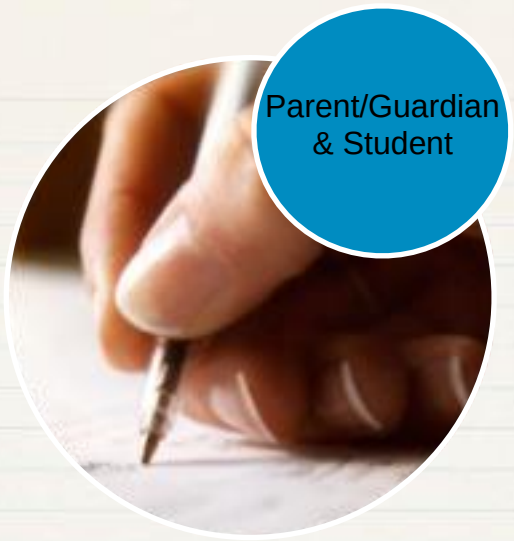
II. Accidents and Injuries

1. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to Mr. Fain immediately.
2. Water spills on the floor need to be cleaned up immediately. Notify Mr. Fain immediately
3. If a chemical should splash in your eye(s) or on your skin, notify Mr. Fain immediately.
4. Treat burns immediately by putting the burned area under cold water – inform Mr. Fain immediately

In summary, I will:

- Follow all instructions given by the teacher
- Protect eyes, face, hands, and body when involved in science experiments.
- Carry out good housekeeping practices and keep my laboratory work area neat and orderly.
- Know the location of first aid, eyewash and fire extinguisher.
- For my own safety and the safety of others, conduct myself in a responsible manner at all times.
- Report potentially hazardous conditions and behaviors.

SIGNATURE & SURVEY



By signing this document, both parent/guardian and student agree that they have both read and understood the curriculum description, grading policies, and syllabus. Also, by signing this document, both parent/guardian and student agree that they have both read, understood and will comply with all the lab safety rules and expectations. If there are any questions about these items, please contact Mr. Fain at bfain@pps.net.

Parent/Guardian (print)

_____

Parent/Guardian (signature)

_____

Student (print)

_____

Student (signature)

_____

Contact information: email _____ phone

_____

Parents and Guardians, please take a few moments to fill out the questionnaire below to help me be a better teacher for your student.

1. **What do you see as your student's strengths in school?**

2. **What do you see as your student's most difficult challenges?**

3. **What are your student's most important needs in a classroom?**

4. **Is there anything you think I should know about that might impact your student's ability to be successful in class?**