

Chemistry Honors 2026 - 2027

Move Up Day Information

Mrs. Ameres - eameres@westex.org

Welcome to Honors Chemistry. This will be one of the most challenging, rewarding courses you take sophomore year. It is your first introduction to analytical science and you'll use math to learn how the world works at a microscopic level. This course serves as a **Pre-AP** course as half of the AP Chemistry curriculum will be covered in this class. Those who excel in this course are highly motivated, incredibly organized, and have the ability to think deeply and critically about topics and make connections between topics. This course will challenge your ability to understand *why* things happen, not just how.

Class Expectations

Successful students ...

- solve complex problems independently
- have very strong algebraic skills and are expected to have deep understanding of ratios, proportions, scientific notation, multistep calculations, equation manipulation, and variable substitution
- think critically instead of memorizing how to solve problems
- stay organized and meet deadlines for the assignments, readings, formal lab reports, and assessments (extensions are not provided and deadlines are strictly enforced)
- are highly motivated to advocate for help when needed and attend extra help sessions regularly
- are self-disciplined to study material independently and complete work when absent
- have good analytical research and writing skills as formal lab reports will be written each marking period
- have good analytical skills, can interpret graphical data, evaluate relationships and patterns, evaluate error, and explain reasoning using evidence
- learn from mistakes and keep pushing forward
- care more about understanding the material rather than receiving a particular letter grade on an assessment
- realize productive struggle is the key to deep understanding and success in the course

Course Topics

- Unit 1: Introduction to Chemistry
- Unit 2: Properties of Matter and the Periodic Table
- Unit 3: Mass Relationships in Chemical Reactions
- Unit 4: Gases
- Unit 5: Quantum Theory and Electron Arrangement
- Unit 6: Chemical Bonding and Intermolecular Forces
- Unit 7: Acids and Bases
- Unit 8: Thermochemistry, Chemical Kinetics, and Chemical Equilibrium

Lab Work

Students complete between 12 and 15 lab activities throughout the year, including 4 formal lab reports (ranging anywhere from 5 to 8 pages in length). These formal lab reports will be your first time writing from an analytical perspective. Strong research and writing skills are mandatory, as well as working knowledge of APA formatting for citations and paraphrasing. Please note - the use of AI will not be accepted on any writing assignments in this class, and issues of usage will result in a zero for the written work. In chemistry, providing support for your position requires evidence from the labs completed and data collected.

Honors Chemistry Optional Summer Assessment

Students are expected to have a **full grasp** of the following concepts upon entering class in the fall. Past experience has shown that those students who are strong in these skill sets and possess solid self-study skills, tend to do well with the Honors Chemistry curriculum and pacing. While this packet is optional, it is **highly recommended** that you complete it as very little time will be spent on this material in the fall. Students who are serious about the honors curriculum make every effort to complete additional assignments, when offered, and early practice with these topics may help with the difficulty of the course in the fall.

Prior Knowledge Topics:

- Measurement uncertainty and significant figures
- Variable manipulation and algebraic skills
- Dimensional analysis
- Scientific notation
- Density

A. Scientific Notation and Variable Manipulation

- Scientific notation is regularly used in chemistry as our world deals with quantities that are very small or very large. Knowledge of exponents is a must, as well as the ability to change numbers back and forth between scientific notation and standard notation.
- Good algebraic skills are a necessity in chemistry. We use algebra every single day to solve complex problems. Knowledge of and ability to manipulate variables and perform variable substitution are mandatory.

**** How to input scientific notation on your calculator****

Make sure that the number in scientific notation is put into your calculator correctly. We will use this format for the entire year. We will NOT use the carrot (^) you may be used to when typing exponents.

Example: write 5.5×10^5

1. Type the number 5.5 into your calculator.
2. Hit the **second** button and then **EE**. (EE represents $\times 10^{\wedge}$)
3. Enter the exponent number, 5.
4. Your number should look like this on your graphing calculator : 5.5E5 which reads as “five point five times ten to the fifth power”

Practice Problems:

1. Convert the following numbers into scientific notation or standard notation.

$$1000 \times 10^3$$

$$234,556$$

$$2.2 \times 10^{-4}$$

$$.000467$$

2. Complete the following algebraic operations to solve for the unknown variable.

$$2b = 6 (22-3b)$$

$$32T = 62 (2x-4)$$

$$12w + 2 = 11w - 6$$

$$44x + 95 = 3 (15-2y)$$

$$\frac{1}{4}(x+1) = 9$$

$$\frac{3}{4}(25) = \frac{1}{5}s$$

B. Conversions

- Conversions, or dimensional analysis, is paramount to your understanding of chemistry.

Simple Conversions

- We will set up conversions using the factor label method of dimensional analysis. See example below.

Ex. How many days are in 2 weeks?

$$2 \text{ weeks} \times (7 \text{ days} / 1 \text{ week}) = 14 \text{ days}$$

Ex. How many seconds are in 2 minutes?

$$2 \text{ minutes} \times (60 \text{ seconds} / 1 \text{ minute}) = 120 \text{ seconds}$$

Practice Problems:

1. How many hours are in one year?
2. How many inches are in 2 feet?
3. How many seconds are in 14 weeks?
4. How many days are in 25 years?

Metric System - Conversions

Scientists generally work in metric units (see SI Chart to the right). The chart can be read using factors or numerical values, the choice is yours. The fundamental units of measurement include liters, meters, grams, and seconds. The chart should be read as follows:

- Ex. 1 kilometer = 1000 meters OR 1 kilometer = 10^3 meters
- Ex. 1 millisecond = .001 seconds OR 1 millisecond = 10^{-3} seconds

SI Prefixes

Factor	Name	Symbol	Numerical Value
10^{12}	tera	T	1 000 000 000 000
10^9	giga	G	1 000 000 000
10^6	mega	M	1 000 000
10^3	kilo	k	1 000
10^2	hecto	h	100
10^1	deka	da	10
10^{-1}	deci	d	0.1
10^{-2}	centi	c	0.01
10^{-3}	milli	m	0.001
10^{-6}	micro	μ	0.000 001
10^{-9}	nano	n	0.000 000 001
10^{-12}	pico	p	0.000 000 000 001

Write the following equivalences using the SI chart (using factors or numerical values).

- | | |
|-------------------------------|-------------------------------|
| 1 terasecond = _____ seconds | 1 decigram = _____ grams |
| 1 gigameter = _____ meters | 1 centiliter = _____ liters |
| 1 megaliters = _____ liters | 1 millisecond = _____ seconds |
| 1 kilogram = _____ grams | 1 micrometer = _____ meters |
| 1 hectosecond = _____ seconds | 1 nanogram = _____ grams |
| 1 dekameter = _____ meters | 1 picometer = _____ meters |

Write the symbols for the following units.

- | | | | |
|---------|---------|--------|---------|
| tera = | deci = | giga = | centi = |
| mega = | milli = | kilo = | micro = |
| hecto = | nano = | deka = | pico = |

Practice Problems:

1. How many Mg are in 235g?
2. How many L are in 556mL?
3. How many ps are in 1,455ds?
4. How many km are in 3,255nm?

C. Density

Density is a characteristic property used in chemistry to help identify objects. The equation for density is below and the units are some form of mass per volume. Complete the problems below.

$$D = \text{mass} / \text{volume}$$

1. A copper penny has a mass of 12.9g and a volume of 0.25cm^3 . What is the density of copper in mg/cm^3 ?
2. A $6.8 \times 10^2\text{g}$ bar of gold is cut into 3 equal pieces. How does the density of each piece compare to the density of the original gold bar?

3. A shiny chunk of metal is found to have a mass of 37.28 grams. The metal is dropped into a graduated cylinder that contains 20.0mL of water. The volume of the cylinder rises to 34.0mL. Determine the density of the metal and identify it using the table to the right.

4. Using the table to the right, calculate the mass of a 17.4mL piece of styrofoam.

Substance	Density
Gold	19.3 g/mL
Mercury	13.6 g/mL
Copper	8.96 g/mL
Aluminum	2.70 g/mL
Water	1.00 g/mL
Styrofoam	0.145 g/mL
Air	1.18 g/L
Helium	0.163 g/L