

# **Honors Physical Chemistry Syllabus**

**2026-2027**

## **Contact Information**

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## **What is Physical Chemistry?**

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Physical Chemistry is a year-long science course that integrates the principles of chemistry and physics to help students understand how matter and energy interact. During approximately the first three-quarters of the school year, students will develop a strong foundation in chemistry by exploring the composition, structure, and properties of matter, chemical reactions, stoichiometry, solutions, thermochemistry, acids and bases, and the behavior of atoms and molecules. Students will investigate how substances change, the energy involved in those changes, and how these concepts explain the world around us.

During the final quarter of the course, students transition into foundational physics concepts, applying their understanding of matter and energy to topics such as motion, forces, work, energy, power, electricity, and waves. Through laboratory investigations, mathematical problem-solving, engineering design challenges, and real-world applications, students will explore the laws that govern both chemical and physical systems.

This course emphasizes critical thinking, scientific inquiry, data analysis, and hands-on experimentation while preparing students for advanced science courses and a wide variety of postsecondary pathways in science, engineering, healthcare, skilled trades, and technology. By the end of the course, students will have a deeper understanding of the physical world and the scientific principles that explain how it functions.

## **Required Materials:**

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- Materials required include a notebook, pencil, and a three ring binder.
- A textbook and chromebook will be provided by the district.
- Optional materials include a set of colored pencils for activities.
  - Each student will be expected to attend class every day with these required materials. The student is expected to bring their chromebook to every class with a fully charged battery.
  - Students will also be expected to arrive to class with their completed/due assignments or assignments we are still working on.
    - No passes will be given for students who do not show up to class with these required materials.

## **Course Description:**

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Welcome to the wonderful world of Physical Chemistry! This course is designed to help students explore the richness and excitement of understanding the natural world by examining how matter, energy, and motion shape the world around us.

Physical Chemistry is a year-long course that blends the study of chemistry and physics. During approximately the first three-quarters of the year, students will focus on chemistry concepts, developing a strong understanding of atomic structure, chemical reactions, stoichiometry, solutions,

thermochemistry, and the behavior of matter. During the final quarter of the course, students will transition into foundational physics concepts, including motion, forces, energy, work, electricity, and waves. This progression allows students to build upon their chemistry knowledge while developing a broader understanding of the physical sciences. Throughout the year, students will strengthen their problem-solving, mathematical reasoning, scientific inquiry, and laboratory skills through hands-on investigations, data analysis, engineering challenges, research, and real-world applications. These experiences are designed to prepare students for higher-level high school science courses as well as postsecondary education and careers in science, engineering, healthcare, skilled trades, and technology.

Physical Chemistry fulfills the Michigan high school graduation requirement for a chemistry or physics credit. Grading policies are explained later in this syllabus. Students are expected to complete and submit all required assignments, actively participate in laboratory activities, and consistently demonstrate their best effort throughout the course.

### **Honors Physical Chemistry Statement:**

In our high school physical chemistry program, we offer both regular and honors physical chemistry courses to cater to the diverse needs and abilities of our students. The regular physical chemistry course provides a comprehensive foundation in the fundamental concepts of chemistry and physics outlined below. This course emphasizes a balanced approach of theoretical learning and practical laboratory experience, ensuring that students grasp the essential concepts while developing their analytical and problem-solving skills.

The honors physical chemistry course, on the other hand, delves deeper into these topics and introduces more complex and advanced concepts. Students in honors physical chemistry engage in a faster-paced curriculum that includes a more rigorous exploration of the topics listed below. The course is designed to challenge students with a strong interest and aptitude in science, requiring them to apply critical thinking and independent research skills. Laboratory experiments in the honors course are more sophisticated, often involving open-ended investigations that encourage creativity and innovation. This course aims to prepare students for advanced studies in science and engineering, providing a solid groundwork for future academic and professional pursuits.

### **Outline of Instruction:**

During the course of study, we will investigate the following topics and systems:

- 1) Measurement & Tools of the Chemist
- 2) Atomic Theory
- 3) Periodic Table
- 4) Chemical Bonding
- 5) Intermolecular Forces
- 6) Chemical Reactions

- 7) Math of Chemistry or Stoichiometry
- 8) Matter & Energy
- 9) Gases
- 10) Solutions
- 11) Kinetics & Equilibrium
- 12) Acids, Bases & Salts
- 13) Motion, Speed, Acceleration
- 14) Forces, Newton's Laws, Momentum
- 15) Energy, Work, Power

## Grading:

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Grades will be updated weekly.

|                                         |            |            |            |
|-----------------------------------------|------------|------------|------------|
| Homework/Projects/Labs/Discussions: 20% | A+ (100%+) | A (94-99%) | A- (90-93) |
| Tests: 50%                              | B+ (87-89) | B (84-86)  | B- (80-83) |
| Quizzes: 30%                            | C+ (77-79) | C (74-76)  | C- (70-73) |
|                                         | D+ (67-69) | D (64-66)  | D- (60-63) |
|                                         | E (0-59)   |            |            |

### Grading Explanation/Common Student Confusions

In this class, student grades are calculated based on a percentage scale, which ensures that different types of assignments are weighted appropriately to reflect their importance.

The overall grade is composed of Homework/Projects/Labs/Discussions, which account for 20% of the final grade, Tests, which constitute 50%, and Quizzes, which make up the remaining 30%.

To calculate a student's grade, each category's average is multiplied by its respective weight, and the results are summed.

For example, if a student has an average of 90% in Homework/Projects/Labs/Discussions, 70% in Tests, and 80% in Quizzes, the calculation would be as follows:

$$(90\% * 0.20) + (70\% * 0.50) + (80\% * 0.30) = 18\% + 35\% + 24\% = 77\%.$$

Therefore, the student's final grade for the quarter would be 77%.

Students sometimes find it confusing when they look in the gradebook to see they scored well on numerous homework assignments which are graded more for attempt than accuracy, but not as well on tests or quizzes, leading to a discrepancy between their expectations and their actual grades.

This confusion often arises because there are more homework grades in the grade book, which may give the impression that homework has a larger impact on the overall grade than it actually does. However, since tests and quizzes are weighted more heavily (50% and 30% respectively), even a

few lower scores in these categories can significantly affect the final grade. Understanding the percentage-based grading system helps students recognize the importance of excelling across all types of assessments to achieve their desired overall grade.

### **Mrs. Sirk's Classroom Rules:**

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1. **No Disruptive Behaviors** - Please avoid disruptive talking during lectures, assignments, etc. If you have a question, raise your hand. Please do not get up during an active lecture to throw things away, sharpen pencils, ask to use the restroom, ect. I welcome communication and questions and want you to feel comfortable and participate, but we do need to create an effective learning environment for ALL students.
2. **No Food or Drinks** - Do not bring food or beverages into class. Water is permitted with a lid.
3. **Only Use Electronic Devices with Permission** - Keep your cell phones away during the class period. If a cell phone is being used in ANY fashion without my prior permission, I will take it and the student can pick the phone back up after school upon completion of their after school detention with Mrs. Sirk (15 minutes). If the student refuses to turn in their phone, they will be asked to leave the classroom and will not be permitted to return until the issue is resolved with administration.
4. **Earbuds Out of Ears** - It's disrespectful to have your earbuds in your ears when someone is speaking or presenting (even if you're not listening to music). The same protocol will be followed with earbuds as cell phones.
5. **Feet on The Floor** - Please refrain from putting your feet on the tables/desks.
6. **Keep Your Area Clean** - Please do not leave anything (papers, old pencils, etc.) on the floor when you leave.
7. **Remain in Your Assigned Seats** - Stay in your assigned seat during the class period. You are dismissed from your seat only once the bell rings.
8. **Keep Your Table / Desk Orderly** - Make sure you get a textbook from the cart when needed and return it neatly when finished. Please keep your backpacks in your locker per school policy.
9. **Turn in Assignments and Books Neatly** - When books are returned to the shelf, make sure they are stacked neatly upright and in order. Assignments are to be turned in on the front table in a neat stack.
10. **Be On Time** - Tardies will be recorded unless the student comes in with a tardy (pink) pass from another teacher or administration. If you are more than 10 minutes late to class it will result in an absence for that period. If the student has been marked absent and

attendance has been submitted before the student has entered the classroom, it is the students responsibility to speak with Mrs. Sirk directly after that class period to resolve the issue.

11. **If You Miss Class** - If you are absent, check Mrs. Sirk's website. It is your responsibility to make up what you have missed. I will not come to you with your missing work. One day absent allows you one extra day to complete missing work. For example, if you miss Monday, your Monday assignment will be due on Wednesday at the beginning of class. If you miss Thursday and Friday, your Thursday and Friday assignments will be due by Wednesday at the beginning of class. You will be responsible for copying missing notes from another classmate.

12. **Keep Track of Due Dates** - If you miss assignments, fail to complete research papers, forget about test dates, etc. you will struggle to succeed in this class. You are the only one responsible for achieving success. I do not pass or fail you. You do. Please record and keep track of due dates and be responsible for completing tasks on time. Late work is not accepted.

13. **Communicate** - If you have any concerns or worries, please talk with me. If you do not understand the material, ask for assistance. If you are having problems outside of the classroom and it is preventing you from succeeding, please let me know. I am available to help before or after school by appointment.

14. **Smartpass** - Use Smartpass if you need to leave the room. Only one student at a time. No passes are allowed the first 10 minutes of class per school policy.

15. **Cheating** - Cheating of any kind will not be tolerated within the classroom. Cheating or suspected cheating will result in a zero on that assignment or assessment.

### **Failing to Adhere to Mrs. Sirk's Classroom Rules:**

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Failing to adhere to Mrs. Sirk's classroom rules will result in the following protocol:

All classroom rules and expectations will be discussed with students at the beginning of the year, so every student is aware of the expectations/consequences that will follow if they fail to adhere to the classroom rules. These expectations/consequences will also have been outlined in a classroom assignment students will have completed along with signatures from each student acknowledging their understanding of the expectations/consequences that will be placed in their student file.

Students will be addressed individually with a concern if Mrs. Sirk feels they have not followed the classroom rules. Students will be treated respectfully as young adults at all times. All discipline within the classroom will be documented within the students classroom file if needed to refer back to at any time.

*First Offense:* A before or after school detention with Mrs. Sirk.

*Second Offense:* A parent phone call or meeting with the student & Mrs. Sirk along with an after school detention.

*Third Offense:* Meeting with administration to determine forward movement in the class. The student will not be allowed to return to class until the meeting has taken place.

### **Lab Safety in the Classroom:**

I like to think that the Chemistry experience is supposed to be fun and humor is an essential part of the classroom environment. However, there is a certain element of "potential danger" with chemicals and sharp instruments used in the lab (please see Lab Safety Contract). Therefore, a NO TOLERANCE policy will be observed for behavior problems or safety issues. Behavior problems will first be discussed individually with each student. Students will be treated respectfully as young adults. First-time offenders may be put on lab clean-up duty before or after school. Continued problems would involve conferences with parents, the student, and administrators, and could result in a possible removal from the class. A safe learning environment will be preserved for all students at all times. Safety contracts will be collected and kept on file before students may conduct labs.

### **Tips For Success:**

- Show Up On Time to Class EVERYDAY. Tardies & absences contribute to lost learning experiences that cannot be recovered just by making up assignments.
- Bring All Necessary Materials to Class EVERYDAY. Be prepared to take an active part in teaching and learning.
- Complete & Turn in Assignments Regularly and on Time on Given Due Dates.
- Study Hard and Work Well With Others. Expect to read a minimum of 45 minutes per night. See HW Rubric!
- Keep Up From the Get-Go; It Is Nearly Impossible to Get Out of a Hole Later On.
- Missed Work or Assessments Due to Absence are the Responsibility of the STUDENT. Make-up times can be arranged before or after school.

### ***STUDY TECHNIQUES:***

The most common problem students have is that their study skills are not adequate for high school level classes. Studying for classes involves more than just "cramming the night before a test." Chapter Reviews are provided at the end of each chapter and study resources are posted on Google Classroom & Mrs. Sirks website for each section studied. The

following suggestions are listed to help improve your grade in Anatomy and Physiology and other high school courses.

1. Prepare to participate in class before class begins by reading over your notes you have previously written and also read over the sections of your text that will be covered prior that day's scheduled lecture/activity.
2. Use your vocabulary list consistently as you work through each section.
3. Complete all worksheets, study questions, labs, reading assignments, and activities, etc.
4. Keep your handouts, lecture notes, and study questions organized in your three ring binder.
5. Always read assigned material and outline all the main ideas for each section.
6. Pay attention and actively participate in class.
7. Study frequently and consistently in small doses.
8. Closely study figures, sidebars, and diagrams from lecture and from your text.
9. If you are having trouble with the material, get help early. Do not wait until the day before test day!

I am looking forward to an exciting year! Best of luck and may we learn a lot from each other.

Sincerely, Mrs. Sirk