

Part 1: Textbooks

You must have a copy of the textbook for this class to show the instructor on the first day, or you will be dropped from the class. The textbook is the following. Get this exact edition, not an older edition.

Brown, LeMay, Bursten, Murphy, and Woodward, *AP Edition: Chemistry, The Central Science, 14th Edition* (2018). ISBN 978-0-13-465095-1. \$182 from Savvas.

There are two other books that you will need this year. They connect the chemistry that we will learn with events in the outside world. They are both inexpensive paperbacks and you should have them by the beginning of the year too.

Levi, *The Periodic Table* (1984 translation). Schocken Books. ISBN 0-8052-1041-5.

Sacks, *Uncle Tungsten* (2001). Vintage Books. ISBN 978-0-375-70404-8.

You will also need a laboratory notebook. For this class, purchase a Hayden-McNeil spiral-bound chemistry student lab notebook, ISBN 978-1-930882-74-4.

Part 2: Preassessment of Chemistry Knowledge

Do these problems on separate paper. Copy down the problems and then show all your work.

This set of questions is meant to find out how much chemistry you remember from your previous science classes. We will be going over all of these concepts this year. Answer every question that you can. If there are any questions that you cannot answer, put an X to indicate “I am quite sure that this has never been taught in any of my classes” and a Y to indicate “I remember learning about this, but have forgotten the details.”

1. What are three observations that indicate that a chemical change is taking place?
2. Two of the three subatomic particles that atoms are made of weigh about the same and are located in the same place in the atom. The third is different in both ways. Which is which?
3. What are the two types of bonding that hold atoms together to make molecules?

4. What are the three states of matter? Which ones count as condensed phases and which ones count as fluids?

5. Two atoms that have the same number of protons but different numbers of neutrons are called what?

6. An atom or molecule that has different numbers of protons and electrons is called what?

7. For any element in the periodic table, the elements that have the most similar chemical behavior can be found next to it in which directions?

8. When the equation $\text{Fe}_2\text{O}_4 + \text{Al} \rightarrow \text{Al}_2\text{O}_3 + \text{Fe}$ is correctly balanced, what is the coefficient of Fe?

9. Give the chemical symbol of an element that is

- a) a solid
- b) a liquid
- c) a gas
- d) a metal
- e) a semimetal
- f) a nonmetal

10. What are the four types of orbitals that electrons occupy?

11. The valence electrons are the ones occupying which type(s) of orbitals?

12. The type of bonding that two elements will adopt is determined by which property of the elements?
13. List two of the most significant greenhouse gases causing climate change.
14. What shape does a water molecule have, and why?
15. How many significant figures are there in the number 0.0788600?
16. How many objects are there in a mole of objects?
17. The critical mass of pure uranium-235 required for a nuclear explosion is 15 Kg. How many moles is that?
18. What is the empirical formula of glucose, whose molecular formula is $C_6H_{12}O_6$?
19. What happens to the volume of a gas if (a) the pressure and (b) the temperature is increased?
20. What is an acid?

21. If you want to speed up a chemical reaction, what are three things you can do?

22. Chemical reactions happen spontaneously in order to increase what property?

23. What are the two most common particles given off in radioactive decay, and what are they made of?

24. Organic compounds have which two elements in them?

25. Atoms bond with other atoms in order to achieve what?