

Dr. Rider's Laboratory at Voyagers

Chemistry

Mondays 1:00-2:30

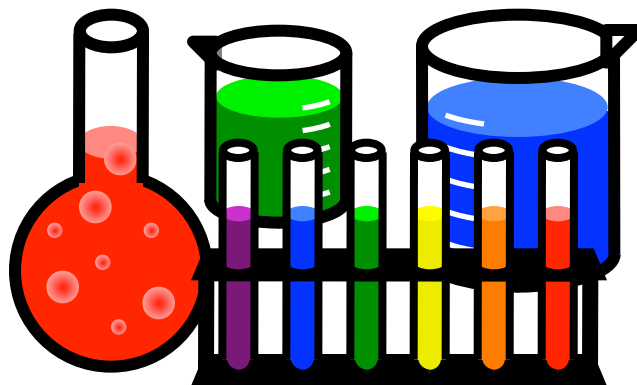
Spring 2019

\$390 members/\$440 nonmembers

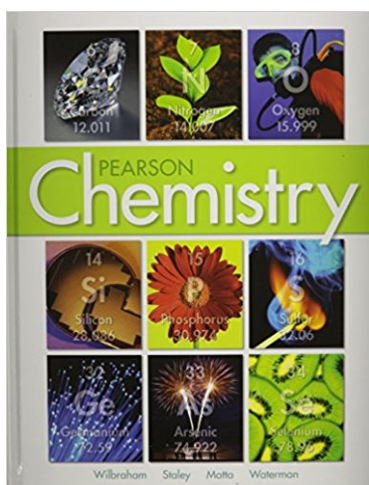
Chelmsford, MA

voyagersinc.org

Dr. Todd H. Rider, thor@riderinstitute.org



This course will cover chemistry and its practical applications. **No prior knowledge is required—new students are very welcome to join.** Each class will have short lectures but will mainly focus on hands-on lab activities using centrifuges, balances, spectrometers, Geiger counters, and other professional laboratory equipment. It is recommended (though not required) that students buy a chemistry textbook for supplementary readings during each week. Students can use **either** Wilbraham's *Chemistry* **or** Brown and LeMay's *Chemistry: The Central Science*:



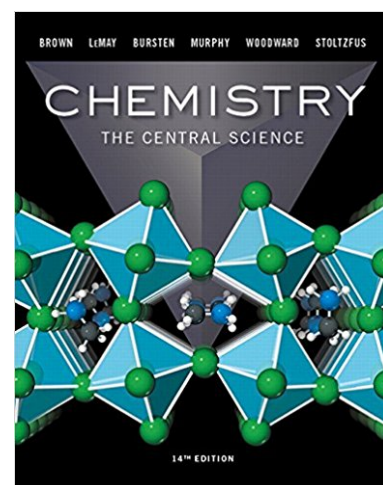
For younger/less
experienced students:

Pearson
edition (2012)
or
Prentice Hall
edition (2008)
or
Addison Wesley
edition (2001)

For older/more
experienced students:

14th ed. (2017)
or
13th ed. (2014)
or
12th ed. (2012)

OR



Date	Topic	Brown & LeMay or Wilbraham	
1/28	Properties of solutions	Ch. 13	Solutions
2/4	Chemical kinetics	Ch. 14	Reaction Rates and Equilibrium
2/11	Chemical equilibrium	Ch. 15	Reaction Rates and Equilibrium
2/18	<i>[No class—school vacation week]</i>		
2/25	Acids and bases	Ch. 16	Acids and Bases and Salts
3/4	Aqueous equilibria	Ch. 17	Acids and Bases and Salts
3/11	Environmental chemistry	Ch. 18	Oxidation-Reduction Reactions
3/18	Chemical thermodynamics	Ch. 19	Oxidation-Reduction Reactions
3/25	Electrochemistry	Ch. 20	Electrochemistry
4/1	Nuclear chemistry	Ch. 21	Nuclear Chemistry
4/8	Chemistry of nonmetals	Ch. 22	Hydrocarbon Compounds
4/15	<i>[No class—school vacation week]</i>		
4/22	Chemistry of metals	Ch. 23	Functional Groups and Organic Reactions
4/29	Organic chemistry	Ch. 24	Chemistry of Life
5/6	<i>[No class—available for makeup if necessary]</i>		

Note: Chapter numbers differ among different editions of Wilbraham, so the right column lists them by their topics, not their numbers. Chapter numbers can also vary in some editions of Brown & LeMay, so always verify that the chapter's topic matches the intended topic.

New textbooks are insanely expensive, but more affordable used copies are available from online dealers at amazon.com, abebooks.com, etc. Students can also save money (without losing much scientific content) by buying an edition that is recent but not the very latest edition. Dr. Rider will bring copies of the textbooks to the first class if you would like to examine them before deciding which one to order. He can suggest free information sources online for those who prefer not to buy a book.

Students are encouraged to pursue their own independent studies or science fair projects outside of the course. Dr. Rider is happy to offer suggestions or advice. Some useful books on setting up a home lab are:

Raymond E. Barrett & Windell H. Oskay, *The Annotated Build-It-Yourself Science Laboratory* (2015)

Robert Bruce Thompson, *Illustrated Guide to Home Chemistry Experiments* (2008)

Robert Bruce Thompson, *Illustrated Guide to Home Forensic Science Experiments* (2012)

Good sources of supplies for setting up a home lab are:

www.homesciencetools.com (Wide range of supplies; ignore the creationist books)

Thames & Kosmos Chem C3000 chemistry kit (Search online to find the best price)

Information on upcoming science fairs and previous winning projects is available at:

www.societyforscience.org

About the instructor:

Dr. Todd H. Rider received his Ph.D. from MIT, and his research has been featured in magazines ranging from *Science* to *Time* and on TV programs from NBC's Nightly News to BBC's Horizon. In biology research, he invented and developed the CANARY sensor, which uses genetically engineered white blood cells to rapidly identify bacteria, viruses, and other pathogens. Dr. Rider also invented the DRACO broad-spectrum antiviral therapeutics and demonstrated that they are safe and effective against 18 different viruses in cells and 4 viruses in mice. In physics research, he discovered fundamental physical limitations on nuclear fusion reactors, analyzed antimatter rocket engines, and demonstrated methods to combine numerous laser beams to form more powerful laser beams. He created the K-12 Science on Saturday program at MIT and has over 25 years of experience teaching biology, chemistry, physics, earth science, engineering, and archaeology courses to students at all levels. He is currently working on his plan for world domination.

