

LABORATORY SCHEDULE
General Chemistry 110, Lycoming College, Fall 2014

Date	Experiment (points)	Prelab lecture / Lab Quiz, What's Due	
Aug. 26, 28	Orientation, Check in, Sig Figs lecture, Brief Experiment on Scientific Method	Meet for Prelab in G40 , Significant Figures lecture Lab Deposit, have safety glasses, get key	
Sept. 2, 4	The Measurement of Mass and Volume: Density of Liquids and Solids (40 pts)	Meet for Prelab in the lab (normal procedure) <i>Leave lab:</i> Density data sheets	
Sept. 9, 11	The Separation of a Mixture (40 pts)	<i>Start of lab:</i> Density lab report <i>Leave lab:</i> Separation data sheets	
Sept. 16, 18	Qualitative Organic Analysis (Four week Expt.) QOA Week 1: Distillation and Measurement of the Boiling Point (BP) of the Solvent	Meet for Prelab in G40 <i>Leave lab:</i> Distillation data sheets	
Sept. 23, 25	QOA Week 2: Freezing Point (FP), Density , and Infrared (IR) Spectrum of the Solvent (40 pts) (one report for weeks 1 and 2)	Meet for Prelab in G40 <i>Start of lab:</i> Separation lab report <i>Leave lab:</i> FP, Density & IR data sheets	
Sept. 30, Oct. 2	QOA Week 3: Recrystallization of the Solute	Meet for LAB QUIZ ONE in G40 <i>Start of lab:</i> Solvent Identity lab report (weeks 1, 2) <i>Leave lab:</i> Recrystallization data sheets	
Oct. 7, 9	QOA Week 4: Melting Point (MP), Gas Chromatography (GC), and IR Spectroscopy of the Solute (40 pts) (one report for weeks 3 and 4)	Meet for Prelab in G40 <i>Leave lab:</i> MP GC IR data sheets	
Oct. 14, 16	Synthesis of Alum (Potassium Aluminum Sulfate) from Aluminum Scrap (40 pts)	<i>Start of lab:</i> Solute Identity lab report (weeks 3, 4) <i>Leave lab:</i> Alum data sheets	
Oct. 21, 23	Finish Alum lab, Analysis of Glucose in Sports Drinks (40 pts)	<i>Leave lab:</i> Alum, Glucose data sheets	
Oct. 28, 30	New Experiment (40 pts) Procedure will be provided, as needed.	Meet for LAB QUIZ TWO in G40 <i>Start of lab:</i> Alum and Glucose lab reports <i>Leave lab:</i> New Experiment data sheets	
Nov. 4, 6	Atomic Weight of a Metal (40 pts)	<i>Start of lab:</i> New lab report <i>Leave lab:</i> Atomic Weight data sheets	
Nov. 11, 13	Calorimetry , ΔH , and Hess' Law (40 pts)	<i>Start of lab:</i> Atomic Weight lab reports <i>Leave lab:</i> Calorimetry data sheets	
Nov. 18, 20	The Nine Bottle Problem (40 pts)	<i>Start of lab:</i> Calorimetry lab report	
Nov. 25, 27	THANKSGIVING – NO LAB		
Dec. 2, 4	Checkout	Meet for LAB QUIZ THREE in G40 <i>Start of lab:</i> Nine Bottle conclusions and net ionics <i>Leave lab:</i> Turn in key, get deposit back	
Lab Instructor	Responsibilities	Office Number, phone	Email Address
Dr. Charles Mahler	Lab Sections M, N, R	202 Heim, (570) 321-4351	mahler@lycoming.edu
Dr. Chriss McDonald	Lab Section Q	233 Heim, (570) 321-4186	mcdonald@lycoming.edu

Pre-lab lectures will be held in Heim G40 for the following topics and weeks: Significant figures and Introduction to Lab (Aug. 26 and 28); Organic molecular structure, functional groups, and distillation (September 16 and 18); Organic functional groups and Infrared (IR) spectroscopy (Sept. 23 and 25); Melting points (MP) and Gas Chromatography (GC) (Oct. 7 and 9).

Lab Quizzes will be held at the start of lab in Heim G40 on: September 30 and October 2; October 28 and 30; November 18 and 20. The three lab quizzes are worth 20 points each, for a total of 60 points.

Lab Performance is worth 20 points, and will be evaluated according to the Lab Performance Matrix, printed on the inside back cover of the lab manual.

General Chemistry 110 Laboratory Make-up Policy:

Only absences where the instructor is notified ahead of time will be excused and a make-up permitted. All requests to make up a lab or attend a section other than your normal lab can only occur after consultation with the instructor. Lab make-ups must be scheduled by the end of the week that the lab is missed and must be completed by the end of the following week. Students who simply show up at a different lab section will not be admitted to that lab.

Lab make-ups are almost always held in another scheduled lab section, either the same week as the absence (preferred), or the next scheduled week after. The General Chemistry lab sections each week are on Tuesday and Thursday mornings (8:45 to 11:35 AM), and on Tuesday and Thursday afternoons (2:00 to 4:50 PM).

Rules for lab make-ups and late lab reports

- 1) It is the student's responsibility to contact the lab coordinator (Dr. Charles Mahler, (570) 321-4351, mahler@lycoming.edu) before the absence, and arrange for a lab make-up as soon as possible.
- 2) Anything due in the missed lab (i.e. lab report) must be handed in to a Chemistry professor at the make-up lab or by 5 PM on Monday of the next week, whichever is earlier.
- 3) Lab reports from make-up labs are due before any graded lab reports for that lab are handed back. A lab report due date will be given to the student by the professor for each absence.
- 4) Late lab reports will be penalized 10% per school day, and are not accepted more than one week late.

Points in General Chemistry 110 Laboratory and the overall course grade:

The **overall lab grade** is calculated based on a total of 480 points possible, from ten labs (at 40 points each), three lab quizzes (at 20 points each), and lab performance (20 points). The total is converted into a percentage, which is used to find the number of points from lab in the overall Chemistry 110 grade.

Example: A student earned 408 lab points out of 480 possible lab points, or 85.0%. In Chemistry 110, the lab is worth 115 course points out of a possible 665, so 85.0% of 115 is 97.75 course points (out of a possible 115). Please be aware that a point in lab is NOT the same as a point in the overall course.

Material covered on General Chemistry 110 Laboratory Quizzes:

Subject matter which may be included on the quizzes includes the following (with a few examples from the first few weeks of lab after each – this is not an inclusive list):

- calculations associated with the Chemistry 110 laboratory (i.e. density calculation or significant figures),
- operation of lab equipment and basic techniques (how to: read a graduated cylinder or do a filtration)
- “big picture stuff”
- names and formulas (please see the list of these, below). Note flash cards help (name on one side, abbreviation or formula on the other).;

For names and formulas, here is what is fair game by lab quiz.

1. For the first quiz, know the names and abbreviations for the chemical elements given below (no periodic table available for this quiz, but will be available for the other two lab quizzes)
2. For the second quiz add common ions for these elements (i.e. Na^+ for sodium, F^- (fluoride) for fluorine)
3. For the third quiz add names and formulas for common polyatomic ions, and their neutral acids and bases (given below). Flash cards help (name on one side, abbreviation or formula on the other side).

General Chemistry 110 Laboratory Quizzes will be held at the start of lab in Heim G40 on the following dates: October 1 and 3; October 29 and 31; November 19 and 21, 2013. The three lab quizzes are worth 20 points each, for a total of 60 points.

Alkali metals or Group 1 (form +1 cations, i.e. sodium ion, Na^+)

Li Lithium, Na Sodium, K Potassium, Rb Rubidium, Cs Cesium

Alkaline Earth metals or Group 2 (form +2 cations, i.e. beryllium ion, Be^{2+})

Be Beryllium, Mg Magnesium, Ca Calcium, Sr Strontium, Ba Barium

All non-metals and metalloids (metalloids marked with *), including:

Noble gases or Group 18 (generally do not react or form stable ions)

He Helium, Ne Neon, Ar Argon, Kr Krypton, Xe Xenon

Halogens or Group 17 (form -1 anions, i.e. fluoride F^-)

F Fluorine, Cl Chlorine, Br Bromine, I Iodine

Oxygen Group or Chalcogens or Group 16 (form -2 anions, i.e. oxide, O^{2-})

O Oxygen, S Sulfur, Se Selenium, Te Tellurium*

Nitrogen Group or Pnictogens or Group 15

N Nitrogen, P Phosphorus, As Arsenic*, Sb Antimony*

Carbon Group or Group 14

C Carbon, Si Silicon*, Ge Germanium*, Pb Lead (a metal)

Group 13 (form +3 cations, i.e. aluminum ion, Al^{3+})

B Boron*, Al Aluminum (a metal)

Some Transition metals, including:

All Period 4 Transition metals

Sc Scandium, Ti Titanium, V Vanadium, Cr Chromium, Mn Manganese,
Fe Iron, Co Cobalt, Ni Nickel, Cu Copper, Zn Zinc

All Period 5 Transition metals

Y Yttrium, Zr Zirconium, Nb Niobium, Mo Molybdenum, Tc Technetium,
Ru Ruthenium, Rh Rhodium, Pd Palladium, Ag Silver, Cd Cadmium

Some Period 6 Transition metals

Pt Platinum, Au Gold, Hg Mercury

Common Polyatomic anions (and their most protonated or acid forms)

Acetate	$\text{C}_2\text{H}_3\text{O}_2^-$	(Acetic acid	$\text{HC}_2\text{H}_3\text{O}_2$)
Carbonate	CO_3^{2-}	(Carbonic acid	H_2CO_3)
Hydrogen carbonate (or bicarbonate)	HCO_3^-	(Carbonic acid	H_2CO_3)
Hydroxide	OH^-	(Water	H_2O)
Nitrite	NO_2^-	(Nitrous acid	HNO_2)
Nitrate	NO_3^-	(Nitric acid	HNO_3)
Phosphate	PO_4^{3-}	(Phosphoric acid	H_3PO_4)
Hydrogen phosphate	HPO_4^{2-}	(Phosphoric acid	H_3PO_4)
Dihydrogen phosphate	$\text{H}_2\text{PO}_4^{2-}$	(Phosphoric acid	H_3PO_4)
Hydrogen sulfite	HSO_3^-	(Sulfurous acid	H_2SO_3)
Sulfate	SO_4^{2-}	(Sulfuric acid	H_2SO_4)
Hydrogen sulfate (or bisulfate)	HSO_4^-	(Sulfuric acid	H_2SO_4)
Peroxide	O_2^{2-}	(Hydrogen peroxide	H_2O_2)
Pemanganate	MnO_4^-		
Chromate	CrO_4^{2-}		
Dichromate	$\text{Cr}_2\text{O}_7^{2-}$		
Cyanide	CN^-		

Common Polyatomic cations (and their deprotonated or basic forms)

Ammonium	NH_4^+	(Ammonia	NH_3)
Hydronium	H_3O^+	(Water	H_2O)