

A.P. Chemistry 2019-20

~ Mr. Jackson ~

Course Description:

This AP Chemistry course is designed to be the equivalent of the general chemistry course usually taken during the first year of college. The AP Chemistry course is designed to be taken only after the successful completion of a first course in high school chemistry. For most students, the course enables them to undertake, as a freshman, second year work in the chemistry sequence at their institution or to register in courses in other fields where general chemistry is a prerequisite. This course is structured around the six big ideas articulated in the AP Chemistry curriculum framework provided by the College Board. Special emphasis will be placed on the seven science practices, which capture important aspects of the work that scientists engage in, with learning objectives that combine content with inquiry and reasoning skills. AP Chemistry is open to all students that have completed a year of Pre AP-Chemistry who wish to take part in a rigorous and academically challenging course.

Textbook:

Since this is an advanced placement class students are required to purchase their own textbook for this class. For the 2019-20 school year we will most likely be using the book, "Edvantage Science AP Chemistry 2". I like this text book because it also serves as a workbook for us as well. I say we will most likely use the textbook, because AP Chemistry is being adjusted for next year by College Board, and I have not seen the new version of the Edvantage text book. I do not expect there to be any significant changes made by College Board. Rather it seems that they are moving away from the "6 Big Ideas" and moving towards more unit based topics, as it taught at most universities. We will order the text books once we get back to school next fall. DO NOT go out and buy this on your own as we get a version made specifically for Thompson Valley High School. This year the Edvantage book only ran around \$30.00 and I do not anticipate a large increase this year.

In addition to the required text book I also recommend that you purchase the following book to help you be successful in class and to prepare for the AP Chemistry Exam.

Cracking the AP Chemistry Exam, The Princeton Review - The 2019 edition should be out by August.

- ISBN-13: 978-1101919873 (for the 2017 version)

A few other supply requirements for the class are as follows:

- 3 ring binder (at least 1 $\frac{1}{2}$ "- for use for THIS CLASS ONLY
- Page dividers with tabs
- Calculator (the one you already use if fine)
- Composition notebook (not spiral bound notebook)

Summer Assignment:

A.P. Chemistry is a continuation and extension of the material that you learned in Pre-AP chemistry. For this reason, it is important that you come back to school feeling confident on everything that was covered during the Pre-AP chemistry class. I suggest that you set aside some time during the summer to review the material from Pre-AP chemistry. In addition, I am assigning one additional homework assignment for the summer:

Memorize the polyatomic ion chart that we use in class. I have attached a copy for you. You will have a quiz over this material the second week of school

Please feel free to contact me if you have any additional questions (jason.jackson@thompsonschoold.org).

Have a GREAT Summer! See you soon

Mr. J



Tips for Learning Polyatomic Ions

A **polyatomic ion** is a charged chemical species (**ion**) composed of two or more atoms covalently bonded or of a metal complex that can be considered to be acting as a single unit. These ions must be memorized for the AP Chemistry exam as they will not be provided for you. While this may seem like a big task there are a number of patterns that can greatly reduce the amount of memorizing that one must do.

1. “**ate**” anions have one more oxygen than the “ite” ion, but the same charge. If you memorize the “ate” ions, then you should be able to derive the formula for the “ite” ion and vice-versa.

a. sulfate is SO_4^{2-} , so sulfite has the same charge but one less oxygen (SO_3^{2-})

b. nitrate is NO_3^- , so nitrite has the same charge but one less oxygen (NO_2^-)

2. If you know that a sulfate ion is SO_4^{2-} then to get the formula for **hydrogen** sulfate ion, you add a hydrogen ion to the front of the formula. Since a hydrogen ion has a 1+ charge, the net charge on the new ion is less negative by one.

a. Example:



3. Learn the hypochlorite \rightarrow chlorite \rightarrow chlorate \rightarrow perchlorate series, and you also know the series containing iodite/iodate as well as bromite/bromate.

a. The relationship between the “ite” and “ate” ion is predictable, as always. Learn one and you know the other.

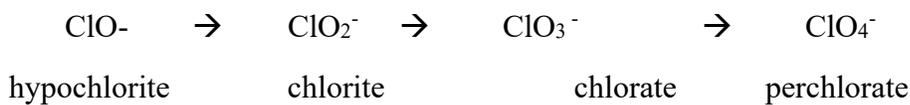
b. The prefix “**hypo**” means “under” or “too little” (think “hypodermic”, “hypothermic” or “hypoglycemia”)

1) Hypochlorite is “under” chlorite, meaning it has one less oxygen.

c. The prefix “**hyper**” means “above” or “too much” (think “hyperkinetic”)

1) The prefix “per” is derived from “hyper” so perchlorate (hyperchlorate) has one more oxygen than chlorate.

d. Notice how this sequence increases in oxygen while retaining the same charge:



Polyatomic Ions

$C_2H_3O_2^-$	Acetate
BO_3^{3-}	Borate
BrO_3^-	Bromate
BrO_2^-	Bromite
CO_3^{2-}	Carbonate
ClO_3^-	Chlorate
ClO_2^-	Chlorite
CrO_4^{2-}	Chromate
CN^-	Cyanide
$Cr_2O_7^{2-}$	Dichromate
$H_2PO_4^-$	Dihydrogen phosphate
HCO_3^-	Hydrogen carbonate
HPO_4^{2-}	Hydrogen phosphate
HSO_4^-	Hydrogen sulfate (bisulfate)
HSO_3^{1-}	Hydrogen sulfite
OH^-	Hydroxide
BrO^-	HypoBromite
ClO^-	Hypochlorite
HIO^-	Hypoiodite
IO_3^-	Iodate
IO_2^-	Iodite
NO_3^-	Nitrate
NO_2^-	Nitrite
$C_2O_4^{2-}$	Oxalate
BrO_4^-	Perbromate
ClO_4^-	Perchlorate
MnO_4^-	Permanganate
O_2^{2-}	Peroxide
PO_4^{3-}	Phosphate
PO_3^{3-}	Phosphite
SiO_3^{2-}	Silicate
SO_4^{2-}	Sulfate
SO_3^{2-}	Sulfite
SCN^-	Thiocyanate
$S_2O_3^{2-}$	Thiosulfate
NH_4^+	Ammonium