Syllabus: Practices & Policies

2021-2022	Franklin High School

Section 1: Course Overview

Course Title	NGSS Chemistry
Instructor Info	Name: David Stroup Contact Info: dstroup@pps.net
Grade Level(s)	10
Room # for class	Room: S-012
Credit	Type of credit: Science (required) # of credits per semester: 1
Prerequisites (if applicable)	This class is intended for all sophomores at Franklin High School. Students will already have taken NGSS Physics their freshman year.
General Course Description	NGSS chemistry is a year-long course that engages students in the composition, interactions, and mathematical representations of matter. A multi-dimensional teaching approach offers a grounding experience that connects material to real-world phenomena.

Section 2: Welcome Statement & Course Connections

Personal Welcome	**Welcome to NGSS Chemistry!** This will be an exciting and very different school year. In this class we will take a year-long journey of learning through the history of our understanding of how matter work, the fundamentals of how atoms and molecules make up the world around us, and the basics of chemical reactions and lab procedures.
Course Highlights	**Course Outline:**

(topics, themes, areas of study)	Measurements and Calculations Modern Atomic Theory Matter Energy Chemical Foundations Elements Atoms and Ions Nomenclature Chemical Reactions Bonding Gases Liquids and Solids Solutions Acids and Bases Equilibrium REDOX Reactions
Course Connections to PPS ReImagined Vision	By providing a college-preparatory experience with challenging inquiry-based labs and a focus on writing, this course is designed to help students grow to meet the goals of the Graduate Portrait — to become problem solvers, critical thinkers, and lifelong learners. By creating a community of scholars in which all students are welcome and diversity is honored, it also aims to foster them as equity leaders and communicators.

Section 3: Student Learning

Prioritized Standards	The following standards will be explored in the course: ELP Standards An ELL can.. 9-12.1 construct meaning from oral presentations and literary and informational text through grade-appropriate listening, reading, and viewing. 9-12.2 participate in grade-appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. 9-12.3 speak and write about grade-appropriate complex literary and informational texts and topics. 9-12.4 construct grade-appropriate oral and written claims and support them with reasoning and evidence. 9-12.5 conduct research and evaluate and communicate findings to answer questions or solve problems. 9-12.6 analyze and critique the arguments of others orally and in writing. 9-12.7 adapt language choices to purpose, task, and audience when speaking and writing. 9-12.8 determine the meaning of words and phrases in oral presentations and literary and informational text. 9-12.9 create clear and coherent grade-appropriate speech and text. 9-12.10 make accurate use of standard English to communicate in grade-appropriate speech and writing. HS.Structure and Properties of Matter Performance Expectations

	HS-PS1-1. 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. HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. HS.Space Systems Performance Expectations HS-ESS1-1. Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation. HS-ESS1-2. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements. HS-ESS1-4. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. HS.Engineering Design Performance Expectations HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. NGSS: Science and Engineering Practices NGSS: 9-12 Practice 1. Asking questions (for science) and defining problems (for engineering) Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.

	Ask questions that arise from careful observation of phenomena, or unexpected results, to clarify and/or seek additional information. Ask questions that arise from examining models or a theory, to clarify and/or seek additional information and relationships. Ask questions to determine relationships, including quantitative relationships, between independent and dependent variables. Ask questions to clarify and refine a model, an explanation, or an engineering problem. Evaluate a question to determine if it is testable and relevant. Ask questions that can be investigated within the scope of the school laboratory, research facilities, or field (e.g., outdoor environment) with available resources and, when appropriate, frame a hypothesis based on a model or theory. Ask and/or evaluate questions that challenge the premise(s) of an argument, the interpretation of a data set, or the suitability of a design. Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical, and/or environmental considerations. NGSS: Crosscutting Concepts NGSS: 9-12 Crosscutting Statements 1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them. Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. Classifications or explanations used at one scale may fail or need revision when information from smaller or larger scales is introduced; thus requiring improved investigations and experiments. Patterns of performance of designed systems can be analyzed and interpreted to reengineer and improve the system. Mathematical representations are needed to identify some patterns. Empirical evidence is needed to identify patterns. 2. Cause and Effect: Mechanism and Prediction – Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering. Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. Cause and effect relationships can be suggested and predicted for complex natural and human designed systems by examining what is known about smaller scale mechanisms within the system. Systems can be designed to cause a desired effect.

	Changes in systems may have various causes that may not have equal effects. 3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change. The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. Some systems can only be studied indirectly as they are too small, too large, too fast, or too slow to observe directly. Patterns observable at one scale may not be observable or exist at other scales. Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale. Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth). 4. Systems and System Models – A system is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. Systems can be designed to do specific tasks. When investigating or describing a system, the boundaries and initial conditions of the system need to be defined and their inputs and outputs analyzed and described using models. Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales. Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models. 5. Energy and Matter: Flows, Cycles, and Conservation – Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior. The total amount of energy and matter in closed systems is conserved. Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems. Energy drives the cycling of matter within and between systems. In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved. 6. Structure and Function – The way an object is shaped or structured determines many of its properties and functions. Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.

	The functions and properties of natural and designed objects and systems can be inferred from their overall structure, the way their components are shaped and used, and the molecular substructures of its various materials. 7. Stability and Change – For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand. Much of science deals with constructing explanations of how things change and how they remain stable. Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. Feedback (negative or positive) can stabilize or destabilize a system. Systems can be designed for greater or lesser stability.
PPS Graduate Portrait Connections  	I will help students grow their knowledge and skills in the following aspects of PPS's Graduate Portrait: • Inclusive and Collaborative Problem Solvers — every lab is an opportunity for problem solving with the lab group. • Inquisitive Critical Thinkers with Deep Knowledge — inquiry-based practices in the sciences foster this aspect of the Portrait. • Resilient and Adaptable Lifelong Learners — this is the goal of an education in the sciences. • Powerful and Effective Communicators — on emphasis on writing in lab reports and written responses on tests will foster growth towards college-level writing skills. • Influential and Informed Global Stewards — this science class will include important issues facing the globe, such as climate change and resource depletion. • Optimistic, Future-Oriented Graduates — science education is designed to create a mindset of optimism about the future and our ability to meet global challenges.
Differentiation/ accessibility strategies and supports:	I will provide the following supports specifically for students in the following programs: *Special Education:* Additional time on exams, "chunking" of projects into easily managed segments, opportunities to retake tests. *504 Plans:* Additional time on exams, "chunking" of projects into easily managed segments, opportunities to retake tests. *English Language Learners:* Additional language support, help with unfamiliar terms, written notes and additional time on projects/tests. *Talented & Gifted:* Opportunities for "honors" work and extra credit going beyond the basic expectations of the class.

Differentiation and Accessibility

The Franklin High School Chemistry team is committed to providing equitable access to curriculum and experiences to ALL students, with a focus on supporting traditionally underserved student populations. Because this is chemistry for all, in an effort to provide an equitable learning experience, students will be allowed to use a percentage of their grade to access a scaffolded version of the assignment. Students with accommodations and/or modifications will receive assignments in accordance with their IEP or 504.

(1) Students may agree to a maximum score of 90% of an exam grade to have access to a pre-filled note sheet during the exam.

(2) Students may agree to a maximum score of 90% of a lab write-up grade to have access to a fillable lab write-up, including sentence starters.

Personalized Learning Graduation Requirements (as applicable in this course):

- Career Related Learning Experience (CRLE) #1
- Career Related Learning Experience (CRLE) #2

  -The experience(s) will be:
- Complete a resume
- Complete the My Plan Essay

8/27 Work

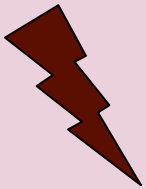
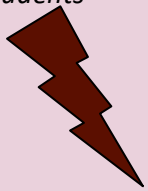
Section 4: Cultivating Culturally Sustaining Communities

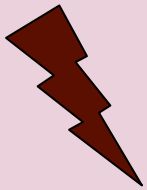
Tier 1 SEL Strategies

Shared Agreements

I will facilitate the creation of our Shared Agreements that respects and celebrates each student's race, ability, language, and gender in the following way(s):

- We will work collaboratively to brainstorm rules and norms that celebrate student diversity.
- We will incorporate rules developed into a consensus document that all students agree to.

	I will display our Agreements in the following locations: • In the classroom • In our Canvas online "classroom."
	My plan for ongoing feedback through year on their effectiveness is: I will maintain a good relationship with the students, checking in with them as the year progresses and soliciting their opinions on how well the classroom agreements are working.
Student's Perspective & Needs 	I will cultivate culturally sustaining relationships with students by: • I have solicited information on their preferences and attitudes towards learning with a "Getting to Know You" document. I will work to incorporate their lived experiences and cultural references that are relevant to them. • I will use a mixture of teaching techniques, including story-telling and alternative ways of showing understanding.
	Families can communicate what they know of their student's needs with me in the following ways: • Remind • My email: dstroup@pps.net.
Empowering Students 	I will celebrate student successes in the following ways: • Many assignments will be in the form of projects that will be displayed in the classroom. • I will personally talk with students to acknowledge when they do well.

	I will solicit student feedback on my pedagogy, policies and practices by: • Personal conversations. • Openness to feedback through Remind and other channels.
	When class agreements aren't maintained (i.e. behavior) by a student I will approach it in the following ways: • I will remind the class of our agreements. • I will talk individually with a student who may not be following our agreements. • I will communicate with parents and counselors when a problem is serious.
Showcasing Student Assets 	I will provided opportunities for students to choose to share and showcase their work by: • Offering options for turning in some work — e.g. to deliver a project in class, or individually to me if talking in class makes the student uncomfortable. • Displaying projects in the classroom

Section 5: Classroom Specific Procedures

Safety issues and requirements (if applicable):	**Safety:** Since this is a laboratory class, students are expected to adhere to common sense safety rules for their protection as well as the protection of others in the classroom, no running, or using equipment as a toy or weapon. We will use potentially dangerous chemicals and breakable glassware in this class, and their improper use can result in eye damage; unsafe behavior may result in removal from the lab! Respect for lab equipment is imperative, and deliberate mistreatment of lab equipment will also result in exclusion from labs until it is determined that the student can be trusted. The student or group of students responsible for broken equipment will be charged for its replacement. COVID Safety: • Masks must be worn at all times, over mouth *and* nose. Opportunities will be provided to e.g. drink

	water, etc. • At least one meter of separation will be maintained at all times when it is possible. • There will be no maskless eating in the classroom.
Coming & Going from class	I understand the importance of students taking care of their needs. Please use the following guidelines when coming and going from class: • Please arrive ready to learn! Be prepared to answer in discussion, and to set aside conversations with friends once we start class. • When leaving class during the period (e.g. a restroom break), check with the teacher and obtain a written hall pass. • Wait for the end-of-class bell without crowding near the door (practice social distancing!) and make your way without crowding to the next class.
Submitting Work	I will collect work from students in the following way: Work is primarily turned into me directly. When needed (if a student is home sick or in quarantine, or for certain online projects) some assignments may be turned in through Canvas.
	If a student misses a deadline, I will partner with the student in the following ways so they have the ability to demonstrate their abilities: Students are always given a chance to make up missing work. Older assignments remain available in Canvas. Students who miss an assignment must negotiate anew due date with me, and create a new due date that they agree to adhere to. Some formative assignments and quizzes may be dropped to help a student catch up with summative work (e.g. exams and major projects) that make up the majority of the grade. Although the grading is "A to F," the class is "performance based" in that in the end it is proof of proficiency on key tests and projects that will determine the grade.
Returning Your	My plan to return student work is the following:

Work	Work is returned as soon after grading as possible. Projects and papers are returned with mark-up to provide feedback. Some tests may be temporarily returned so that students can peruse them while we discuss the class in class, and then collected again.
Formatting Work (if applicable)	Directions on how to format submitted work (ex. formal papers, lab reports, etc) can be found here: Any work requiring specific formatting will be discussed in class in advance, and clear rubrics and graphic organizers will be provided (which the student should keep in their portfolio/three-ring binder).
Attendance	If a student is absent, I can help them get caught up by: All material will be available in the Canvas version of the class, and students who are behind can get caught up at any time.

Section 6: Course Resources & Materials

Materials Provided	I will provided the following materials to students: • Access to lab materials. • Pre-printed "skeleton notes." • Downloadable resources.
Materials Needed	Please have the following materials for this course: • A calculator. • A composition-style lab notebook. • A binder. *Franklin can help with any materials you may need as well. Please reach out to me privately and I will help you get what you need.*
Course Resources	Here is a link to resources that are helpful to students during this course:
Empowering Families	The following are resources available for families to assist and support students through the course: The following are online resources parents can access to help support students: OpenStax Chemistry (free PDF textbook): https://openstax.org/details/books/chemistry-2e More free textbooks: http://www.freetextbooklist.com/physical-science/chemistry/

Section 7: Assessment of Progress and Achievement

Formative Assessments	As students move through the learning journey during specific units/topics, I will assess & communicate their *progress* in the following ways: • Feedback on work completes. • Up-to-date grades in Synergy.
Summative Assessments	As we complete specific units/topics I will provide the following types of opportunities for students to provide evidence of their *learned* abilities: In addition to work in class (projects, labs, and assessments), I will provide opportunities for extra credit.
Student Role in Assessment	Students and I will partner to determine how they can demonstrate their abilities in the following ways:

Section 8: Grades
Progress Report Cards & Final Report Cards

Accessing Grades	Students & Families can go to the following location for up-to-date information about their grades throughout the semester: Synergy (FHS's online parent and student portal for grades and attendance).
	I will update student grades at the following frequency: Grades are updated as soon after assignments are turned in as is possible.
Progress Reports	I will communicate the following marks on a progress report: I use standard letter grades. An "A" in an this course indicates a high level of understanding of the material. Because of the way assignments and grades are weighted, it is rare for a student to have a grade of "F" (below 60%) unless they are missing one or more major grades (tests or quarter projects) completely.
Final Report Card Grades	The following system is used to determine a student's grade at the end of the semester: A: 90–100% B: 80–89% C: 70–79% D: 60–69%

F: <60%

Grading

Quizzes	10 %
Current Events	10 %
Lab and Safety Procedures	5 %
Exams/Labs/Projects	75 %

I use this system for the following reasons/each of these grade marks mean the following:

Other Needed info (if applicable)

Honors Option

Students are eligible for honors credit if the following criteria are met…

- Student has never exhibited academic dishonesty
- Student completes a poster board to accompany their science fair project by the end of first semester
- Student chooses unscaffolded test and lab options (Does not apply to students with accommodations for scaffolded assignments).